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Factors Influencing Nontraditional Age Student Participation in Postsecondary Education: How Do Student Motivations and Characteristics Relate to Adult Participation in Credential Programs?

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Abstract

How do student motivations and characteristics relate to participation in credential programs—either in the form of a college or university program, or a program leading to a diploma or certificate from a vocational or technical school or program? Through multinomial logistic regression analysis of data from the 1999 National Household Education Survey Adult Education Interview (AE-NHES: 1999), this study finds age, prior educational attainment, and reason for participation to be significant factors for all college/university degree outcomes. Gender, marital status, household income, and household size were significant predictors of participation in Vocational/Technical programs. Having participated via distance education predicted Voc/Tech and Bachelor degree participation.

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In recent years, growth in postsecondary education has reflected not only population growth and an increase in the proportion of high school students who seek to continue their formal education; in addition, growing numbers of adult learners are returning to college. From a business perspective, Peter Drucker (1994) has described the rise of new types of workers and an "emerging knowledge society." In education, Merriam and Caffarella (1999) describe the connection between adult learning and contemporary society in terms of three dimensions of the sociocultural context shaping today's world: demographics, the global economy, and technology. Fueled by structural changes in the national economy, as well as the rapidly changing economics of information technology, the trend of increasing demand by adult learners for postsecondary education (Rowley, Lujan, & Dolance, 1998) seems likely to continue. Yet, comparatively little research has been done to better understand the factors that influence participation in postsecondary education by nontraditional age students. This paper represents a summary of literature, analyses, and findings described in more detail in my dissertation addressing the research question: How do the characteristics and motivations of nontraditional age students relate to participation in credential programs—either in the form of a college or university program, or a program leading to a diploma or certificate from a vocational or technical school or program?

While participation in adult education has grown steadily in recent decades, increasing to 45 percent of all adults and 40 percent of all college students in 1999 (Kim & Creighton, 2000; *Chronicle of Higher Education Almanac*, 1999-2000), it has been argued that "our understanding

of the unique factors that predict adult student success has not increased likewise" (Lundberg, 2003, p. 665). Several major forces since the end of the cold war—i.e., economic globalization and increased cultural exchange; personal computers, internet access, and the information explosion—are changing the educational landscape (Duderstadt, Atkins, & VanHouweling, 2002; Twigg, 2002). Changing perceptions of nontraditional age students since the GI Bill, and the interplay between higher education and society (Ashby, 1966; Boyer, 1990; Dey & Hurtado, 2005; Nowotny, Scott, & Gibbons, 2001), help to frame the historical progression of adult education research.

Strictly speaking, the term *adult* may convey an impression of financial independence and responsibility which the phrase *nontraditional age student* may not; however, throughout this work these terms will be used interchangeably with respect to participation in postsecondary education. In contemporary society, working adults must master new types of literacy skills on an ongoing basis. Increasingly, the rising cost of a college education in recent decades—and policy changes related to student financial aid—have provided strong stimulus for students to work while enrolled; however, in depth analyses of college costs and student financial aid are beyond the scope of this research. Because the phrase *adult education* means so many different things to so many groups of people, and the concept changes with changing social norms, the literature on adult education is vast. The following literature review briefly summarizes a longer dissertation version, introducing themes that characterize adult education as well as previous empirical research studies.

Literature Review

The literature relating to nontraditional age student or adult participation in postsecondary education represents the intersection of two research areas embedded within

larger fields of education study: first, a subset of the *higher education* literature describing nontraditional students, programs, etc. as well as college choice; and, second, a subset of the *adult education* literature focusing on adult participation in formal postsecondary programs. As in other social sciences, the influence of prevailing political, social, and economic trends is also of interest in education research, particularly as it relates to adult participation. In contemporary society, adult participation in postsecondary education is important as a policy issue as well as a research area.

Most conceptual models from the higher education literature focus on factors that influence *traditional* age students whether to participate in postsecondary education and what programs to choose. Hossler, Braxton, and Coopersmith (1989) note that this decision process is difficult to study because it is longitudinal and cumulative and begins at an early age; they summarize literature describing the process using terms such as *college plans, educational goals*, and *the demand for higher education* and define the now widely recognized term *student college choice*: "a complex, multistage process during which an individual develops aspirations to continue formal education beyond high school, followed later by a decision to attend a specific college, university or institution of advanced vocational training" (p. 234). The econometric, sociological, and combined models reviewed by Hossler et al. focus primarily on the perspective of traditional age students, and expected college costs are consistently an important factor. Several models of *nontraditional age student* or *adult* participation have also been proposed in the literature.

Informational and Other Barriers to Participation

For adult students, models of postsecondary participation reflect many of the factors common to models of traditional age students; however, adult education models often also

include a broader category of variables representing *barriers* to participation (e.g., Cross, 1981; Darkenwald & Merriam, 1982) or *deterrents* (e.g., Henry & Basile, 1994; Valentine & Darkenwald, 1990). Adults with multiple social roles and many types of responsibilities often cite *lack of time* as well as cost as barriers to participation; however, for adults, other types of factors may lie behind these situational factors. In the context of data collection through self-report surveys of adults, Cross (1981) cites two "methodological problems in understanding the actual role of dispositional barriers" (p. 106). The first has to do with perceptions of social desirability: "it is far more acceptable to say that one is too busy to participate in learning activities or that they cost too much than it is to say that one is not interested in learning, is too old, or lacks ability… [The second problem is that survey] respondents who said they were not interested in further education were frequently dropped from further analyses" (pp.106-107).

A theme of information society issues for adult education, including new questions of access for minorities and other special interest groups, is emerging. This theme appears infrequently in the literature of higher education, and it might be more clearly understood in terms of *information literacy* (Hancock, 1993). Just as the institutional planning perspective must expand in order to adapt to a new competitive environment or "postsecondary knowledge system" (Peterson & Dill, 1997), educators' perspective of literacy in an information society must also expand. In the same way that contemporary business has become a globally connected enterprise, postsecondary education is changing to become a globally connected "postsecondary knowledge industry." In this new environment, *information* literacy, or the "ability to know when information is needed" and then having the "skill to identify, locate, evaluate, organize and effectively use that information" (Rosenberg, 2002, para 5) becomes an essential component of literacy.

