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Persisters and nonpersisters: Identifying the characteristics of who stays and who leaves from adult literacy interventions

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Abstract

Adult literacy programs are characterized by high attrition rates. Rigorous exploration of student persistence in adult reading classes is lacking. This study was an attempt to understand the profiles of adults who completed reading classes compared to a group of adults who made it to the midpoint and a group of adults who did not make it to the midpoint. Students were offered 100 hours of instruction. Of the 395 students who attended the first day of class, only 198 completed the program. Results indicated that English language status, age, some reading related skills, class assignment, avoidance of reading, previous adult education experience, and Women, Infants, and Children (WIC) benefit receipt variables significantly predicted persistence. The significance of some of these predictors varied based on analyzing midpoint completion or full completion. To further explore the characteristics of the sample, the most representative participants were selected from the group that did not make it to midpoint and from the group that completed the program. Results indicated that the most representative members of these two groups differed in English language status, gender, age, some reading related skills, and information access.

Keywords

Adult literacy; Persistence; Attendance

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Introduction

Approximately thirty million adults in the United States struggle with daily reading activities, such as reading a newspaper article or filling out a job application (Kutner et al., 2006). In addition to the personal costs of poor literacy skills, these statistics also have implications for intergenerational transmission of low literacy skills, job performance, international competiveness, increased medical costs, and participation in civic activities (e.g., Reder & Bynner, 2009). Federal, state, city, and community funds are used to cover the costs of adult basic education programs where many of these individuals receive instruction to help them improve their literacy skills. Although estimates for nonfederally funded programs are not available, approximately 2.4 million adults attend federally funded programs each year (U.S. Department of Education, 2010).

Unfortunately, adult basic education programs are plagued with high attrition rates (e.g., Miller, Esposito, & McCardle, 2011; Sabatini, Shore, Holtzman, & Scarborough, 2011), with researchers reporting a range of 38–54% attrition among programs (Alamprese, MacArthur, Price, & Knight, 2011; Hock & Mellard, 2011; Sabatini et al., 2011). Disengagement from learning is an issue for all age groups (e.g., Farrell, Peguero, Lindsey, & White, 1988) and for adult learners it often is exhibited through inconsistent attendance patterns. Unlike children, adults decide for themselves whether to attend educational programs and whether to persist (Comings, 2009). Aside from lack of engagement in learning, high attrition rates can be attributed to the difficulties many adults face trying to get to their classes (Greenberg, 2008).

Similar to the field of adult learning in general (Merriam, Caffarella, & Baumgartner, 2007), researchers who study adult literacy attrition issues often focus on the obstacles adults face while trying to access educational classes (e.g., Quigley, 1997; Ziegler, Bain, Bell, McCallum, & Brian, 2006). Obstacles often are characterized as situational (i.e., student-related issues, such as lack of childcare or transportation), institutional (i.e., program-related issues, such as scheduled class times), and dispositional (i.e., issues related to students' beliefs and feeling about learning, such as self-esteem). This current study was an attempt to redirect the focus from the obstacles to an understanding of the profiles of individuals who persist in reading classes versus those students who do not. Of specific interest is whether a predictive persistence model can be described for individuals who decide to enroll in a research-based reading intervention.

As with many areas within the field of adult literacy, rigorous research in the area of persistence is lacking. Our current knowledge is based on qualitative interviews and quantitative studies with small sample sizes and other methodological inconsistencies. For example, many studies have poorly defined descriptions of completion. Often students are divided into dichotomous groups of completers versus noncompleters, as opposed to more nuanced divisions of those who enrolled and did not continue, versus those who took a few classes, versus those who completed a specified length of stay. Additionally, persistence studies often look at individual variables, as opposed to combining the variables into a prediction model of persistence. This current study was an attempt to further our knowledge of persistence in adult basic education classes, while also improving upon some of the methodological issues from previous studies. Before turning to the specific goals of the current study, a brief overview of previous persistence studies will be described. Although intervention studies can include information regarding attrition (e.g., Alamprese, 2009; Alamprese et al., 2011), this literature review will highlight four studies similar to the focus of this study (i.e., studies that are substantively focused on persistence).

Dirkx and Jha (1994) retrospectively reviewed files of 2,323 students enrolled in adult literacy classes over a 2-year period, and they recorded the students' ages and entry-level math and reading scores on the Test of Adult Basic Education (TABE). They divided students into completers (these students had teacher notes in their files which indicated that they completed their educational goals; 28% of group); continuing students (still enrolled in the program while data were being collected; 12.1% of group); and noncontinuing students (students who left the program before their educational goals were attained; 59.9% of group). No significant differences among the groups were found when age was compared. However, significant differences were found in their math and reading scores, with the completing students possessing higher scores than the other groups of students. A prediction model, through discriminant analysis, was tested and indicated that 70% of the time completers were correctly identified, and 58% of the time continuing students were correctly identified. Their model could not successfully identify the noncontinuing students.

In perhaps one of the most cited persistence studies in the field of adult literacy, Comings, Parella, and Soricone (1999) interviewed 150 adults who read approximately between the 5th and 8th grade levels and were enrolled in adult literacy programs. Sixty- seven percent of the initial students were still enrolled four months later in their literacy programs. These students were labeled as persisters if, at the time of the second interview, they were still attending their adult literacy classes (n = 78), were attending a different adult literacy class (n = 9), or had attained their goal of preparation for the General Educational Development (GED) credential (n = 13). The interviewers asked students various questions, including those specific to their demographics and educational backgrounds. The researchers found that gender and employment status were not related to persistence; however, age, history of previous attendance in adult education classes, language status, and educational background of significant people in the students' childhood were related to persistence. Specifically, students were more likely to persist if they were over the age of 30, had been involved with adult education previously, and/or did not consider English their first language. In addition, students tended to persist if "significant adults in their childhood" were dropouts or if their educational backgrounds were unknown, compared to if the "significant adults" were high school graduates or more.

In a more recent study, Ziegler et al. (2006) collected background information and administered their in-house developed Adult Education Persistence Scale (AEPS) to 245 female adult struggling readers who read on average at the sixth grade level and who were offered the opportunity to attend literacy classes 20 hours a week during a 12-week period as part of a welfare reform initiative. The AEPS scale measured issues of self-efficacy, resilience, attitudes toward school, and attributions for academic failures. Persistence was defined in terms of the percentage of attended classes (M=39.33, SD = 30.18). They defined high attendees as attending 75% or more of the classes (n = 45) and low attendees as attending 25% or fewer of the classes (n = 97).

