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FACTOR STRUCTURE OF THE ADULT ATTITUDES TOWARD ADULT AND CONTINUING EDUCATION SCALE AND ITS CAPACITY TO PREDICT PARTICIPATION BEHAVIOR: EVIDENCE FOR ADOPTION OF A REVISED SCALE

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Although attitude is an important influence on the decision to participate, there are few instruments to assess attitude toward continuing education. Furthermore, there is little empirical information about the properties of the most widely known instrument, the Adult Attitude Toward Continuing Education Scale (AACES). This study subjects the AACES to a rigorous examination. Confirmatory factor analysis revealed a three-dimensional structure of attitude with three factors, Enjoyment of Learning, Perceived Importance, and Intrinsic Value. A substantial number of the AACES items were judged extraneous, and a nine-item Revised Attitude Toward Continuing Education Scale (RAACES) was constructed. Through structural equation modeling, it was demonstrated that RAACES was conceptually sound, and each of its three dimensions of attitude was significantly related to participation behavior. The nine-item RAACES is recommended for use in future studies of attitudes and participation in adult education.

Participation continues to be one of the most studied areas in the field of adult and continuing education. Researchers persist in systematic efforts to understand adults' decisions to engage in learning activities and factors influencing the decision to participate (Taylor, 2001). Substantial effort has been devoted to quantifying variables related to participation in adult education, and the development of valid and reliable instruments continues to be a priority. Few standardized sociopsychological instruments are currently available to researchers. The Adult

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Attitudes Toward Continuing Education Scale (AACES) (Darkenwald & Hayes, 1988; Hayes & Darkenwald, 1990) is one instrument purported to be a valid and reliable scale to measure attitudes toward adult education and has been disseminated through the two most widely read, blind reviewed, English language journals of adult education research in North America, *Adult Education Quarterly* (AEQ) and the *International Journal of Lifelong Education* (IJLE) (Rachal & Sargent, 1995). Although the AACES was introduced more than 10 years ago, a rigorous and independent replication and assessment of the scale's factor structure and psychometric properties has not been published.

Today, in the discipline of adult education, as in other social science disciplines criticized by Schwab (1980) more than two decades ago, the paucity of well-developed psychometric instruments frequently leads researchers to use whatever instruments are available. Often, instruments are used before sufficient evidence has been accumulated to support their developers' claims to validity and reliability. Valid and reliable instruments are essential tools for empirical work, and it remains a major responsibility of those in the quantitative domain to contribute to their development and continuing improvement. As Nunnally (1978), among others, has made clear, factor analysis results are often sample specific, and content validity is dependent in large part on the systematic exclusion of extraneous item content. Consequently, replication of a scale's factor structure with multiple samples and assessments of reliability and validity claims are important contributions to the strengthening of empirical research and to theory construction. Boshier (1991), for example, has regularly reported data to support the validity of the Education Participation Scale (EPS), including one report that justified reducing the number of EPS items from 48 (F version) to 42 (A version). Similar cumulative and sustained efforts to improve instruments are rare in adult education research. A rigorous reassessment of the AACES is overdue.

DEVELOPMENT OF THE AACES

The development of the AACES drew on Rokeach's (1968; Rokeach & Kliejunas, 1972) two-attitude theory of attitude toward a psychological object and attitude toward the situation in which the object is encountered (Darkenwald & Hayes, 1988; Hayes & Darkenwald, 1990). Using Likert-type scaling procedures, an initial pool of 88 items representing attitude to object and attitude to situation was reduced by a panel of judges to 30 items. Next, a pilot test with 93 volunteers was used to reduce the pool to 22 items. The final version of the scale included seven attitude-to-situation and 15 attitude-to-object items (Darkenwald & Hayes, 1988).