Self-directed Nature of Adult Learning

In defining adulthood, Darkenwald and Merriam (1982) emphasize the arbitrariness of using age alone as a delineator without recognizing the process of maturing and adapting to new social roles. Educators such as Malcolm Knowles and K. Patricia Cross authored multiple works throughout their careers, sometimes employing different terminology for studying nontraditional age students. However, much of their work reflects a common interest in designing effective programs for nontraditional age students based on *why* they participate in postsecondary education—hence, the classification of such studies as *motivational* or *psychological*. In Knowles (1980) system of *andragogy*, the first of four original assumptions or stated characteristics of adult learners is: "As a person matures, his or her self-concept moves from that of a dependent personality toward one of a self-directing human being" (Knowles, 1980, p. 43).

Trend to "Vocationalism"

Increasingly, governmental policy perspective encourages links between college curricula and vocational education for adults in order to promote economic development and support competitiveness in a global knowledge economy. Adult education theory and practice were not new in America after World War II; however, as more adults became involved in postsecondary education, the early 20th century focus of adult education on the liberal arts—and social benefits—began shifting toward what has been described recently as *vocationalism* in higher education (Grubb & Lazerson, 2005). Now that the 21st century is under way, education for work performance continues to increase in importance. Like Ben-David (1977/1992) and other scholars of comparative systems, Brint and Karabel (1989b) contrast the American system of education with the educational systems of other advanced industrial countries and describe a unitary pattern of *comprehensive* education (i.e., mixing secondary and postsecondary students

of the liberal arts with students pursuing vocational courses of study) as "the characteristic American pattern of educational organization" (p. 726). Karabel (1972) and Pincus (1980), for example, also criticize the effectiveness of the community college in achieving the American ideal of equal opportunity for all students, but they nevertheless acknowledge the unitary pattern ideal and its purposes in supporting a democratic society. In today's *Information Society*, the changing societal context is influencing what is meant by *vocational* (Grubb & Lazerson (2005).

Models from Previous Research

Previous empirical research on adult participation in postsecondary education reflects two general classes of literature: psychological/motivational (later psychosocial interaction) models, and studies of student characteristics. Psychological models focus on differences in student motivation (e.g., Morstain & Smart, 1977; Wolfgang & Dowling, 1981). Studies of the characteristics of nontraditional students take several forms (e.g., Aslanian & Brickell, 1980; Bash, 2003), and include governmental reports based on national surveys (e.g., Berker & Horn, 2003; Choy & Premo, 1995; Horn, 1996). By 1980, higher education enrollments at some types of institutions had peaked and begun to decline for the first time (Zammuto, 1986), resulting in competition for students and stimulating institutional interest in studying the characteristics of students most likely to continue their education beyond high school. Although total higher education enrollments continued to grow throughout the 1980s "despite predictions to the contrary" (Dey & Hurtado, 2005, p. 319), economic issues—including the rising cost of obtaining a college education—have remained a policy concern since that time.

Summary of Previous Research Findings

Previous empirical research on adult participation in postsecondary education has varied in focus—often including the full range of adult education activities, yet has created a somewhat

consistent profile of the adult participant. The first national study of participation in adult education, conducted by Johnstone and Rivera (1965) at the National Opinion Research Center, found the typical adult participant to be better educated, younger, employed full-time with a relatively high income, and most likely to be white (Henry & Basile, 1994, p. 65; Merriam & Caffarella, 1999, p. 49). During the 1960s, the influence of developments in psychology stimulated interest in explaining the motivations of adult students. Based upon in-depth interviews of a small sample of adult learners, Houle (1961) constructed a typology of three adult learning orientations: 1) *goal-oriented* learners, 2) *activity-oriented* learners, and 3) *learning-oriented* participants. This typology was extended through the work of other researchers, especially Boshier (1971, 1982) who developed and refined the Education Participation Scale (EPS). Studies of national survey data by the U.S. Department of Education National Center for Education Statistics (NCES), have also contributed to the literature on reasons for participation—consistently finding job-related reasons important (Berker & Horn, 2003; Kleiner, Carver, Hagedorn, & Chapman, 2005). Another national study based on survey data (Aslanian & Brickell, 1980), found that *major life changes in the last year* were an important factor for many participants (Henry & Basile, 1994).

Since both *opportunity* and *motivation* are necessary for adult participation in postsecondary education, psychosocial interaction models have helped to increase understanding of potential barriers to adult participation. Boshier's (1973) Congruence model, Cross' (1981) Chain-of-Response model, Darkenwald and Merriam (1982), Cookson's (1986) ISSTAL model, Rubenson (1989), and Henry and Basile (1994) all incorporate contextual characteristics as well as motivational factors. Cross (1981) identifies prior education level as the best predictor of participation in adult education. In stressing the importance of including both participants and

non-participants in the sample, the study by Henry and Basile (1994) remedies one of the methodological problems identified by Cross (1981). In this respect, as well as in its recognition of *sources of information* as a factor for adult participation, the Henry and Basile study has inspired the research design described in the next section of this paper.

Data Source and Method of Analysis

Since 1991, NCES has conducted a series of National Household Education Surveys (NHES)—including an adult education (AE) interview. Data analysis techniques employed in this study focus on adult participants in postsecondary credential programs, as a proxy for nontraditional age students in such programs, compared with participants in work-related courses that did not lead to a credential (i.e., *non*-participants in *credential programs*).

Sample Selection Criteria

I chose the 1999 NHES Adult Education Interview as a source of data for this study for several reasons. The AE-NHES:1999 survey and dataset structure: (a) combine the full range of credential programs (i.e., college or university programs as well as programs leading to some type of vocational or technical diploma or certification) into a common section of the interview, (b) represent more detailed coverage (i.e., more detailed than later National Household Education Surveys) of motivational factors for adults, (c) contain a subset of questions related to the use of new information technology in educational programs, and (d) provide the opportunity to compare cases of non-participants with participants in postsecondary credential programs.

The AE-NHES:1999 interview was designed to incorporate a broad approach to the diverse arena of adult education, including “voluntary and required educational activities that are formal, as defined by the presence of an instructor” (Kim & Creighton, 2000, p. 3). Adult survey respondents were asked if they had participated in the following *six types* of adult education *in*

the following order: English as a Second Language, Adult Basic Education, Credential Programs, Apprenticeship Programs, Career- or Job-related (i.e., *work*-related) Courses, and Personal Interest or Development Courses. For many survey respondents, these were *not* mutually exclusive categories.