In their regression analyses, they found that the AEPS total score accounted for 10% of the variance of percentage attendance, followed by age, which accounted for 3.5% of the variance. Reading and math TABE scores, last grade completed, self-report of learning difficulty, ethnicity, number of dependents, accessibility to transportation, and level of family support did not account for variance in percentage of attendance. When they analyzed the data further, they found that the average age of the high attenders was 29 compared to the average age 25 of the low attenders, and that their scale correctly identified 69% of the high and low attendees. Although age and AEPS scores were the only variables that accounted for variability in percentage attendance, there were noteworthy (but not statistically significant) differences between the high-attendee and low-attendee groups. Compared to the low attendees, the high attendees had higher TABE scores, reported

learning difficulties, and had attended previous adult basic education classes. In a different direction, more low attendees reported repeating a grade as a child.

Finally, Sabatini et al. (2011) examined three different supplementary reading interventions for 300 adults reading below the 7th grade level. They compared the age and literacy skills of students who completed at least 10 sessions of instruction and all posttests to the skills of students who did not meet these criteria. They found that completers were on average older than the noncompleters (average age of completers = 42; average age of noncompleters = 35). When they examined the written and oral language skill profiles of the completers versus the noncompleters, they found a mixed pattern. The completers exhibited significantly lower baseline test results on the Test of Word Reading Efficiency (TOWRE) sight word reading test and the Woodcock Johnson (WJ) subtests of understanding directions, passage comprehension, word attack, and reading fluency. However, the two groups did not show significant differences on the TOWRE phonemic decoding or on the WJ oral comprehension and picture vocabulary subtests.

Findings from these studies are complicated to summarize because they differ in their definition of persistence, the method of categorizing students, and the variables tested. Comings et al. (1999) and Sabatini et al. (2011) found that persisters tended to be older than nonpersisters, while Dirkx and Jha (1994) did not. In addition, the studies showed diverse findings in terms of skills, which perhaps related to what was tested. For example, when TABE scores were used, skill-level differences were noted with students with higher scores persisting more (Dirkx & Jha, 1994; Ziegler et al., 2006). However, as Sabatini's study indicates, different tests can show varying differences in terms of persistence (e.g., some TOWRE and WJ subtest scores differentiated persisters from nonpersisters, but other subtests did not).

This study sought to further our understanding of the differences between persisters and nonpersisters in adult literacy classes. The impetus of this study was a follow-up to a reading intervention study (Greenberg et al., 2011) that focused on adults who read between the 3.0 and 5.9 single word grade equivalency levels. In that intervention study, students were randomly assigned to different instructional approaches and offered 100 hours of reading instruction spread over two-hour classes that were administered four days a week. Of the 395 students who attended the first day of class, only 198 students completed the program.

The studies described above indicate that the variables measured have included: demographics (age, ethnicity, and gender); skill level; economic hardship (employment and accessibility to transportation); educational history (previous attendance in adult education, last grade completed, language status, educational background of significant adults in their childhood, and self-report of learning difficulty); and psycho-social issues (self-efficacy and resilience). As part of the intervention study, Greenberg and her colleagues (2011) collected this type of information as well as: participants' exposure to print and the type of reading intervention class to which participants were randomly assigned. It was felt that these two variables might also impact persistence decisions. Exposure to print was considered to be important due to its attention by other adult literacy researchers, (e.g., Purcell-Gates, Jacobson, & Degener, 2004; Sheehan-Holt, & Smith, 2000) and its known variability in adults of diverse reading abilities (e.g., Reder, 2009). The assignment to type of class was considered important because adults who voluntarily attend a class often leave the voluntary class situation if the class does not coincide with their instructional expectations (Merriam et al., 2007). Most of the tested intervention approaches stressed explicit and scripted instruction, while one was focused on literature exposure with instruction being very implicit. Since adult learning stresses an andragogical approach, which focuses on self-directed learning with the teacher acting as a guide (Merriam et al., 2007), it was thought

that assignment to this class might impact persistence. In addition, since the other classes covered different emphases on decoding and/or comprehension, it was also thought that assignment to these classes might impact persistence.

The students were assigned randomly to one of five approaches: explicit instructional groups of Decoding and Fluency (DF); Decoding, Comprehension, and Fluency (DCF); an implicit approach to reading instruction, Extensive Reading (ER); a combination approach of Decoding, Comprehension, Extensive Reading, and Fluency (DCEF); and a generic approach common to some community-based literacy programs, Control/Comparison approach (C/C). It is beyond the scope of this article to describe in depth the different instructional approaches; however a brief description is as follows. The explicit instructional approaches included materials from SRA/McGraw Hill Direct Instruction Corrective Reading, Timed Readings Plus (Spargo, 1989), and Jamestown Fluency Readers (Blachowicz, 2004). In the DF approach, 100 minutes were focused on decoding and 15 minutes on reading fluency; in DCF, 50 minutes were devoted to decoding, 50 minutes to comprehension, and 15 minutes to fluency; in DCEF, approximately 33 minutes each was spent on decoding, comprehension, and extensive reading with 15 minutes on fluency. The Extensive Reading approach offered students a library full of high interest/low vocabulary books. In this approach, they were offered two silent sustained reading blocks of 40 minutes, and 15 minutes of teacher read-aloud activities. All approaches included a 5-minute break (see Greenberg et al., 2011, for a description of the instructional approaches).

Purpose Of the Study

This study sought to further our understanding of the differences between persisters and nonpersisters in adult reading classes. Common to the field of adult literacy (Comings, 2009), persistence in this study was measured in terms of hours of instruction during a specified period of time. Although student persistence was not the purpose of the larger intervention study (see Greenberg et al., 2011) and measures designed specifically for persistence were not selected a priori, enough information corresponding to previous persistence studies was gathered that can be useful in a descriptive exploratory analysis that can help move the field forward in the understanding of the differences between adult struggling readers who persist in reading classes and those who do not. Specifically, the following exploratory research questions were addressed:

1. Do the profiles of adults who enroll in a reading program differ based on whether they do not continue to the midpoint, attend until the midpoint, or complete the program?
2. Based on model predicted group membership, which characteristics are associated with the participants who “best” represent the three completion groups?