Data for an assessment of the scale's properties were obtained from a convenience sample of 275 adults, who also completed a four-item Behavioral Index to assess their adult education participation in the preceding 12 months. Analyses of the properties of the AACES were published in two separate publications, with contradictory conclusions regarding the scale's factor structure (Darkenwald & Hayes,

1988; Hayes & Darkenwald, 1990). In the first analysis, published in *IJLE* (Darkenwald & Hayes, 1988), the authors reported a factor analysis that yielded five factors with eigenvalues greater than 1.0 prior to rotation. Because the first unrotated factor with an eigenvalue of 7.2 was dominant, the authors declared the scale to be unidimensional. They further stated, "To double-check the foregoing evidence of unidimensionality, two, three, four and five factor oblique and orthogonal factor analyses were computed. None yielded conceptually meaningful results" (p. 199). In summary, the authors reported that their analyses failed to confirm Rokeach's (1968; Rokeach & Kliejunas, 1972) theoretical two-attitude model and attitude toward continuing education was unifactorial. Unfortunately, the authors and the editors and reviewers of *IJLE* failed to recognize that the reported factor analysis results actually confirmed AACES to be multifactorial. In contradiction with recognized interpretations of eigenvalues (see, e.g., Comrey & Lee, 1992), the authors interpreted the presence of a number of eigenvalues greater than 1.0 to be inconsequential when they claimed that the scale was one-dimensional (p. 202).

In their second report, published in *AEQ*, Hayes and Darkenwald (1990) reanalyzed their original data and reinterpreted their factor analyses to report that "solutions consisting of two to six factors were derived; using both orthogonal and oblique rotations . . . the final [three-factor] structure was selected based on its conceptual meaningfulness" (p. 161). The three-factor solution thought to best fit the data was arrived at by orthogonal rotation, and the factors were labeled Enjoyment of Learning Activities (7 items), Importance of Adult Education (9 items), and Intrinsic Value of Adult Education (5 items). Although this three-factor structure again failed to confirm Rokeach's (1968; Rokeach & Kliejunas, 1972) two-factor theoretical framework that had guided the scale's development, the authors argued that the final solution was conceptually meaningful. What had been unifactorial and conceptually meaningless as a multifactorial structure in 1988 became, 2 years later, both multifactorial and meaningful.

In both published reports on the development of AACES, the authors ignored prior evidence indicating that attitudes toward adult education were most likely multifactorial. The widely published work of Boshier (see Boshier & Collins, 1985) on the EPS, which has its origins in Houle's (1961) hypothesized tripartite conceptualization of motivational orientations (the same research cited by the developers of AACES to ground their research in existing adult education literature), confirms a six-factor model of motivational orientations. Boshier in the 1970s had extended Houle's conceptual model to confirm the existence of six motivational orientations with a large number of independent samples of learners. Furthermore, Blunt (1983, p. 26) had previously factor analyzed 40 attitude scale items to confirm the existence of nine factors. A second order, principal components analysis of the data, yielded a three-factor solution. This study suggested that further scale development work ought to focus on a multifactorial model of attitude toward adult education with three factors, General Appreciation of Adult Education, Subjective Antipathy, and Goal Achievement, most likely to be identified through

refinement of scale items, Likert-type measurement, and further factor analyses with new samples of respondents (Blunt, 1983, p. 27). Although prior research strongly indicated that attitude toward adult education was multifactorial, the designers of the AACES' began their scale development with a search for only a two-factor model.

Because the two original reports on the measurement properties of AACES (a) did not build on prior empirical work indicating attitude toward continuing education was highly likely to be multifactorial; (b) failed to confirm the conceptual framework on which the instrument was constructed, that is, a two-attitude structure; (c) reported contradictory factor structure interpretations; and (d) offered only modest evidence of construct validity, and because there have been no independent analyses of the properties of the AACES with new samples published in the past 10 years, there is insufficient evidence to support its use. Recent research has confirmed the importance of attitude as an essential aspect of the decision to participate, and it is likely that future work to examine and theorize participation will continue to require valid instruments (Yang, Blunt, & Butler, 1994). For these reasons, it is important that the factor structure, robustness, and validity of the AACES be reassessed.

PURPOSE OF THE STUDY

The study incorporated two objectives. The first objective was to implement a rigorous test of the AACES' factor structure using the confirmatory factor analytic technique developed by Jöreskog (1969). Confirmatory factor analysis is a sophisticated statistical technique that has not been granted much attention in adult education research. Given the important role of adult attitudes toward adult education in explaining and predicting participation behavior, determining whether the factor structure claimed by the scale developers is robust and replicable is a priority for participation researchers. It is important to know to what extent adult attitudes toward adult education, as measured by the AACES, can be explained by the factor structure claimed by the scale's developers. The second objective was to examine the predictive validity of the AACES using the more powerful approach of structural equation modeling. For this objective, the guiding research question was: Do scores on the AACES satisfactorily predict participation in adult education activities?