Of the six types of adult education activities defined for the NHES, only participants in either a Credential Program or a Work-related Course, *or both,* are included in the effective sample. Estimated percentages of adults participating in adult education activities related to English as a Second Language, Adult Basic Education, or Apprenticeship Programs are small, and these groups are beyond the scope of this study. Similarly, due to the potential for extreme variability of content and quality associated with Personal Interest and/or Personal Development Courses, these courses are also beyond the scope of this study and are excluded from the effective sample. The total number of adults in the United States at the time of the survey (1st quarter, 1999) is estimated to be a *population* of 194.625 million (Kim & Creighton, 2000). Although the NHES:1999 survey screening process was designed to include household members ages 16 and older in the resulting AE-NHES:1999 dataset, it is important to note that those individuals *only participating full-time in a college or university credential program* are considered 'traditional' students here and, as such, *are excluded* by design from the 'adult education' survey and, accordingly, from the AE-NHES:1999 dataset of 6,697 cases overall.

Proportional comparisons between major conceptual categories of the adult education sample (representing all six types of adult education activities mentioned earlier) are blurred by the fact that respondents representing an estimated 12% of adults participated in more that one type of adult education activity during the survey period. Table 1 summarizes the logic employed in identifying cases for the effective sample, based on the variables that identify participants in

either type of credential program (i.e., College/University or Vocational/Technical) or in a work-related course (i.e., credential program non-participants). The observations of primary interest

Table 1. Selection of effective sample: Postsecondary participation by type of participation (representing all logical combinations of credential program and/or work-related course) during the past year, and number of observations (n)

		Participation in either type of Credential Program during the past year?					
Logical Combination Possibility		College or University Participant?	Vocational or Technical Participant?		Work-related Course or activity Participant in past year?		Number of Observations* (n)
1		*Yes*	*Yes*		*Yes*		57
2		*Yes*	*Yes*		No		112
3		*Yes*	No		*Yes*		270
4		*Yes*	No		No		664
5		No	*Yes*		*Yes*		71
6		No	*Yes*		No		263
	Subtotal Credential Participants						**1,437**
Comparison: Work-related Courses only		No	No		*Yes*		1,545
Total Potential Number of Observations in Effective Sample							**2,982**

* Of 6,697 total 1999 NHES Adult Education interview respondents, the remaining 3,715 not described in Table 1 did not acknowledge participation in credential programs or in work-related courses during the 12-month period preceding the survey.

for this study are the 1,437 participants in either type or both types of credential programs; however, an additional 1,545 participants only in work-related courses that did not lead to a credential is also of interest for comparison purposes and is included as a control group in the effective sample of 2,982 observations.

Data Analysis Techniques and Complex Sample Design Effects

Given the categorical nature of the dependent variables and *complex design* of the overall NHES sample, I conducted logistic regression analyses using the survey commands in Stata. The

survey literature (Heeringa & Liu, 1997) describes samples incorporating special design features such as stratification, clustering, and weighted estimation as 'complex designs.' Stata 9 includes capabilities for analyzing complex sample design survey data, with some known limitations. For example, many post-estimation tests have not yet been fully adapted for complex sample design survey data (Long & Freese, 2006). Wherever necessary, I conducted sensitivity analyses by comparing logistic regression results obtained using survey commands to those obtained under assumptions of simple random sampling (with pweights) to determine the importance of complex sample design effects for these data. I took the relative magnitude of design effects into account in determining whether simple (non-survey data) test commands could be employed without risk of misinterpretation of results or unreasonable loss of precision.

Multinomial Logistic Regression

Initially, I estimated a multinomial logistic (MNL) regression model, regressing participants' highest credential program (HIGHCRED) on a number of independent variables conceptualized to be related to one's choice of credential program (see Table 2 for dependent variable descriptions and frequencies). The initial MNL regression phase of the study compares outcomes representing participation in each of six categories of credential program to a *base category* of credential program non-participants, then tests whether underlying assumptions for that model are violated for these data. MNL regression analysis requires that the decision makers can be assumed to view each alternative outcome possibility *independently*. This analysis technique is most appropriate when the alternatives are quite different from one another. In the case of the dependent variable highest credential pursued, one might think about the *independence of irrelevant alternatives* (IIA) property constraint in terms of the question: Would

the probability of pursuing an Associate Degree, for example, change if the Vocational/Technical Diploma were no longer an alternative?

Tests of the IIA Assumption

Two tests of the IIA assumption (i.e., to determine that the relative risk of obtaining any outcome does not depend on the availability of other outcomes) have been implemented in Stata for use after the MNL regression is estimated: the Hausman test and the Small-Hsiao test. When designing this research, I planned to execute both tests to determine if the MNL is an appropriate model specification for these data. If tests of the IIA assumption failed, I then planned to estimate a binary logistic regression model, exploring the appropriateness of nested binary models representing two decisions: first, to enroll in a postsecondary program or not; then, to choose either a college/university or some type of vocational/technical school or program. For the final phase of this research, I constructed a binary logistic regression analysis with the same effective sample as in the first phase and a dependent variable (CRDIPART) representing participation (or not) in any form of postsecondary credential program. In order to further explore the relationship between the decisions involved in (a) returning to school (or not), and (b) choosing a course of study or type of program, I compared a binary logistic regression model including the same independent variables used in the MNL regression analysis to a second binary model including institutional type of instruction provider as an additional independent variable.

Dependent Variables

The primary dependent variable for this study is highest credential program pursued (HIGHCRED), including both the possibility of a college or university program and the possibility of a program leading to a diploma or certificate from a vocational or technical school or program. This variable is considered the *primary* dependent variable for this research in two

ways: first, it represents the full range of outcomes (see Table 2) addressed by the research question being explored, and, second, it serves as the dependent variable in the initial MNL regression. Table 2 summarizes the initial frequencies of each category of highest credential program pursued and recoding to define the categories for an initial MNL regression analysis.

Table 2. Description of primary dependent variable, original and recoded values; Number of observations (n) in total AE dataset and in effective sample for initial regression

Original Values of Primary Dependent Variable: Highest Credential, HIGHCRED					Recoding of Primary Dependent Variable: HIGHCRED	
Value and Description	Freq.	% of **Total Adults**	% of **Credential Participants**		Description	Freq.
					*Other**	*159*
1 Voc/Tech Diploma	228	3.4	15.8		Voc/Tech Diploma	228
2 Associate Degree	250	3.7	17.4		Associate Degree	250
3 Bachelor Degree	473	7.1	32.9		Bachelor Degree	473
4 Master Degree	205	3.1	14.3		Master Degree	205
5 Doctorate	47	0.7	3.3		Doctorate/Professional	122
6 Professional Degree	75	1.1	5.2			0
91 *Other**	*159*	2.4	11.1			0
Subtotal Credential Program Participants	**1,437**	21.5	100.0		**Subtotal Credential Program Participants**	**1,437**
Neither type of participation	3,715	55.5			(Non-credential)	
Work-related Courses only	1,545	23.0			Work-related Courses	1,545
Total Adult Ed. No. of Observations	**6,697**	100.0			**Effective Sample No. Of Observations**	**2,982**

*Note: Preliminary review of supplemental restricted use data associated with 'Other' responses suggested possible combination of this category with the 'Voc/Tech Diploma' category.