METHOD

Participants

Participants were recruited from students attending 23 adult literacy programs. Classroom teachers identified potential participants as reading within the second through sixth grade levels on the Test of Adult Basic Education (TABE; CTB/McGraw-Hill, 1994). Research personnel told potential participants that this research study focused on two aspects: understanding the reading strengths and weaknesses of adults who have difficulty reading and exploring the best way to teach adults to read. Students who expressed interest in the study were administered the Woodcock Johnson Psycho-Educational III Letter and Word Identification Test (WJ Word ID; Woodcock, McGrew, & Mather, 2001). Those students who received raw scores between 42 and 57 (3.0–5.9 grade reading equivalencies) and were

available to attend classes four days a week, each day for two hours, were invited to participate in the study. They were told that participation involved a commitment to attending all classes, and were asked whether they believed they could make such a commitment. The testing schedule was also described to them.

One thousand one hundred seventy four participants were screened, and 629 qualified (mean raw WJ Word ID score = 49.76; reading grade equivalencies, M = 4.29). Of this 629, 428 agreed to be pretested and were randomly assigned to one of four reading interventions or a control comparison condition. Each of the five approaches offered students the opportunity of 100 hours of instruction (two hours a day, four days a week). Three hundred ninety five students attended the first day of class. For the current analyses, this final group of 395 who attended the first day of class served as the sample of interest. Because the purpose of this paper was to examine potential differences between those individuals who completed a reading intervention and those who did not, the group of 395 was divided into three subgroups. These subgroups consisted of those individuals who attended the first day of class but did not continue to the midpoint of an intervention (i.e., attended at least 30 hours of reading instruction), those individuals who made it to the midpoint but did not complete an intervention (i.e., did not attend at least 60 hours of reading instruction), and those individuals who were considered to have completed an intervention (i.e., attended at least 60 hours of the 100 hours of instruction that were offered).

The group of participants that did not make it to the midpoint consisted of 131 students. Sixty-six participants continued to the midpoint of an intervention, and the group that was classified as completing an intervention included 198 participants (see Table 1 for information regarding these different completion groups). Chi-square analyses indicated that the proportion of males and females did not differ significantly ($p > .05$) across the three completion groups. Analyses did, however, indicate that the proportion of African Americans, Hispanics, and Asians differed significantly across the completion groups, χ^2 (4, n = 372) = 26.39, $p < .001$. Because there were very small numbers of Caucasian and Bi-racial participants, a number of cells had expected values less than 5. These two racial groups, therefore, were deleted from this analysis. Chi-square analyses also indicated that the proportion of native English speaking and ESL participants differed significantly across completion groups, χ^2 (2, n = 395) = 14.28, $p = .001$. Finally, chi-square analyses indicated that the proportion of participants assigned to the different reading interventions differed significantly across the completion groups, χ^2 (8, n = 395) = 29.78, $p < .001$.

A univariate ANOVA did not evidence significant differences between completion groups with respect to WJ Word ID scores ($p > .05$). Significant differences, however, were evidenced for age, F (2, 392) = 11.65, $p < .001$, $\eta^2 = .06$. Tukey post hoc analyses indicated that those participants who did not continue to the midpoint were significantly ($p < .05$) younger (M = 29.30, SD = 12.40) than either those participants who continued to the midpoint of an intervention (M = 35.08, SD = 12.59) or who completed an intervention (M = 35.49, SD = 14.29). Those participants who continued to the midpoint of an intervention did not differ significantly in age from those who completed an intervention.

Procedures

Participants were individually administered a pretest battery of measures by trained graduate students. Testing was completed in one session and took approximately two hours. The battery consisted of a series of oral and written language standardized assessments, as well as demographic and reading pattern/attitude questions.

Written and oral literacy assessments—These tests included the Woodcock Johnson III (WJ III) Letter and Word Identification, Word Attack, Passage Comprehension, and

Reading Fluency subtests (Woodcock et al., 2001); the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999) Elision, Blending, and Rapid Letter Naming subtests; the Peabody Picture Vocabulary Test–III (PPVT; Dunn & Dunn, 1998); the Gray Oral Reading Test–IV (GORT; Wiederholt & Bryant, 2001); and the Test of Word Reading Efficiency (TOWRE; Torgesen & Wagner, 1999) Sight Word Reading Efficiency and Phonemic Decoding Efficiency subtests. Analyses of these tests involved raw scores. There were two primary reasons for using raw scores. Because standard scores could not be calculated on some measures and due to the age and performance levels of the participants, using only raw scores eliminated the confound of combining standard, scale, and raw scores in the analyses. Additionally, raw scores increase variability as well as help reduce floor effects.

Demographic and reading attitude/pattern questions—Information was gathered on demographics, indicators of economic hardship, current and previous educational history, psycho-social sense of reading self-concept, and exposure to print.

Demographics: Students indicated their race, age, gender, and ESL status.

Economic hardship: Students indicated whether they were employed or were past/current recipients of Women, Infants, and Children (WIC) benefits (recipients receive supplemental foods if they are low-income pregnant or postpartum women with young infants and children).

Current and previous educational history: Students indicated whether they were a high school graduate, had repeated a grade in school, had attended a special education class as a child, have learning difficulties, they currently or previously attended adult literacy classes, and whether they have a family history of difficulties in learning to read. Students also indicated the highest grade completed in school for both their mother and father.

Psycho-social sense of reading self-concept: On a three-point scale, students indicated how well they can spell, sound out words, and recognize words (without sounding them out), and how well they can understand what they read. A composite score of answers to these items was used for analysis purposes.

Exposure to print: On a four-point scale, students were asked to rank how much information they receive from magazines, the Internet, radio, television, and family/friends. On a three-point scale they were asked to indicate how often they read advertisements, email, magazines, books, newspapers, and information from the computer. Their exposure to print was further probed by asking questions such as how many magazines they subscribe to on a regular basis, which sections of newspapers they read, how many books and magazines they have in their home, and how many books they read in the last year. A composite score of answers to these items was used for analysis purposes. Finally, they were asked the following question: “Would you say that you avoid (English) reading material that looks too difficult for you?

RESULTS

Initial analyses consisted of an examination of exploratory frequency distributions, chi-square analyses, and univariate ANOVAs to determine whether the three continuation groups differed significantly on study variables collected at the beginning of the study. These exploratory analyses indicated that the three continuation groups differed significantly on a number of the study’s variables and warranted further examination through more appropriate and inclusive data analytic techniques. It was decided that multinomial logistic

regression analysis was the most suitable data analytic technique to answer the study's research questions. The use of multinomial logistic regression analysis allowed for the prediction of continuation group membership while controlling for a number of different predictor variables.