METHOD

Sample

Participants were 458 adult learners enrolled in a variety of adult education programs offered by a western Canadian university and other adult education agencies

in the same province. The sample consisted of 240 males (52.9%) and 218 females (47.1%), with a mean age of 35 years (*SD* of 11 years) and a mean of 13.4 years of schooling. The participants were largely white-collar, middle-class, well-educated persons enrolled in a continuing professional education or general interest adult education course, and they differ in these respects from the participants used to develop the AACES.

DATA COLLECTION

The 22-item AACES was included in a larger survey instrument. The response instructions, item order, and the scaling categories were reproduced exactly as the scale developers had used them. To measure participation behavior in adult educational activities, a five-item Participation Behavior Index (PBI) similar to the four-item index used by Darkenwald and Hayes (1988) was constructed. The items sought yes-no responses to questions about the respondents' recent adult education participation, their annual participation, whether they were active learners, whether they had suggested that others participate in adult education, and whether they had claimed adult education fees as an income tax deduction. Demographic information such as age, gender, and number of years of schooling was also sought.

PLAN OF DATA ANALYSIS

Data analysis proceeded in three distinct phases, each using LISREL 8 analysis procedures (Jöreskog & Sörbom, 1996). Because the total data pool ($N = 458$) was relatively large in relation to the number of scale items (22), two independent samples were drawn from the pool to provide a means of cross-validating results. In Phase 1, the entire sample was divided into two random samples with an equal number of participants ($n = 229$). These two samples were designated the exploratory and confirmatory samples. Maximum likelihood confirmatory factor analyses were undertaken for both exploratory and confirmatory samples. To begin Phase 1, the 22-item AACES was subjected to exploratory factor analyses to test whether the latent factor structures held for the current data set. Next four alternative measurement models of the item covariance matrix were assessed using confirmatory factor analyses: (a) a null model in which all 22 items correlated with separate factors, (b) a one-factor model in which all 22 items correlated with the same factor, (c) a two-factor model in which the items originally intended to measure attitude to object correlated with the first factor and the items intended to measure attitude to situation correlated with the second factor, and (d) a three-factor model to test the three dimensions of attitude reported by the scale developers in 1990.

Phase 2 of the analysis consisted of a search for adequate measurement of the respondents' attitudes toward adult and continuing education by refining the instrument and its subscales through systematic item deletion. Goodness-of-fit indices

were examined at each step in the process, and items were examined for conceptual meaningfulness as proposed by the scale's developers. Next, a series of confirmatory factor analyses were conducted to identify adequate measurement models based on shorter versions of the AACES. In the third and final phase of the data analysis, a causal model was constructed with participation behavior (PBI) as an endogenous variable to examine the predictive validity of versions of the AACES identified in Phase 2. The relationship between attitude and participation behavior was assessed using linear structural equation modeling.

RESULTS

Measurement Models for Attitudes and Participation Behavior

In this section, we report the results of confirmatory factor analyses for the AACES and the PBI. Initially, alpha coefficients were computed for comparison with those reported by the AACES developers. However, later in this article we discuss the problem of the effects of scale length on Cronbach's alpha values (Niemi, Carmines, & McIver, 1986) and researchers' reliance on this method of estimating reliability. The internal consistency estimates according to Cronbach's coefficient alpha were .86 for the AACES and within the range of .66 to .76 for the three factors extracted. These results are comparable with those of the original AACES study. The five-item PBI yielded a Cronbach's alpha reliability estimate of .52, whereas the four-item index in the 1988 study had an alpha coefficient of .63. The descriptive statistics for the three scales are reported in Table 1.

Before the confirmatory factor analysis was conducted, the AACES was submitted to conventional exploratory factor analysis to check the structure of the scale. A scree plot of eigenvalues indicated a single dominant latent factor and three additional eigenvalues greater than 1. In other words, four potentially meaningful latent variables were derived from the AACES items, although five were anticipated based on Hayes and Darkenwald's (1990, p. 161) report on the properties of AACES. A confirmatory factor analysis was conducted with a number of different possible factor structures, and the measurement models were compared using the chi-square difference test. It was on the basis of this level of analysis that the AACES' developers have previously justified their claims for the scale's factor structure. However, chi-square has long been recognized as highly sensitive to the effects of large sample sizes, and there are now several methods that are more appropriate, available to estimate data-model fit. Contemporary analysis methods now require the use of several data-model fit indices (Bollen, 1989), and we chose to use Jöreskog's (1989) Goodness-of-Fit Index (GFI) and Bentler's (1990) Comparative Fit Index (CFI). The results of these analyses are reported in Table 2. The GFI indicates the proportion of shared variance and covariance of the measurement