For analytical convenience and without substantial loss of clarity for purposes of this study, the original values of the primary dependent variable were recoded to combine the two categories 'Doctorate' and 'Professional Degree.' The 159 responses labeled 'Other' represent only 2.4 % of total adult education cases, but slightly over 11% of credential program participants. According to additional information available in the NHES supplemental restricted use file, the 'Other' category includes many vocation- related credential program descriptions; based on this preliminary information, the 'Other' category has been re-ordered to appear next to the 'Voc/Tech Diploma' category but not combined with that category.

A second dependent variable (CRDIPART) representing participation in either type of credential program (a college or university program or a program leading to a diploma or certificate from a vocational or technical school or program), as opposed to non-participation in a credential program, is employed in the binary logistic regression models of this study.

Independent Variables

Reflecting the literature, and theoretical influence from sociology as well as psychology, both contextual factors and variables representing student motivational factors were identified in the AE-NHES:1999 dataset. Variables representing the contextual perspective include student demographics such as age, gender, marital status, and race/ethnicity; and household characteristics such as household income, total number of persons in the household, and whether the respondent owns or rents the home. Additional contextual elements include background characteristics such as prior educational attainment (i.e., prior to current postsecondary participation), library use during the past month and year, and labor force participation-related elements including the region of the country in which the household is located and whether the household is located in an urban or rural area. Study variables also include self-reported number of hours worked weekly, and whether or not the employer provided any support for education activities (including providing instruction) or required continuing education.

In the AE-NHES:1999 datasets, variables representing the motivational perspective are somewhat limited—based primarily on the survey question that asks the main reason the respondent participated during the past 12 months in the program being discussed at the time with the interviewer. Choices suggested to the respondent include: (a) improve, advance or keep up to date on current job; (b) train for a new job or career; (c) improve basic reading, writing, or math skills; (d) meet a requirement for a diploma, degree, or certificate; (e) personal, family, or

social reason; or (f) some other reason. For purposes of this study, the (c) improve basic skills category and the (e) personal, family, or social reason category were combined with (f) some other reason and reported as 'Other Reasons.' In recognition that nontraditional age students are often time-limited adults with family or work responsibilities, or both, the variable representing postsecondary participation via some type of distance education was studied as an additional proxy for nontraditional age student motivation to return to school.

Given the diverse range of adult education activities represented in the overall dataset of 6,697 observations, and the multiple definitional perspectives in the adult education literature, the usefulness of a single summary statistic for the age variable is limited. Table 3 illustrates how the mean age varies for different groups within the effective sample. Adult survey respondents

Table 3. Summary age statistics (df = 6695) for selected groups of adult credential program participants

Group (see below)	# of Obs.	*AAGE98 Mean*	Linearized Std. Error	95% Confidence Interval		*Deff*
I-A	2,982	37.1	.29	36.52	37.65	1.14
I-B	2,823	36.9	.30	36.35	37.52	1.14
II-A	1,437	31.8	.41	30.97	32.58	1.23
II-B	1,278	30.7	.42	29.87	31.54	1.23

I-A: Full range of credential participant observations (College/University and Voc/Tech), *including* 159 with 'Other' as a highest credential pursued, *plus additional work-related control group.*

I-B: Full range of credential participant observations (College/University and Voc/Tech), *excluding* 159 with 'Other' as a highest credential pursued, *plus additional work-related control group.*

II-A: Full range of credential participant observations (College/University and Voc/Tech), *including* 159 with 'Other' as a highest credential pursued.

II-B: Full range of credential participant observations (College/University and Voc/Tech), *excluding* 159 with 'Other' as a highest credential pursued.

who had participated in credential programs during the previous 12-month period (n=1,437) ranged in age from 17 to 87 years; among *all* adult education respondents (n=6,697), the age

range was 16 to 95 years (mean 44.7; linearized s.e. 16.97). Nontraditional age students are defined here as those who are 25 or older. Age ranges selected for categorical age variables in this study are based on age classifications from the most recent United Nations Educational, Scientific, and Cultural Organization (UNESCO) study of participation in adult education (Valentine, 1997), reprinted with permission in Merriam and Caffarella (1999, p. 50).

Findings

This section presents a summary of results in three parts, according to three sequential stages of the analysis: MNL regression, post-estimation tests, and binary logistic regression.

MNL Regression Results

Overall MNL results across seven outcome categories are summarized below in Table 4.

Demographics

Based on relative risk ratios (RRR) and Wald statistics calculated, age was a significant demographic predictor across college/university outcomes, but not a significant predictor for the Vocational/Technical and 'Other' categories. For Associate, Bachelor, and Master program outcomes, nontraditional age adults were less likely (indicated by RRRs less than 1.0) than traditional age students to participate in credential programs. For the Doctoral or Professional Degree outcome, only the ages 35-44 and ages 55-87 categories were significant; both of these relative risk ratios (.153 and .090, respectively) indicate a much smaller relative risk that adults in these age ranges would be participants in this type of credential program, as compared to the base category outcome of work-related course participation only.

For the Vocational/Technical outcome, both separated, widowed, or divorced marital status and married marital status were significant. Results indicated that separated, widowed, or divorced adults (RRR of .331) and married adults (RRR of .242) had a lower relative risk of

being participants in this type of credential program. Married marital status was also a significant predictor of participation in an Associate, Bachelor, and Doctoral/Professional degree program, but not in a Master degree program. For example, married students had a relative risk of being in a Bachelor degree program that was only .416 that of their single counterparts.

Gender was a significant predictor of participation by adults in Vocational/Technical, Associate, and Bachelor programs but not in Doctoral/Professional programs and significant only at the $p < .10$ level for the Master program outcome. For the three significant outcomes (at least $p < .05$), females had a relative risk of being participants in credential programs that was approximately half the RRR of males.

In general, race or ethnicity was not a significant predictor of credential program participation. However, this demographic characteristic, along with country of origin, was a significant predictor of participation in 'Other' types of credential programs. For the 'Other' outcome category, Black non-Hispanic adults had RRRs that were 2.026 times higher than that of White adults of non-Hispanic origin; adults of Hispanic origin had RRRs that were 2.281 times that of White adults of non-Hispanic origin; and, the RRRs of adults of other races or ethnicities were 3.684 times that of White non-Hispanic adults.