Multinomial Logistic Regression Analysis

A multinomial logistic regression was conducted via SPSS NOMREG to evaluate potential predictors of three levels of continuation: enrolled in the intervention but did not continue to midpoint; enrolled and continued to midpoint; enrolled and completed the intervention. In this exploratory analysis, predictors were drawn from the pool of assessments, demographic, and reading attitude/pattern variables collected prior to intervention start. Potential predictors were required to demonstrate substantial univariate relationship with continuation, or to have a prior theoretical and/or empirical relationship with intervention response or reading ability. The final set of predictors included age at enrollment, gender, English as a second language status (ESL or native), oral blending (CTOPP Blending), rapid automatized naming (CTOPP RAN Letters subtests), reading comprehension (GORT Comprehension), whether the participant currently or had ever attended adult education classes, a self-report rating of whether the participant ever avoids reading, and past or present receipt of WIC benefits. Four effect-coded program vectors also were included, arranged with C/C as the reference group so each reading intervention approach would be contrasted with the grand mean (e.g., ER, DF, DCF, DCEF) as a potential predictor of continuance.

Missing data were distributed across these variables for 20 cases. SPSS MVA was used to implement Expectation-Maximization (EM) imputation for missing values on continuous predictors. Initial diagnostics indicated that the distribution of missing values could not be distinguished from randomness (Little's MCAR test, $X^2(18) = 19.92$, $p = .34$). Six participants of 395 offered no response to ever having attended adult basic education classes. These were coded as never having attended. For the WIC benefits variable, two participants offered no response to both past and present questions. These were coded as having never received and not presently receiving WIC benefits. A total of 395 cases were available for analysis. Crosstablulations of continuation status with all categorical variables to evaluate adequacy of expected frequencies revealed that goodness of fit tests would be applicable (i.e., all expected frequencies > 5). No evidence of nonlinearity in the logit was observed for continuous variables.

With basic demographic and reading process predictors in the model (e.g., ESL, age, blending, rapid letter naming, four program vectors) a good model fit was observed, indicating reliable discrimination among continuance groups ($X^2(766) = 701.17$, $p = .95$) using a deviance criterion. Adding economic hardship, reading attitude/pattern, and higher order reading variables resulted in a good fit, $X^2(760) = 670.85$, $p = .99$, Nagelkerke $R^2 = .32$. The change in fit when the additional variables were added was reliable (−2 log likelihood difference between models; $X^2(6) = 30.32$, $p < .001$), indicating an improvement to model fit with this additional class of variables.

Univariate results are summarized in Table 2, which includes contributions of predictors to the model when removed, along with odds-ratios (OR) associated with continuance to midpoint or full completion. See Table 3 for coding schemes used with categorical variables. All model predictors contributed reliable addition to the predictive power of the model, as evidenced by the X^2 *to Remove* in Table 2. Being ESL was specifically associated with prediction of full completion (OR = 2.56). Table 3 portrays the relationship between continuance and ESL status. Native English speakers were more likely to not make it to midpoint (66.4%) than ESL students (33.6%). Conversely, more ESL students completed the

intervention (54.5%) compared to native speakers (45.5%). Older participants were also more likely to achieve midpoint completion (OR = 1.89) and to complete the program (OR = 2.10). In particular, the mean age of those who completed the intervention was 36.5 years (SD = 14.3), while the mean age of those who enrolled, but did not complete programming was 29.3 years (SD = 12.4). Greater blending skill was associated with midpoint completion (OR = 1.42) and full completion (OR = 1.37). Faster letter naming speed was associated with continuance to midpoint (OR = .54) and full completion (OR = 0.78). Being in the ER or the DF conditions was associated with a decreased probability of full completion (OR = 0.26; 1.64). Participants who reported a lower likelihood of avoiding reading material that looks too difficult were more likely to continue to midpoint (OR = 1.63). Participants who at the time of program entry had not received WIC benefits were more likely to reach full completion (OR = 2.47). Previously being enrolled in an adult basic education course was associated with a greater probability of continuing to midpoint (OR = 2.17). Finally, participants with higher comprehension scores on the GORT were more likely to continue to midpoint (OR = 1.67) and to reach full completion (OR = 1.30). See Tables 3 and 4 for frequency counts and means by continuation status respectively.

While gender of participant was not a factor in the model, one moderation effect was observed with gender interacting with previously attending adult education classes (OR = 6.03 for continuation to midpoint; OR = 3.46 for completing the intervention). Post-hoc analyses indicated no relationship between previous attendance and continuation status for males. For females, however, the following pattern was observed ($X^2(2) = 6.14$, $p = .04$). If females had not previously attended adult basic education classes, then more than expected by chance did not make it to midpoint, and fewer completed the full intervention. The reverse was true if females *had* previously attended, in that fewer than expected by chance did not make it to midpoint, and more completed. The conclusion is that if a participant was female, previous attendance is a factor that both increases the likelihood of completion *and* reduces the likelihood of noncompletion.

Subgroup Analyses

Reading self-concept of respondents who report avoiding reading—The self-report item “Would you say that you avoid (English) reading material that looks too difficult for you?” was a significant predictor of continuance in the multinomial logistic regression analysis. While the majority of students (78.5%) reported rarely or never avoiding reading material, 21.5% reported frequently or always avoiding. Although not anticipated, finding that avoidance of reading difficult material was a predictor of continuance became an important variable to explore further. If this behavioral self-report is accurate, it represents an important part of these struggling readers’ self-concept. Those who reported avoiding reading were contrasted with those who did not through a MANOVA, with overall print exposure and the psycho-social sense of reading self-concept questions as predictors. Missing data were distributed across the self-concept responses for 32 cases and on one print exposure composite. SPSS MVA was used to implement EM imputation for missing values. Initial diagnostics indicated that the distribution of missing values could not be distinguished from randomness (Little’s MCAR test, $X^2(31) = 36.432$, $p = .23$).