TABLE 1
Descriptive Statistics for the Adult Attitudes Toward Continuing
Education Scale (AACES), AACES Subscales, and the Participation Behavior Index

<i>AACES Scale and Subscales</i>	<i>M</i>	<i>SD</i>	<i>Alpha</i>	<i>Items</i>
Enjoyment of Learning Activities	27.57	4.97	.69	7
Importance of Adult Education	36.35	5.75	.76	9
Intrinsic Value of Adult Education	22.98	4.34	.66	6
Total AACES	86.91	13.12	.86	22
Participation Behavior Index	3.03	1.37	.52	5

items accounted for by the model being tested, whereas the adjusted GFI (AGFI) is an estimate of fit adjusted for the degrees of freedom relative to the number of constructs in the model. The CFI is an estimate of the degree of fit between the hypothesized and null measurement models. By convention, fit indices that approach or exceed .90 are considered evidence of an acceptable model fit.

In both samples, chi-square tests suggested that the three-factor measurement model provided the best fit to the data. The results obtained clearly reject the null measurement model, as the GFI and AGFI were lower than .40, indicating a meaningful conceptualization among the 22 items. Nevertheless, no strong differences were observed between most of the fit indices among one-, two-, and three-factor measurement models. None of the measurement models yielded adequate fit indices, as the GFIs indicate that the measurement models could account for less than 70% of item variation. This result confirms the underlying unidimensional structure of the AACES, which is a function of the items selected for inclusion in the scale. No evidence was found to support Rokeach's two-attitude conceptualization of attitude toward adult education originally proposed by the scale developers. Because the three-factor model was the best fit among several alternative models and it was the factor structure selected by the AACES developers, our further analyses focused on this three-factor structure.

It was noted that for the three-factor measurement model derived for both the exploratory and confirmatory samples, some item factor loadings were adequate, whereas others were quite low and a few were even negative. The modification indices indicated double and triple loadings for some items as well as many correlated measurement errors (residuals). Taken together, the results obtained indicated that psychometric refinement of the three subscales was needed with regard to factor content and the number of items.

For the five-item measure of participation behavior in adult education (PBI), the confirmatory factor analysis results yielded an appropriate fit to the data. The chi-square tests were all statistically significant, and the GFIs were greater than .90 for both the exploratory and confirmatory samples. The rest of the selected fit

TABLE 2
Fit Indices for Original 22-Item Adult Attitudes
Toward Continuing Education Scale (AACES)

<i>Model</i>	χ^2	df	<i>Probability</i>	<i>GFI</i>	<i>AGFI</i>	<i>CFI</i>
AACES for exploratory sample						
Null	2766.78	231	.00	.30	.23	—
One factor	1306.20	209	.00	.68	.61	.57
Two factor	1277.26	208	.00	.68	.62	.58
Three factor	1274.96	208	.00	.69	.61	.58
AACES for confirmatory sample						
Null	2551.74	231	.00	.35	.29	—
One factor	1349.45	209	.00	.66	.59	.51
Two factor	1307.05	208	.00	.67	.60	.53
Three factor	1302.90	208	.00	.67	.60	.53
Participation Behavior Index measurement model						
Exploratory sample	25.73	5	.00	.96	.88	.88
Confirmatory sample	41.72	5	.00	.93	.80	.86

Note: GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; CFI = Comparative Fit Index.

indices approached .90. Therefore, it was concluded that the five-item index formed an adequate measurement model for a single construct of adult education participation behavior.

Having established the superiority of the three-factor model, the analysis focused on a search for an adequate measurement model for the construct of attitude within the AACES item pool. In modifying the AACES, items were deleted one at a time based on modification indices (MI) that pointed to individual items having either a complex loading pattern or being correlated with measurement error. An item with a complex loading pattern, or a passenger item, is an item with a high factor loading on the primary factor as well as a high loading on at least one other secondary factor. Items were discarded from the scale one at a time, with the item having the largest MI on at least one secondary factor being selected for deletion.