Educational Background Prior to the Survey Period

The literature describing previous empirical studies of adult participation notes educational background to be an important predictor of participation in postsecondary education and results of this study concur. In most result categories, adults with some level of additional education after high school had higher RRRs than those with a background of high school or less. As an exception to this pattern, adults with a prior educational background of postgraduate work or a bachelor degree had RRRs of about .5 for the Vocational/Training program outcome,

indicating they were about half as likely to be participants in a Vocational/Technical program than adults with a background education of high school or less.

Household Characteristics

Both household income and the number of persons in the household were generally not significant in predicting participation in college or university degree programs, but were significant predictors of participation in Vocational or Technical programs. From household income levels of $30,000 to $50,000 per year, increasing household income levels were associated with lower relative risks of participation in a Vocational/Technical program. As the number of persons in the household increased, the relative risk of Vocational/Technical program participation also increased, as compared to single person households. Other variables associated with household own/rent status and household location within an urban or rural area, as well as location within a region of the United States, were not significant predictors at the $p < .05$ level.

Reasons for Participation

Wald tests for these variables were significant at the $p < .001$ level for all outcome categories. Adults who said they participated in credential programs to earn a credential had RRRs from 2.104 (Voc/Tech) and 2.493 (Master) to 7.647 (Bachelor) and 7.605 (Doct/Prof) times those who said they participated to advance in their current job. Results for adults who said they participated for other reasons or in order to train for a new job generally showed even higher RRRs, even for the outcome category for 'Other' unspecified credential programs. Results for the variable associated with distance education participation also showed significance for the 'Other,' Vocational/Technical, and Bachelor outcomes, and suggested that the availability of this mode of participation option may have influenced the decision of these participants.

Table 4. Multinomial logit relative risk ratios (RRR) by outcome category, Variable Wald tests, significance levels. (n = 2982; Log Pseudolikelihood -2840.667; Pseudo R2 .356; Prob > chi2 .0000)

Independent Variables	Other RRR		Voc/Tech RRR		Associate RRR		Bachelor RRR		Master RRR		Doct/Prof RRR	
Age chi2(4) =	1.96 (.7427)		4.02 (.4036)		19.26 (.0007)		58.53 (.0000)		15.89 (.0032)		23.70 (.0001)	
Age 25-34	.903		1.305		.452	**	.277	***	.413	**	.550	
Age 35-44	1.212		.763		.247	***	.146	***	.242	***	.153	***
Age 45-54	1.443		.863		.180	***	.047	***	.156	***	.617	
Age 55-87	1.537		1.130		.134	***	.035	***	.106	***	.090	***
[Age 19-24]												
Marital Status	2.83 (.2431)		22.56 (.0000)		7.70 (.0213)		11.01 (.0041)		3.33 (.1892)		10.06 (.0065)	
Sep., Wid., Div.	.510		.331	***	.617		.593		.545		.440	
Married	.712		.242	***	.418	***	.416	***	.634		.338	***
[Single]												
Gender	2.23 (.1354)		11.27 (.0008)		11.93 (.0006)		8.87 (.0029)		2.83 (.0926)		1.48 (.2231)	
Female	.711		.494	***	.456	***	.523	***	.660	*	.676	
[Male]												
Race/Ethnicity	11.17 (.0108)		2.05 (.5611)		4.23 (.2379)		8.16 (.0428)		4.29 (.2318)		5.06 (.1678)	
Black, non-Hisp.	2.027	**	1.053		1.593		1.359		.784		.957	
Hispanic	2.281	*	1.229		1.370		1.680	*	2.165	*	.753	
Other Race/Ethn.	3.684	**	2.136		2.024		3.051	**	.882		3.142	**
[W, n-Hisp]												
Country of Origin	4.88 (.0272)		.00 (.9612)		.56 (.4546)		.01 (.9049)		2.35 (.1257)		.66 (.4174)	
Not born in US	.277	**	.979		.730		.960		.544		.691	
[Born in US]												
Prior Education	7.50 (.1862)		18.27 (.0026)		89.15 (.0000)		108.44 (.0000)		2895.5(.0000)		43.89 (.0000)	
Voc/Tech post HS	.764		1.638		1.166		1.130		.000	***	1.121	
Some college	1.327		1.539		5.743	***	14.025	***	7.433	***	2.776	*
Assoc. Degree	2.144	**	1.072		4.499	***	12.561	***	4.536	*	1.471	
Bach. Degree	1.380		.512	**	.214	***	3.462	***	37.839	***	4.720	***
Grad school +	.747		.473	**	.291	*	.674		91.123	***	19.783	***
[HS or less]												
Household Income	8.86 (.1819)		18.77 (.0046)		9.20 (.1625)		12.62 (.0495)		4.61 (.5942)		7.93 (.2430)	
$10,001-20,000	.840		.455		.990		1.078		.468		1.534	
$20,001-30,000	.351	*	.480		.509		.430	*	.701		.745	
$30,001-40,000	.657		.392	*	.810		.741		1.130		1.148	
$40,001-50,000	.382		.388	*	.701		.395	*	.621		.388	
$50,001-75,000	.542		.259	**	.516		.499		.809		.868	
$75,001 or more	.340	*	.149	***	.360	*	.375	**	.727		.550	
[< $10K]												
No. in Household	8.63 (.1246)		11.71 (.0390)		3.97 (.5537)		4.62 (.4636)		13.05 (.0229)		8.59 (.1264)	
2 persons	.950		2.287	**	1.416		1.411		1.333		1.849	*
3 persons	1.906	*	2.374	**	.979		1.465		1.424		.818	
4 persons	.911		3.089	***	.937		1.096		.635		1.670	
5 persons	1.742		4.082	***	1.049		1.193		3.297	**	3.829	*
6 or more	1.112		4.609	***	.714		.793		1.032		2.018	
[Hsehold of 1]												
Own/Rent Status	.34 (.8427)		3.69 (.1577)		1.38 (.5024)		.65 (.7213)		2.80 (.2466)		3.76 (.1523)	
Home is rented	1.104		.609	*	.728		.814		1.653	*	1.961	*
Oth thn own/rent	.864		.809		.913		.868		1.266		1.729	
[Home owned]												