The results of the MANOVA indicated that overall, avoiders and nonavoiders differed significantly and substantially on print exposure and reading self-concept ($F(6, 388) = 6.27$, $p < .001$, $\eta^2 = .088$). At the univariate level, avoiders reported lower print exposure (M = 14.55; SD = 4.91) than those who did not avoid reading (M = 18.20; SD = 5.60), $F(1, 393)$ = 29.70, $p < .001$, $\eta^2 = .070$). Those who frequently or always avoided reading also described themselves as having lower ability on all reading components, including the following: spelling ($F(1, 393) = 4.18$, $p = .04$, $\eta^2 = .011$); decoding ($F(1, 393) = 7.81$, $p = .005$, $\eta^2 = .$

019); sight-word identification ($F(1, 393) = 4.03$, $p = .05$, $\eta^2 = .010$); and fluency ($F(1, 393) = 6.24$, $p = .013$, $\eta^2 = .016$). Reading comprehension trended in the same direction, but was marginally significant. These results further characterize an important subgroup of adult struggling readers, representing a substantial subset of the participants in the present study (21.5%). These individuals report avoiding reading, based on the full predictive model are more likely to drop out of intervention, based on this further analysis report a lower degree of print exposure, and self-describe as being poorer on almost every component of reading skill.

Model-based group membership—To further characterize the dynamics of this model of persistence, analyses were carried out on two subgroups of participants identified by the logistic regression as those who best fit the model of persisters and nonpersisters. Groups were created based on the predicted probability of group membership (e.g., did not make it to the midpoint of an intervention, made it to the midpoint of an intervention, and completed an intervention) evidenced from the multinomial logistic regression analyses. Based on the probabilities of group membership, the most representative participants were selected from each group. Thirty-three participants evidenced probability scores above .70 for the group that did not continue to the midpoint of an intervention. Thirty-one participants evidenced probability scores above .80 for the group that completed an intervention. For the group that made it to the midpoint, only two participants evidenced scores of .69 or above. The remaining probability scores were .60 or below with the majority of the probability scores being below .50. Thus, all subsequent analyses were carried out only comparing the 33 most representative participants who did not make it to the midpoint of an intervention (hereafter best-fitting nonpersisters) and the 31 most representative participants who completed an intervention (hereafter best-fitting persisters). Overlap with actual group membership was substantial ($\chi^2(1) = 27.59$, $p < .001$; phi = .66), forming two groups that matched actual persisters and nonpersisters closely, but also accounted for the multivariate relationships among the predictors of persistence. This analytic strategy is hypothesis-generating, allowing for exploration of other potential factors related to persistence.

First, chi-square analyses were conducted on demographic variables to compare the two groups of interest. Analyses indicated that a significantly larger portion of best-fitting persisters (BFP) were ESL (77%) compared to the best-fitting nonpersisters (BFNP) (10%), χ^2 (1, n = 64) = 23.46, p < .001. In addition, the proportion of females in the BFP group (100%) was significantly different than in the BFNP group (67%), χ^2 (1, n = 64) = 12.48, p < .001. Because of small-expected cell values, chi-square analyses could not be carried out on race. The BFNP group, however, was composed of primarily African Americans (94%, 3% Hispanic, and 3% Asian), while the BFP group was more equally distributed across the different ethnicities (52% African American, 29% Hispanic, and 19% Asian).

An independent measures *t* test indicated that the BFNP group was significantly younger (M = 22.52, SD = 7.71) than the BFP group (M = 49.42, SD = 11.36), t (62) = 11.14, p < .001, d = 2.83. The two groups, however, did not differ significantly with respect to their PPVT scores (p > .05).

In order to examine for difference in reading skills between the two groups, a multivariate analysis of variance (MANOVA) was conducted with the dependent variables of WJ Word Identification, WJ Word Attack, WJ Passage Comprehension, WJ Reading Fluency, TOWRE Sight Word Reading Efficiency, TOWRE Phonemic Decoding Efficiency, CTOPP Elision, CTOPP Blending, CTOPP Rapid Letter Naming, GORT Fluency, and GORT Comprehension. Multivariate results indicated a significant effect of best-fitting continuation group, F (11, 51) = 2.85, p = .006, η^2 = .38.

Follow up univariate ANOVAs indicated that the BFNP group evidenced significantly higher WJ Reading Fluency scores (M = 41.15, SD = 10.76) than the BFP group (M = 32.63, SD = 9.43), F (1, 61) = 11.07, p = .001, η^2 = .15. Best-fitting nonpersisters also evidenced significantly higher scores on the WJ Passage Comprehension (M = 24.18, SD = 4.25) compared to the best-fitting persisters group. (M = 21.74, SD = 4.46), F (1, 61) = 4.98, p = .029, η^2 = .08. Finally, the BFNP group evidenced significantly faster scores on the CTOPP Rapid Letter Naming (M = 28.27, SD = 5.29) compared to the BFP group (M = 37.13, SD = 9.22), F (1, 61) = 22.39, p < .001, η^2 = .27. No other significant main effects were found.

In addition to reading performance, it was of interest to examine for group differences with respect to reading behavior. The first MANOVA analyzed the questions that asked participants where they received their information. Specifically, the questions asked participants how much information they received from newspapers, magazines, the Internet, radio, television, and from family and friends. A significant multivariate effect was found for completion group, F (6, 56) = 3.28, p = .008, η^2 = .26.

Follow up univariate ANOVAs indicated a significant main effect of completion group for the questions that asked how much information participants received from magazines, F (1, 61) = 6.07, p = .017, η^2 = .09; the Internet, F (1, 61) = 7.09, p = .01, η^2 = .10; radio, F (1, 61) = 5.07, p = .028, η^2 = .08; television, F (1, 61) = 4.99, p = .029, η^2 = .08; and from family and friends, F (1, 61) = 8.94, p = .004, η^2 = .13. For each question, the best-fitting nonpersisters group reported receiving significantly lower amounts of information from these sources than the best-fitting persisters group (see Table 5).

The final MANOVA examined questions that asked how often participants reported reading advertisements, email, books, newspapers, magazines, and information from the computer. Multivariate results did not indicate a significant effect for completion group, F (4, 58) = 2.31, p = .069, η^2 = .14. Follow up univariate ANOVAs, therefore, were not conducted.