Items were deleted until an acceptable fit for a set of items was obtained for each factor. Acceptability was based on a consideration of all the fit indices. Consideration was also given to maintaining a balance in the number of items per factor. More specifically, efforts were made to keep a minimum of three items per factor to avoid identification and convergence problems. Bentler and Chou (1988) and Bollen (1989) recommended that a latent variable must have three or more indicators to avoid identification problems. The final model accepted consisted of nine items with three items per factor (see the appendix). The nine-item measurement model was developed from the exploratory sample and then tested with the

confirmatory sample. Figure 1 presents estimates of the measurement model for the overall sample, and the fit indices of the model for different samples are presented in Table 3. This revised measurement model fitted the exploratory sample well ($GFI = .94$, $CFI = .92$). Although it fitted the confirmatory sample less well (fit indices were less than .90), the fit of the model for the overall sample was acceptable ($GFI = .93$, $CFI = .87$). In other words, more than 90% of attitudinal variations measured on the modified scale could be explained by the three-factor structure of attitudes generated from the nine-item instrument. Next, the utility of the nine-item measure of attitudes to assess the relationship between attitude and participation behavior was examined.

RELIABILITY OF THE REVISED AACES (RAACES)

To assess the reliability of the RAACES we used the simple, conventional, Cronbach's coefficient alpha and a more demanding and empirically appropriate congeneric model (Jöreskog, 1969). Cronbach's (1951) alpha assumes a tau-equivalent model wherein each scale item is an equally accurate indicator of the one true scale score and that the individual item errors have different variances and are uncorrelated. Consequently, the tau-equivalent model's assumptions are quite restrictive because it is rare for all scale items in newly developed scales to perform equally well in measuring the same true score. Furthermore, Cronbach's alpha is frequently, although not always, influenced by the number of scale items, with a large number of items being likely to yield a high reliability estimate and a small number of items to yield a low estimate (Niemi, Carmines, & McIver, 1985). The effect of overreliance on Cronbach's alpha by scale developers is to develop and accept scales with more items than are necessary, thus raising problems during data collection and analysis. The tau-equivalent model, therefore, ought not to be the preferred estimate of reliability or the sole measure of reliability in situations where the equality of each item's association to the true score is not maintained and the minimum number of scale items necessary is being sought (Bollen, 1989; Fleishman & Benson, 1987; Lord & Novick, 1968). This problem may be greater in the case of an index of behavior than a psychological metric. Unfortunately, Cronbach's method is the preferred and frequently the sole method relied upon by many researchers because of its ease of calculation. In comparison to Cronbach's alpha, the assumptions of the congeneric model are less restrictive. It is assumed that each item reflects the same true score but to different degrees and that item errors may differ or even be correlated. In the opinion of the authors, in this case the congeneric model is a more powerful and appropriate method for estimating the reliability of the RAACES and the behavioral index (PBI).

To assess the reliability of the RAACES and the PBI with a congeneric model, a confirmatory factor analysis was performed and estimates were derived from calculations of the proportion of item variance accounted for by the latent variable