	Other		Voc/Tech		Associate		Bachelor		Master		Doct/Prof	
Urban/Rural Status	3.44 (.1793)		.69 (.7070)		1.94 (.3790)		2.07 (.3548)		.88 (.6424)		2.19 (.3344)	
Urban, outside	1.318		.815		1.313		1.600		1.114		.343	
Rural area	1.666	*	1.130		1.445		1.035		1.365		.749	
[Urban, inside]												
Census Region	5.03 (.1695)		2.49 (.4767)		1.96 (.5802)		1.42 (.7007)		2.93 (.4033)		5.17 (.1600)	
South	.905		.735		.677		.934		.969		1.375	
Midwest	1.725		.635		.856		1.218		.920		1.160	
West	1.488		.650		.868		1.154		.646		.561	
[Northeast]												
Reason for Particip.	43.50 (.0000)		57.37 (.0000)		95.67 (.0000)		121.16 (.0000)		57.96 (.0000)		60.63 (.0000)	
Earn credential	.942		2.104	**	4.421	***	7.647	***	2.493	***	7.605	***
Train for new job	4.980	***	5.471	***	13.105	***	14.764	***	7.594	***	13.150	***
Other reasons	5.260	***	6.125	***	11.552	***	12.525	***	4.233	***	10.701	***
[Current Job]												
Dist. Ed. Particip?	8.56 (.0034)		6.22 (.0126)		1.32 (.2499)		7.79 (.0053)		3.22 (.0728)		2.24 (.1347)	
Dist Educ: Yes	2.597	***	2.110	**	1.487		2.551	***	1.727	*	2.061	
[Dist Ed: No]												
Employer Support?	14.58 (.0001)		41.89 (.0000)		22.16 (.0000)		8.52 (.0035)		12.46 (.0004)		6.32 (.0119)	
No empl support	2.704	***	4.795	***	3.338	***	2.039	***	2.688	***	2.165	**
[Empl supp]												
Employer Req CE?	.87 (.6470)		3.76 (.1524)		1.35 (.5092)		3.75 (.1537)		4.35 (.1137)		6.24 (.0441)	
Not applicable	.557		.618		.765		.510		.721		.236	**
CE not required	1.009		1.334		1.218		1.217		1.514	*	.724	
[CE required]												
Weekly Hrs Worked	8.48 (.2923)		6.33 (.5021)		4.87 (.6760)		25.94 (.0005)		10.49 (.1627)		20.18 (.0052)	
1- 10 hrs per wk	1.447		.273		1.737		1.371		1.156		.148	*
11-20 hrs per wk	.154	**	.342		.970		.583		.662		.287	**
21-30 hrs per wk	.580		.678		1.227		.275	***	.620		.231	***
31-40 hrs per wk	.775		.791		1.160		.326	***	.650		.223	***
41-50 hrs per wk	.596		.787		.727		.443	**	.599		.166	***
51-60 hrs per wk	.617		.793		.631		.240	***	.246	**	.177	***
61-99 hrs per wk	1.079		1.462		.848		.162	***	.278	*	.303	*
[0 hrs per wk]												
Heard of tax credit?	5.46 (.0195)		2.10 (.1468)		.00 (.9534)		.05 (.8158)		10.68 (.0011)		3.12 (.0773)	
Lifetime learning	2.647	**	1.560		.980		.936		.425	***	.509	*
Heard of tax credit?	.01 (.9202)		.00 (.9925)		.83 (.3619)		3.38 (.0661)		.79 (.3753)		.68 (.4087)	
Hope scholarship	1.034		.997		1.286		.660	*	.808		.730	
Used Public Library	.20 (.6523)		6.46 (.0110)		.04 (.8379)		.03 (.8583)		.00 (.9832)		1.34 (.2470)	
Y-in past month	.880		1.914	**	1.050		1.041		1.006		1.541	
Used Public Library	.41 (.5239)		.72 (.3960)		10.54 (.0012)		13.00 (.0003)		7.74 (.0054)		1.01 (.3159)	
Y-in past year	1.208		.809		.397	***	.361	***	.411	***	.660	
Read any Books?	.19 (.6626)		.67 (.4138)		.74 (.3906)		6.04 (.0140)		6.83 (.0090)		.51 (.4767)	
Y-in past 6 mths	1.121		.822		.801		.506	**	.391	***	.688	
No. of Magazines	2.54 (.1110)		1.39 (.2387)		3.83 (.0504)		5.38 (.0204)		1.22 (.2703)		1.69 (.1929)	
Read regularly	.942		.952		.919	*	.926	**	.959		1.033	
Read Newspaper?	4.88 (.1806)		13.09 (.0044)		4.49 (.2128)		.97 (.8088)		3.34 (.3423)		6.35 (.0960)	
Almost every day	.858		.479	**	.563	*	.925		1.051		1.612	
At least 1 per wk	1.219		.392	***	.606		.974		.958		1.945	
At least 1 per mo	2.128		1.265		1.016		1.482		.259		4.739	**
[Hardly Ever]												

Reference Category: Credential Program *non*-participants (i.e., Work-related Course participation only)

*** p < .01 ** p < .05 * p < .10

Other Independent Variables

Although approximately 86% of adults in the effective sample reported being employed, no overall pattern of association between credential program participation and the (self-reported) number of hours worked on a regular weekly basis was identified. In all result categories where number of weekly hours worked is significant, the RRRs are less than one, indicating a relatively lower risk of credential program participation among working adults than among those who reported working zero hours per week or were not in the labor force. The influence of no employer support was significantly associated with participation in credential programs. However, several forms of employer support, including requirements for continuing education and provision of instruction, were defined in the survey as components of 'any support.'

Very few of the variables included in the study to explore possible influences of having information or access to information were significant at the $p < .05$ level. It was encouraging to see that having heard of the Lifetime Learning tax credit was a significant predictor for two outcome categories: the 'Other' category, and the Master degree program outcome. Some results related to use of a *public* library in the past month or year showed significance with respect to influence on participation in a credential program, but their interpretation here may be misleading if survey respondents distinguished between *public* and *school* libraries.

Post-estimation Tests, IIA Assumption, and Complex Sample Design Effects

After estimating the initial MNL regression, I ran several post-estimation tests to help determine the most parsimonious and appropriate model specification for these data. By their nature, MNL results are more complicated than the results of linear or binary logistic regression analyses. Accordingly, I had hoped that statistical results would justify combining two or more of the original six credential program outcome categories. As noted above in Table 2,

preliminary information suggested the possibility of combining the 'Other' category with the 'Voc/Tech Diploma' category; however, further analysis has indicated that the 'Other' category represents a diverse range of participant characteristics. Results of statistical testing of the effect of all possible combinations of two outcomes did not justify any such combinations.