DISCUSSION

The primary purpose of this paper was to evaluate whether the profiles of adults with different persistence records differ based on class assignment, demographics, economic hardships, current/previous educational history, psycho-social self-concept of reading, and exposure to print. From the many different possible predictors, only English language status, age, blending, rapid letter naming, comprehension skills, assignment to the ER or DF approach, avoidance of reading, previous adult education experience, and WIC benefit receipt variables significantly predicted persistence. Of interest is that the significance of some of these predictors varied based on analyzing midpoint completion or full completion. Both midpoint and full program completions were associated with students who were older in age and who possessed better blending, rapid letter naming, and comprehension skills. While midpoint completion was additionally associated with less avoidance of reading difficult material and current or past enrollment in basic adult education classes, full program completion was additionally associated with students who spoke English as a second language, were not assigned to the ER or DF approaches, and had no history of receipt of WIC benefits. In addition, although gender was not a significant factor in the model, gender did interact with previous attendance of adult literacy classes. For females (but not for males), previous attendance contributed to the likelihood of persistence.

The second purpose of this study was to explore which characteristics best represent the different completion groups. Based on the probability analysis results, analyses were conducted only on the most representative participants who did not continue to the midpoint

and the participants who completed the program. Results indicate that, compared to the representatives of the participants who did not continue to the midpoint, the representatives of the full program completer group were more likely to be English as second language learners, female, and older, and to possess lower reading fluency, comprehension, and rapid letter naming scores. The most representative of the full program completer group were also characterized by receiving more information from magazines, the Internet, television, radio, and from family/friends.

With one exception (Dirkx & Jha, 1994), this study confirms previous findings that older adults persist longer in adult basic education classes. Further research needs to be conducted to further analyze this relationship. For example, qualitative probes of adults of varying ages would be useful in uncovering whether findings related to age reflect maturity issues, different life realizations and/or different life circumstances. In addition, qualitative probes of teachers and students, as well as class observations, and curricular audits may uncover why young adults have difficulty with persistence. For example, analyses may uncover aspects of the classroom environment and elements of the curricular and/or teaching styles that do not meet the expectations and/or needs of young adults. These type of further research studies would help adult literacy practitioners and administrators consider which program changes may increase the persistence of younger students. This is a considerable yet important challenge. During the past two decades, there has been an increase in young adults below the age of 22 attending adult literacy programs. When they attend, they often exhibit special needs such as immature behaviors in the classroom and poor time on task (Flugman, Perin, & Spiegel, 2003; Harting, 2006).

Through interviews, Comings et al. (1999) found that persistence was not related to employment status. This finding was confirmed in this study. This study also confirmed Comings et al.'s (1999) and Alamprese et al.'s (2011) findings that more nonnative English speakers tend to complete the reading program as compared to native English speakers. This finding corroborates the anecdotes often heard by adult literacy practitioners and is an issue that should be further explored. For example, what is it about the interactions between the reading class experience and the historical/current backgrounds of these two different groups that would result in different persistence patterns? Finally, while Comings et al. (1999) did not find gender to be related to persistence, this study found an interaction effect between gender and current or previous attendance in an adult literacy program. In this study, females tended to persist more if they had a current/previous history of adult literacy program attendance, while for males this was not an influential factor in their persistence patterns. Further research is warranted to understand how gender interacts with persistence patterns.

The additional analyses that were conducted on the subgroup of individuals who reported that they avoid reading difficult materials are an important addition to the persistence literature. Compared to others who did not report avoidance of reading difficult materials, individuals who reported avoiding reading reported a lower degree of exposure to print and self-concept on reading skills and were more likely to withdraw their attendance from classes. This subgroup needs further exploration because they highlight a potential group of individuals for whom additional support may be warranted in order to increase their attendance patterns. These findings imply that they do not engage in literacy practices, they possess low reading self-concept, and they may leave classes when material is perceived as too difficult. This further exploration is essential. Researchers have noted the relationship between adult literacy program attendance and increased engagement in literacy practices (e.g., Purcell-Gates et.al., 2004; Reder, 2009; Sheehan-Holt & Smith, 2000). However, the very individuals who avoid reading do not persist in adult literacy programs and therefore do

not have the opportunity to benefit from the possible program impact of participation on their engagement in literacy practice.

Limitations

This study illustrates the difficulty in conducting persistence studies in the field of adult literacy. First and foremost, how to define persistence is a difficult decision. Although the field typically defines persistence in terms of the number of hours of instruction during a specified time period (Comings, 2009), the “specified time period” and the “number of hours of instruction” varies greatly from program to program and from study to study. This lack of uniformity in measurement makes comparisons among persistence studies very difficult. In addition, upon further analysis, the definition of persistence becomes even more complicated. For example, if a class meets twice a week, four hours a day, and two students are said to have attended 40 hours of instruction during a 2-month period, these 40 hours could reflect very different attendance patterns. One student could have attended daily for five weeks and then stopped attending, while another could have attended more sporadically over the two-month period. Which student would be considered more persistent? Both students attended the same number of hours, but their exposure to instruction differed, as well as their persistence patterns. In a large sample size, any number of attendance permutations is possible, and how one takes these different attendance patterns into consideration is an issue that has not yet been resolved.

Another difficulty inherent in adult literacy persistence studies is identifying which variables are of interest to study. In this study, for example, a long list of different oral and written language assessments was included, yet only a handful predicted persistence. It is unclear how to make sense of these types of findings. For example, why should blending skills influence persistence, while word attack skills do not? Sabatini and colleagues (2011) experienced a similar issue, in which some oral and written language skills predicted persistence and others did not. However, the relationships between skill level and persistence and specific interventions is an important one to explore. As Venezky, Bristow, and Sabatini (1994) explained, “if the better performing students based on pretest scores had a higher probability of leaving earlier than those who scored low on the pretest measure, some increase in posttest scores would be expected from the resulting regression bias” (p. 105).

This study focused on 395 students who attended the first day of class. However, 1,174 individuals were screened, and 629 qualified, with 428 agreeing to be pretested. To fully understand persistence, data from those who refused to engage in screening should be analyzed, as well as data collected from those who refused to be pretested, and from those who were pretested but never attended class. Unfortunately, screening refusal data were not collected in this study, and the sample sizes of the other two groups are too discrepant to be included in this study. Although beyond the scope of this present study, in order to expand our understanding of persistence issues, future research should include those individuals who do not attend even the first day of class.

Another limitation to this study is that the researchers were constrained by the measures and questions selected for the purpose of an efficacy study (see Greenberg et al., 2011). In addition, instead of only focusing on data collected before the intervention begins, ideally the students who stopped attending classes should have been contacted for further data collection. Although such attempts were made as part of the study, they were unsuccessful. As Comings et al. (1999) reported, people who withdraw from classes are difficult to contact; therefore, researchers need to rely on information that is collected while the student is attending the program. One notable description of the difficulty in contacting struggling adult readers is Reder’s (2009) longitudinal study of high school dropouts who did not have

a GED credential. Over a nine-year period, he retained 90% of his initial sample. To accomplish this, four part time "trackers" and one half time "lead detective" were employed and followed an extensive procedure designed to help keep in touch with participants during the study period (readers are encouraged to download the retention manual at: http://www.lsal.pdx.edu/instruments.html).