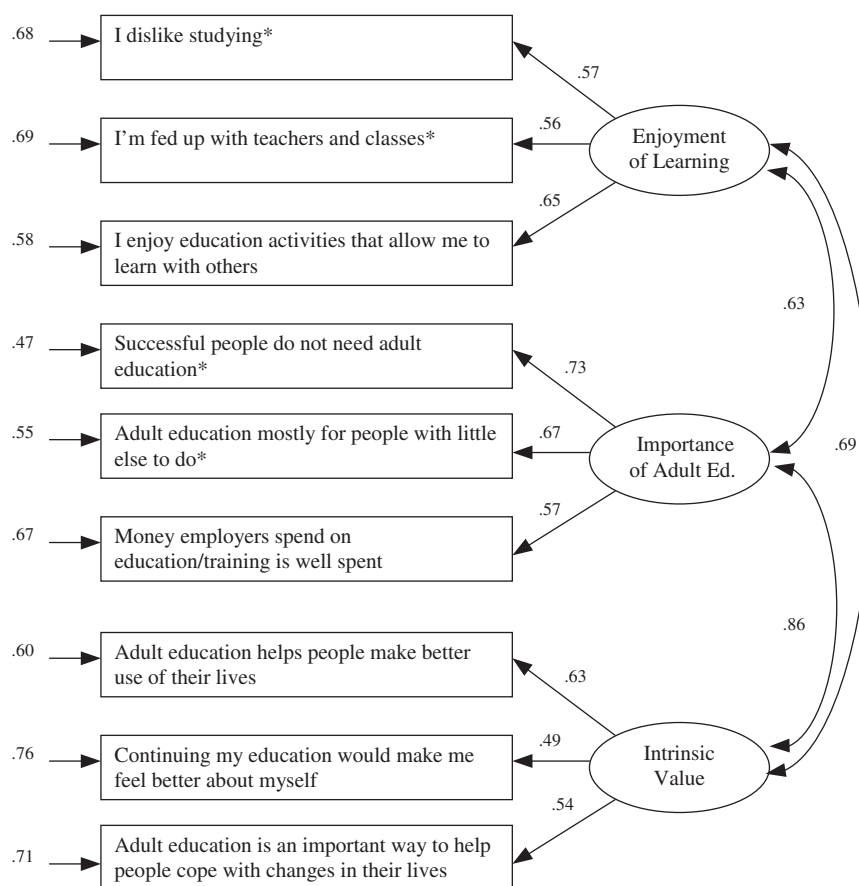


Figure 1. Measurement Model of Adult Attitudes Toward Adult Education

Note: Negatively worded items were reverse coded prior to analysis.

(Fleishman & Benson, 1987). Table 4 presents the Cronbach's coefficient alpha estimates of reliability for the 22-item AACES and the Cronbach's alpha and congeneric model reliability estimates for the nine-item RAACES and the five-item PBI. All of the reliability estimates reported were calculated based on the total sample ($N = 458$).

The results show that although the number of attitude scale items has been reduced significantly from 22 to 9 items, the RAACES and its subscales have acceptable levels of reliability when calculated by the congeneric method. The congeneric model method estimates were higher than those yielded by the

TABLE 3
Fit Indices for the Revised Adult Attitudes Toward Continuing
Education Scale (RAACES), the Nine-Item Modified Measurement
Model of the Adult Attitudes Toward Continuing Education Scale

<i>RAACES Sample</i>	χ^2	df	<i>Probability</i>	<i>GFI</i>	<i>AGFI</i>	<i>CFI</i>
Exploratory sample	68.85	24	.00	.94	.88	.92
Confirmatory sample	143.05	24	.00	.87	.76	.71
Total sample	136.65	24	.00	.93	.88	.87

Note: GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; CFI = Comparative Fit Index.

conventional method of Cronbach's coefficient alpha, likely due in part to the congeneric model not being negatively biased by the small number of scale items. Intrinsic Value of Adult Education, for example, had a modest coefficient alpha of .66 with five items from the AACES, whereas the RAACES's three-item factor subscale reliability estimate yielded by the congeneric model was .65. The relatively high coefficient alpha of .86 for the overall 22-item AACES was likely attributable to measurement distortion contributed by the large number of items. For the nine-item RAACES, the coefficient alpha of .73 was likely a more accurate estimate because it is confirmed by the estimate yielded by the congeneric model (also .73).

A higher reliability estimate for the five-item measure of participation behavior (PBI) was yielded by the congeneric model method (.75) rather than by Cronbach's coefficient alpha (.52). Again, we consider the difference in results to be attributable to the weakness of Cronbach's alpha method when used with a small number of items and the likelihood that the data did not fit the assumptions of the tau-equivalent model (Crocker & Algina, 1986).

PREDICTIVE VALIDITY OF THE RAACES

To assess the predictive validity of the three-attitudinal constructs of the RAACES, we used a structural equation modeling technique to examine the relationship between attitudes and participation behavior (PBI). We assessed a causal model of attitudinal constructs and behavior based on prior research findings (Bagozzi, 1982; Fishbein & Ajzen, 1975; Rokeach & Kliejunas, 1972). Bagozzi (1982) has demonstrated that the affect component of attitude serves to mediate the relationship between beliefs and behavior. For the three attitude factors, we think that Enjoyment of Learning reflects an affect component, whereas Perceived Importance and Intrinsic Value of Adult Education reflect beliefs and values held about adult education (Hayes & Darkenwald, 1990). Therefore, we reasoned that Enjoyment of Learning was a function of Perceived Importance and Intrinsic Value