Regarding tests of the IIA assumption, additional research experience with the post-estimation tests available in Stata has led to a different recommendation regarding their use in the interval since my research design was proposed. As similarly reported by other researchers over the past year, my experience with the Hausman and Small-Hsiao tests of IIA contributes to a pattern of conflicting results in which one test supports the null hypothesis that the assumption is upheld while the other test rejects the same null hypothesis for the same data. In response to such reports, Cheng and Long (2005) "ran Monte Carlo experiments to examine the properties of these tests," and concluded "these tests are not useful for assessing violations of the IIA property" (Long and Freese, p. 243). Although not necessarily definitive for determining model misspecification, results of these tests for the MNL regression model I constructed might still be informative, and suggest that the IIA assumption does not hold for this study's effective sample. After running both the survey data MNL regression command and the non-survey data command with the appropriate pweight and cluster() variables versions of the as suggested by Long and Freese (2006, p.85), I determined that relative risk ratios (RRR) calculated by each were exactly the same and standard errors the same to four or five decimal places. I then ran both tests of the IIA: the Hausman test supported the null hypothesis of independence among outcome categories and the Small-Hsiao did not. In other words, the Small-Hsiao test did not confirm the null hypothesis that eliminating any outcome category has no significant effect on comparisons between other categories.

Binary Logistic Regression

To further explore the relationship between the independent variables and participation in a credential program, I ran two binary logistic regressions: first, with the same independent variables as used in the MNL model, then adding institutional type of instruction provider as an independent variable to the model. In order to compare variables representing type of instruction provider for credential program participants with type of instruction provider for those adults who only participated in work-related courses (i.e., the MNL base category of credential program *non*-participants), it was necessary to analyze and recode several variables. In the survey questionnaire, credential program participants had been asked to indicate the type of provider for the *highest* credential program they had pursued. However, participants in work-related courses were asked to indicate provider types for *all* courses they had participated in during the survey period. Thus, data regarding institutional provider type for work-related course participants included observations with *multiple* types of providers. Results of the two binary logistic regression estimations, *excluding 210 cases* with multiple institutional instruction type providers are compared in Table 5.

In the comparative binary logistic regression analysis, the model including type of institutional instruction provider yielded a Pseudo R2 of .47, as compared to a Pseudo R2 of .36 for the model without provider type. In the final model, the odds of participation in a credential program were significantly higher when the instruction provider was a school or college than when the instruction was provided by a business or industry association. For example, when the instruction provider was a vocational or technical school or program the odds of participation in a credential program were 3.728 times higher than when a private business provided the instruction.

Table 5. Binary logit odds ratios (OR) and significance levels by model

Independent Variables	Logit Model with MNL Indep Vars. (n = 2772; Pseudo R2 = .36) Odds Ratio (OR)		Logit Model plus Inst. Provider Type (n = 2772; Pseudo R2 = .47) Odds Ratio (OR)	
Age				
Age 25-34	.566	**	.789	
Age 35-44	.371	***	.526	**
Age 45-54	.334	***	.430	***
Age 55-87	.260	***	.402	**
[Age 19-24]				
Marital Status				
Sep., Wid., Div.	.422	***	.437	***
Married	.403	***	.387	***
[Single]				
Gender				
Female	.645	***	.586	***
[Male]				
Race/Ethnicity				
Black, non-Hispanic	1.216		1.176	
Hispanic	1.625	*	1.264	
Other Race/Ethnicity	2.258	**	2.109	*
[White, non-Hispanic]				
Country of Origin				
Not born in USA	.624	*	.619	
[Born in USA]				
Prior Education				
Voc/Tech after HS	1.261		1.213	
Some college	3.026	***	1.711	**
Associate Degree	2.542	***	2.044	***
Bachelor Degree	1.495	*	.903	
Some grad school +	2.101	***	.842	
[HS or less]				
Household Income				
$10,001-20,000	1.026		.681	
$20,001-30,000	.522	*	.363	**
$30,001-40,000	.750		.605	
$40,001-50,000	.477	*	.291	***
$50,001-75,000	.558		.373	**
$75,001 or more	.380	***	.313	***
[less than $10K]				
No. in Household				
2 persons	1.537	**	1.371	
3 persons	1.706	**	1.630	**
4 persons	1.300		1.365	
5 persons	2.151	**	2.183	**
6 or more	1.493		1.249	
[Household of 1]				
Own/Rent Status				
Home is rented	.916		.712	*
Other than own/rent	.930		.605	*
[Home owned]				

Independent Variables	Logit Model with MNL Indep Vars.		Logit Model plus Inst. Provider Type	
Urban/Rural Status				
Urban, outside	1.132		1.108	
Rural area	1.226		1.074	
[Urban, inside]				
Census Region				
South	.849		.714	
Midwest	.935		.838	
West	.811		.872	
[Northeast]				
Reason for Participation				
Earn credential	3.209	***	2.166	***
Train for a new job	7.890	***	6.407	***
Other Reasons	7.655	***	5.896	***
[Current job]				
Dist. Educ. Participation	2.290	***	2.358	***
[Dist. Educ.: No]				
No Employer Support	2.838	***	2.427	***
[Empl support]				
Employer Req'd CE				
Not applicable	.480	*	.644	
Cont. Ed. not required	1.136		1.052	
[CE required]				
Weekly Hours Worked				
1-10 hrs per week	.948		.592	
11-20 hrs per week	.566		.594	
21-30 hrs per week	.522	*	.647	
31-40 hrs per week	.571	**	.682	
41-50 hrs per week	.512	**	.646	
51-60 hrs per week	.408	***	.533	
61-99 hrs per week	.576		1.026	
[0 hrs per week]				
Heard of tax credit?				
Lifetime learning	.834		1.138	
Heard of tax credit?				
Hope scholarship	.869		.880	
Used Public Library?				
Yes-in past month	1.142		1.221	
Used Public Library?				
Yes-in past year	.655	**	.782	
Instit. Instruction Provider				
2yr Voc/Tech or less	n.a.		3.728	***
2yr Comm./Jr. College	n.a.		10.941	***
4yr College/University	n.a.		18.629	***
Government	n.a.		1.420	
Community/Relig./Other	n.a.		1.467	
[Business/Industry]				
	Log pseudolikelihood -1233.88 Prob > LR .0000		Log pseudolikelihood -1013.83 Prob > LR .0000	

*** p < .01 ** p < .05 * p < .10

Discussion

In the workplace of the 21st century, credentials remain an important signal system to employers (Bowen, 1977/1997). Yet, in finding that credential program participants were 2 to 3 times more likely to describe their reason for participating as 'to train for a new job' as 'to earn a credential,' this study supports the observation of increasing *vocationalism* in higher education (Grubb & Lazerson (2005). Results of this study also underscore the importance of prior education as a factor influencing adult participation in postsecondary credential programs. In particular, although cases reflecting prior vocational or technical education were few, this background was significantly associated with later participation in a Master's degree program. A prior background of "some college" was a significant predictor of all college/university outcomes, though a weaker predictor for the Doctoral/Professional outcome. And, adults who had participated via distance education technology were more than twice as likely as their counterparts who had not taken a distance education course to be in some type of credential program.