An underlying assumption of the importance of analyzing persistence is that students who persist will experience significant literacy skill gains. However, in a recent special journal issue on federally funded adult literacy intervention research, all "well-designed and carefully implemented studies" (Miller et al., 2011, p. 93) indicated challenges in significantly improving the performance of adult struggling readers who attend classes. Both the National Academy of Sciences Adolescent and Adult Literacy Panel Report (National Research Council, 2012) and Comings et al. (1999) explained that reading skill development requires "thousands of hours" of study and practice for adults who read at very low levels to increase their skill levels to attain dramatic changes in their reading abilities. As indicated in the National Academy of Sciences Adolescent and Adult Literacy Panel Report, the most significant challenge to the design of adult literacy instruction is encouraging and facilitating persistent learner attendance (National Research Council, 2012). As indicated by Comings and his colleagues (1999), "understanding how to help adults persist in their studies, therefore, is key to increasing the impact of adult education programs" (p. 16). Clearly, much more research is warranted in the area of persistence before research can inform adult literacy practice.

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References

Alamprese, JA. Developing learners' reading skills in adult basic education programs. In: Reder, S.; Bynner, J., editors. Tracking adult literacy and numeracy skills: Findings from longitudinal research. New York, NY: Routledge; 2009. p. 107-131.

Alamprese JA, MacArthur CA, Price C, Knight D. Effects of a structured decoding curriculum on adult literacy learners' reading development. Journal of Research on Educational Effectiveness. 2011; 4:154–172.10.1080/19435747.2011.555294 [PubMed: 22163055]

Blachowicz, CLZ. Reading fluency reader. Columbus, OH: Glencoe/McGraw-Hill; 2004.

Comings, JP. Student persistence in adult literacy and numeracy programs. In: Reder, S.; Bynner, J., editors. Tracking adult literacy and numeracy skills: Findings from longitudinal research. New York, NY: Routledge; 2009. p. 160-176.

Comings, J.; Parella, A.; Soricone, L. NCSALL Report No 12. Cambridge, MA: National Center for the Study of Adult Learning and Literacy, Harvard Graduate School of Education; 1999. Persistence among adult basic education students in pre-GED classes.

CTB/McGraw-Hill. TABE: Tests of Adult Basic Education. Monterey, CA: CTB/McGraw-Hill; 1994.

Dirkx JM, Jha LR. Completion and attrition in adult basic education: A test of two pragmatic prediction models. Adult Education Quarterly. 1994; 45:269–285.

Dunn, LM.; Dunn, LM. Peabody Picture Vocabulary Test. 3. Circle Pines, MN: American Guidance Service; 1998.

Farrell E, Peguero G, Lindsey R, White R. Giving voice to high-school students- Pressure and boredom, Ya know what im sayin. American Educational Research Journal. 1988; 25:489–502.

Flugman, B.; Perin, D.; Spiegel, S. An exploratory case study of 16–20 year old students in adult education programs. New York, NY: Center for Advanced Study in Education; 2003 Oct.

Greenberg D. The challenges facing adult literacy programs. Community Literacy Journal. 2008; 3:39–54.

Greenberg D, Wise JC, Morris R, Fredrick LD, Rodrigo V, Nanda AO, Pae HK. A randomized control study of instructional approaches for struggling adult readers. Journal of Research on Educational Effectiveness. 2011; 4:101–117.10.1080/19435747.2011.555288

Harting D. The challenges of serving youth: How programs are coping with a new reality. Litscape. 2006 Fall;:8–10.

Hock MF, Mellard DF. Efficacy of learning strategies instruction in adult education. Journal of Research on Educational Effectiveness. 2011; 4:134–153.10.1080/19435747.2011.555291 [PubMed: 22121409]

Kutner, M.; Greenberg, E.; Jin, Y.; Boyle, B.; Hsu, Y.; Paulsen, C. Literacy in everyday life: Results from the 2003 National Assessment of Adult Literacy (NCES 2006-477). Washington, DC: U.S. Department of Education, Institute for Education Sciences, National Center for Education Statistics; 2006.

Merriam, SB.; Caffarella, RS.; Baumgartner, LM. Learning in adulthood: A comprehensive guide. 3. San Francisco, CA: Jossey Bass; 2007.

Miller B, Esposito L, McCardle P. A public health approach to improving the lives of adult learners: Introduction to the special issue on adult literacy interventions. Journal of Research on Educational Effectiveness. 2011; 4:87–100.10.1080/19435747.2011.555287

National Research Council. Improving Adult Literacy Instruction: Options for Practice and Research. Washington, DC: The National Academies Press; 2012.

Purcell-Gates, V.; Jacobson, E.; Degener, S. Print literacy: Uniting cognitive and social practice theories. Cambridge, MA: Harvard University Press; 2004.

Quigley, B. Rethinking literacy education: The critical need for practice-based change. San Francisco, CA: Jossey-Bass; 1997.

Reder, S. The development of literacy and numeracy in adult life. In: Reder, S.; Bynner, J., editors. Tracking adult literacy and numeracy skills. New York, NY: Routledge; 2009. p. 59-84.

Reder, S.; Bynner, J. The need for longitudinal studies in adult literacy and numeracy education. In: Reder, S.; Bynner, J., editors. Tracking adult literacy and numeracy skills. New York, NY: Routledge; 2009. p. 1-23.

Sabatini JP, Shore J, Holtzman S, Scarborough HS. Relative effectiveness of reading intervention programs for adults with low literacy. Journal of Research on Educational Effectiveness. 2011; 4:118–133.10.1080/19435747.2011.555290 [PubMed: 22303487]

Spargo, E. Timed readings in literature. Columbus, OH: Glencoe/McGraw Hill; 1989.

Sheehan-Holt J, Smith C. Does basic skills education affect adults' literacy proficiencies and reading practices? Reading Research Quarterly. 2000; 35:226–243.

Torgesen, JK.; Wagner, R. Test of Word Reading Efficiency. Austin, TX: ProEd; 1999.