TABLE 4
Cronbach's Alpha and Congeneric Model Reliability Estimates for
Attitude Scale Factors, Total Scale Scores, and Behavioral Index

<i>Attitude Scale Factor</i>	<i>AACES (22 items)</i>	<i>RAACES (9 items)</i>	
	<i>Coefficient Alpha</i>	<i>Coefficient Alpha</i>	<i>Congeneric Model</i>
Enjoyment of Learning Activities	.69	.56	.71
Importance of Adult Education	.76	.59	.80
Intrinsic Value of Adult Education	.66	.51	.65
Total scale score	.86	.73	.73
Participation Behavior Index (five items)		.52	.75

of Adult Education, and the latter two variables had an indirect influence on behavior as they represent the cognitive component of attitude. Furthermore, we assumed that adults' perceived Importance of Adult Education was determined by their beliefs regarding the Intrinsic Value of Adult Education. Figure 2 presents this causal model of attitude and participation behavior with estimates of the structural coefficients for the overall sample. All the path coefficients obtained were statistically significant ($p < .05$), and the fit of the model to the data was acceptable, $\chi^2(69) = 592.39, p < .01$; GFI = .86, CFI = .71. Almost 90% of the variance and covariance of the measures on attitude and participation were explained by the model.

The results also indicate that participation in adult education functioned effectively as a construct, with 14% of its variance attributable to the assessed attitudes toward continuing education. Participation behavior was directly influenced by Enjoyment of Learning (.37), which in turn was almost equally affected by Perceived Importance and Intrinsic Value of Adult Education, their path coefficients being .39 and .36, respectively. Although the impact of Intrinsic Value on Enjoyment of Learning was moderate (.36), it had a much stronger influence on Importance of Adult Education (.74). In summary, the results obtained demonstrate that all three factors of adult attitude toward continuing education have significant and interpretable influences on participation behavior.

DISCUSSION

The confirmatory factor analysis results of this study confirm earlier findings that attitude toward adult and continuing education is a multifactorial construct. Although this study employed an adequate representation of items and a sufficiently large sample size, the three-factor structure of attitudes identified by Hayes and Darkenwald (1990) failed to yield a satisfactorily clear factor structure. However, nine selected AACES items were demonstrated to form a satisfactory measure

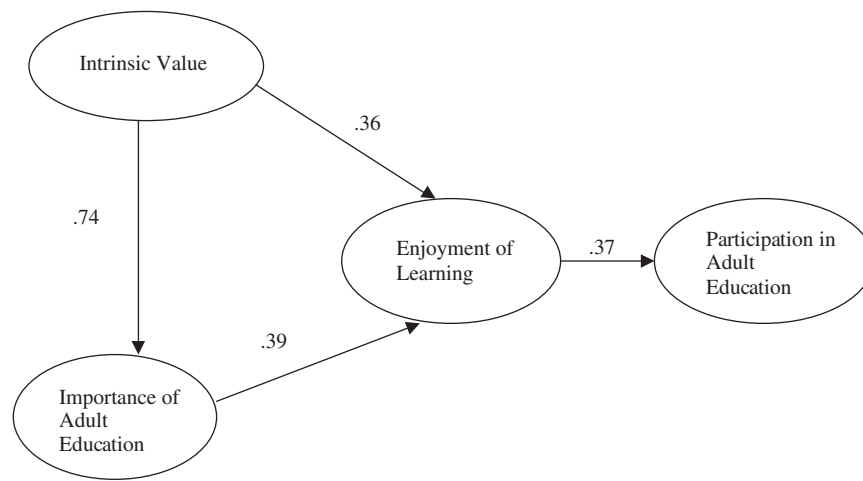


Figure 2. Causal Model of Adult Attitudes Toward Adult Education and Participation Behavior

of three attitude components: Enjoyment of Learning, Intrinsic Value, and Perceived Importance. For the original 22-item AACES, the differences between its possible three-factor structures were marginal. Many of the 22 items did not adequately reflect the constructs they were intended to measure, suggesting low content validity; the factors were poorly identified, and the scale's reliability was too dependant on its large number of items. A series of confirmatory analyses led to nine representative items being retained to comprise a revised scale (RAACES) that generated an acceptable conceptual and measurement model for the proposed three-factor structure. The variance in participation behavior explained by the AACES three-factor model of attitudes was modest (14%).