U.S. Department of Education, Office of Vocational and Adult Education. State administered adult education program: Program year 2008–2009 enrollment. Washington, DC: Author; 2010.

Venezky RL, Bristow PS, Sabatini JP. Measuring change in adult literacy programs: Enduring issues and a few answers. Educational Assessment. 1994; 2:101–131.

Wagner, RK.; Torgesen, JK.; Rashotte, CA. Comprehensive Test of Phonological Processing. Austin, TX: Pro-Ed; 1999.

Wiederholt, JL.; Bryant, BR. Gray Oral Reading Tests. 4. Austin, TX: Pro-Ed; 2001.

Woodcock, RW.; McGrew, KS.; Mather, N. Woodcock-Johnson III: Tests of Achievement. Itasca, IL: Riverside Publishing; 2001.

Ziegler MF, Bain SK, Bell SM, McCallum RS, Brian DJG. Predicting women's persistence in adult literacy classes with dispositional variables. Reading Psychology. 2006; 27:59–85.10.1080/02702710500542668

Table 1

Demographics

Demographic Variable	Did Not Make it to the Midpoint (n = 131)	Made it to the Midpoint (n = 66)	Completed the Intervention (n = 198)
Ethnicity			
African American	80.2%	59.1%	54.5%
Hispanic	11.5%	13.6%	28.3%
Asian	5.3%	15.2%	11.6%
Caucasian	1.5%	9.1%	5.1%
Bi-racial	1.5%	3.0%	0.5%
Instructional Group			
C/C	13.7%	16.7%	19.2%
DCEF	19.8%	16.7%	24.7%
ER	32.8%	30.3%	10.1%
DF	16.0%	18.2%	25.3%
DCF	17.6%	18.2%	20.7%
Gender			
Male	35.9%	34.8%	31.3%
Female	64.1%	65.2%	68.7%
Native English Speaker Status			
Native Speaker	66.4%	57.6%	45.5%
Non-native Speaker	33.6%	42.4%	54.5%
WJ Word ID	49.74 (4.28)	49.32 (4.56)	49.81 (4.72)
AGE	29.30 (12.40)	35.08 (12.59)	36.49 (14.29)

Note. C/C = Control Comparison; DCEF = Decoding, Comprehension, Extensive Reading and Fluency; ER = Extensive Reading; DF = Decoding and Fluency; DCF = Decoding, Comprehension and Fluency; WJ Word ID = Woodcock Johnson Psycho-Educational III Letter and Word Identification Test.

Table 2

Univariate Statistics For Full Model of Continuance

Predictor	X^2 to remove	df	sig.	Model X^2	OR to midpoint	OR to complete
ESL	10.19	2	.006		1.63	2.56**
Age	29.18	2	<.001		1.89**	2.10**
Gender	3.88	2	.143		0.49	1.05
CTOPP Blending	5.59	2	.061		1.42*	1.37**
CTOPP Rapid letter naming	13.31	2	.001		0.54**	0.78*
ER vs. overall	33.96	2	<.001		1.01	0.26**
DCEF vs. overall	2.31	2	.315		0.79	1.23
DCF vs. overall	0.98	2	.614		0.94	1.21
DF vs. overall	4.37	2	.112		1.10	1.64*
				92.11		
Avoids reading	7.84	2	.020		1.63**	1.11
Received WIC benefits	8.19	2	.017		0.96	2.47**
Prev. basic adult education	9.26	2	.010		2.17**	0.87
GORT Comprehension	8.36	2	.015		1.67**	1.30*
Gender x Prev. basic	6.73	2	.035		6.03**	3.46*
				127.98		

Note.

* = Univariate Wald statistic marginally significant, .10 > p > .05;

** Wald p < .05

ESL = English as a Second Language; CTOPP = Comprehensive Test of Phonological Processing; ER = Extensive Reading; DCEF = Decoding, Comprehension, Extensive Reading and Fluency; DCF = Decoding, Comprehension and Fluency; DF = Decoding and Fluency; WIC = Women, Infants, and Children; Prev. basic adult education = attended previous basic adult education classes; GORT = Gray Oral Reading Test-IV.

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Table 3

Categorical Variables As A Function of Continuance

	Continuation group			
	Did not continue to midpoint *n*	**Achieved midpoint *n***	**Completed intervention *n***	**Total *n***
		Language		
ESL (0)	44	28	108	180
Native (1)	87	38	90	215
		Gender		
Male (0)	47	23	62	132
Female (1)	84	43	136	263
		Received WIC Benefits		
No (0)	94	49	172	315
Yes (1)	37	17	26	80
		Previous Adult Basic Education		
No (0)	94	52	133	279
Yes (1)	37	14	65	116

Note: ESL = English as a Second Language; WIC = Women, Infants, and Children.

Table 4

Mean Levels Of Continuous Model Variables By Continuation Group

	Continuation group		
	Did not continue to midpoint *M (SD)*	**Achieved midpoint *M (SD)***	**Completed intervention *M (SD)***
Age	29.3 (12.4)	35.08 (12.59)	36.49 (14.29)
CTOPP Blending	5.99 (3.26)	6.73 (3.56)	6.62 (3.98)
CTOPP Rapid Letter Naming	36.16 (9.02)	32.05 (10.06)	33.86 (8.64)
Avoids reading	21.76 (10.05)	24.47 (10.59)	22.28 (10.18)
GORT Comprehension	1.88 (1.06)	2.24 (0.84)	2.03 (0.96)
Proportion in ER vs. Total	.33	.30	.10
Proportion in DCEF vs. Total	.20	.17	.25
Proportion in DCF vs. Total	.18	.18	.21
Proportion in DF vs. Total	.16	.18	.25

Note: CTOPP = Comprehensive Test of Phonological Processing; GORT = Gray Oral Reading Test-IV; ER = Extensive Reading; DCEF = Decoding, Comprehension, Extensive Reading and Fluency; DCF = Decoding, Comprehension and Fluency; DF = Decoding and Fluency.

Table 5

Means and Standard Deviations for the Amount of Information Received From Diverse Sources for Model-based Membership Groups.

	Did Not Make it to the Midpoint	Completed the Intervention
Magazines	2.18 (1.04)	2.83 (1.05)
Internet	2.30 (1.13)	3.07 (1.08)
Radio	1.67 (0.32)	2.23 (1.17)
Television	1.45 (0.79)	1.93 (0.91)
Family and Friends	1.73 (0.98)	2.50 (1.08)