Although the three-factor structure of the RAACES is more clearly determined and is unambiguous, it remains a product of the scale items analyzed. Our findings are not conclusive, as evidence of additional factors persists in the broader psychological domain. Further theoretical and empirical studies are needed to fully confirm the dimensionality of adult attitudes toward adult and continuing education. We acknowledge the advice of measurement experts (Crocker & Algina, 1986; Nunnally, 1978) that several steps of the instrument development process used by Darkenwald and Hayes (1988) need to be repeated, beginning with item selection and validation. There is a need to examine further and modify current items in the RAACES to fully confirm their appropriateness. Because of the importance of attitude in explaining and predicting participation behavior, there is also a need to identify and include other measures of attitude in future studies of attitude-participation

relationships. This study echoes suggestions made by many others that a good scale is best developed through theoretical formulation, attention to prior research, and cross-validation with different samples over time (Comrey & Lee, 1992).

Although the five-item index of participation behavior (PBI) suffered from a relatively low internal consistency estimate of reliability, its reliability was confirmed by a more rigorous and appropriate congeneric method. It is understandable that the PBI has a relatively low internal consistency in part because of the small number of items that address a wide range of behaviors. Further work is needed to confirm the PBI as a comprehensive and valid index to assess participation behavior. One way to enhance the study of participation behavior would be to construct a number of indexes for different types of adult education activities and participant populations that would allow scores to be aggregated as they might for symmetric forms of the same test.

This study has examined not only the factor structure of adult attitudes toward continuing education but also the relationship of attitudes to participation behavior. The first attitudinal factor, Enjoyment of Learning, was interpreted as primarily an indicator of an affect component of attitude that had direct influence on participation behavior. The second and third attitudinal factors, Perceived Importance and Intrinsic Value, were each interpreted to have a significant indirect influence on participation behavior through the affect factor. Our results suggest that adults' perceived intrinsic valuing of adult education plays a fundamental role in participation decisions. Increasing adult learners' perceived value of educational activities is likely a good starting point for many adult educators and policy developers whose work focuses on recruitment and retention. It appears likely that the intrinsic value of continuing education enhances the perception of the importance of adult education and affects the decision to participate. However, it is recognized, based on prior research, that positive beliefs alone are insufficient to ensure participation behavior, and as this study confirms, affect plays a key mediating role. Negative educational experiences, with their subsequent feelings and emotions that result in a generalized dislike for educational experiences, are recognized to be deterrents to future participation for many adults (Quigley, 1990, 1992; Thompson, 1992).

A major challenge facing adult educators, an area where this psychometric and conceptual work can be helpful, is in the area of influencing potential participants' decisions to engage in continuing education and the creation of conditions in which participants discover or rediscover the personal enjoyment and satisfaction to be gained through educational activities.

SUMMARY AND CONCLUSIONS

This study is significant as the first rigorous analysis of the psychometric properties of the AACES. By means of a series of confirmatory factor analyses, weak items were removed from the original scale to create the RAACES, which yielded a more satisfactory three-factor model of attitudes toward continuing education.

The relationship between attitudes and participation behavior was examined by means of structural equation modeling. Our results support recent investigations that suggest attitudes are moderately significant predictors of participation behavior. To increase participation and retention according to the causal model tested in this study, adult educators and policy developers need to pay more attention to the role of attitude and recognize the complexity of the causal framework of participation decision making.

Finally, the study results confirm that the nine-item RAACES is a major improvement on the original 22-item scale. A shorter scale could allow the inclusion of additional variables on survey instruments without unduly increasing the time required of respondents and potential respondent fatigue or resistance during data collection. In addition, a shorter scale, which has met rigorous criteria for reliability and construct validity, will better serve researchers engaged in large-scale multivariate studies. We therefore recommend that the revised form, RAACES, be used to assess adult attitudes toward continuing education in future studies.

APPENDIX

Revised Adult Attitudes Toward Continuing Education Scale Items

1. Continuing education is mostly for people with little else to do.
 2. I dislike studying.
 3. Successful people do not need continuing education.
 4. I am fed up with teachers and classes.
 5. Money spent on continuing education for employees is money well spent.
 6. Continuing my education would make me feel better about myself.
 7. I enjoy educational activities that allow me to learn with others.
 8. Continuing education is an important way to help people cope with changes in their lives.
 9. Continuing education helps people make better use of their lives.
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