Findings also highlight the importance of household income and size as factors influencing the career decisions of adults. In the 1999 AE-NHES data, the RRR for female participants in credential programs was about half that for males. Although differences by race were not significant in these data, this study suggests a different profile of nontraditional age students than described in the earliest study of adult participation in postsecondary education (and much of the later adult education literature) where the focus is on participation by comparatively higher income adults in hobby or recreational activities. All of these findings have important institutional implications, especially for community colleges and possibly for four-year institutions with distance education programs.

For institutional researchers, this study highlights the importance of questioning whether assumptions about studies of and programs recommended for nontraditional age students may be based on outdated data, or on research that includes too broad a range of adult education activities. Part-time or full-time status was not studied here due to ambiguity regarding cases indicating both types of participation status and a larger percentage of missing data for this variable. However, additional research on part-time/full-time status (possibly a more difficult distinction for busy adults to relate to, as compared to perceptions of traditional age students), on how best to provide convenient access to application/enrollment information, and on the role of employer support for working adults could also help institutional researchers better understand potential barriers to time-limited adults with multiple social roles and responsibilities.

In discussing credentials, Bowen (1977/1997) concludes that education is "strongly and positively associated with adaptability" (p. 142). However, he also argues that "a case can be made for critical skepticism toward new products, new jobs, new ideas, and new ways of life" (p. 142). In the United States, much of the strength of the educational system has been its broad range of alternatives and institutional diversity. Particularly for adults from lower income households of more than one person in this study, unknown barriers to college/university degree programs may have prevented greater participation in such programs. The challenge of improving broad access to postsecondary education is even more important when adults need ongoing education in order to function in a rapidly changing society. Although the debate about multiple missions for community colleges continues, the role community colleges play in serving large numbers of nontraditional age students gives them unique potential (Bailey, 2002). Coincidentally, a recent issue of *Newsweek* (Green, May 1, 2006) includes a contributed essay from the chief executive officer of an American consulting firm. The essay was prompted by the

State of the Union Address earlier this year, in which President Bush challenged Americans to find ways to improve American competitiveness in the world. The CEO took the time to contribute a personal account of his own career-changing experience and argues that, in seeking to increase American competitiveness, “many still overlook our system of community and junior colleges” (p. 22).

References

Altbach, P. G., Berdahl, R. O., & Gumport, P. J. (Eds.). (2005). *American higher education in the twenty-first century: Social, political and economic challenges* (2nd ed.). Baltimore: The Johns Hopkins University Press.

Ashby, E. (1966). *Universities: British, Indian, African*. Cambridge, MA: Harvard Univ. Press.

Aslanian, C. B., & Brickell, H. M. (1980). *Americans in transition: Life changes as reasons for adult learning.* New York: College Entrance Examination Board.

Bailey, T. (2002). *Community colleges in the 21st century: Challenges and opportunities*. In National Research Council. *The knowledge economy and postsecondary education: Report of a workshop*. Committee on the Impact of the Changing Economy on the Education System. P. A. Graham and N. G. Stacey (Eds.). Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press. 59-75.

Bash, L. (2003). *Adult learners in the academy*. Bolton, MA: Anker Publishing Company, Inc.

Ben-David, J. (1992). *Centers of learning: Britain, France, Germany, United States*. New Brunswick, NJ: Transaction Publishers. (Original work published 1977. New York: McGraw-Hill Book Co.)

Berker, A. & Horn, L. (2003). *Work first, study second: Adult undergraduates who combine employment and postsecondary enrollment*. (NCES 2003-167). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved from http://nces.ed.gov on October 20, 2004.

Boshier, R. W. (1973). Education participation and dropout: A theoretical model. *Adult Education*, 23, 255-282.

Boshier, R. W. (1982). *Education participation scale*. Vancouver: Learning Press.

Bowen, H. R. (1997). *Investment in learning: The individual and social value of American higher education*. Baltimore: The Johns Hopkins University Press. (Original work published 1977. San Francisco: Jossey-Bass Publishers .)

Brint, S., & Karabel, J. (1989a). *The diverted dream: Community colleges and the promise of educational opportunity in America, 1900-1985*. New York: Oxford University Press.

Brint, S., & Karabel, J. (1989b). American education, meritocratic ideology, and the legitimation of inequality: The community college and the problem of American exceptionalism,* *Higher Education*, 18, 725-735.

Caffarella, R. S. & O'Donnell, J. M. (1987). Self-directed learning: A critical paradigm revisited. *Adult Education Quarterly*, 37(4), 199-211.

Cheng, S. & Long, J. S. (2005). *Testing for IIA in the multinomial logit model*. University of Connecticut, Working Paper.

Choy, S. & Premo, M. (1995). *Profile of older undergraduates: 1989-90*. (NCES 95-167). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved from http://nces.ed.gov/pubs95/web/95167.asp on June 27, 2004.

Chronicle of Higher Education Almanac (1999-2000). College enrollments by age of students, p.24.

Cookson, P. S. (1986). A framework for theory and research on adult education participation. *Adult Education Quarterly*, 36(3), 130-141.

Cross, K. P. (1981). *Adults as learners: Increasing participation and facilitating learning*. San Francisco: Jossey-Bass Publishers.

Darkenwald, G. G., & Merriam, S. B. (1982). *Adult education: Foundations of practice*. New York: Harper and Row.

Dey, E. L., & Hurtado, S. (2005) Students , colleges, and society: Considering the interconnections. In P. G. Altbach, R. O. Berdahl, & P. J. Gumport (Eds.). *American higher education in the twenty-first century: Social, political and economic challenges* (2nd ed.). Baltimore: The Johns Hopkins University Press.

Drucker, P. F. (1994, November). The age of social transformation. *The Atlantic Monthly*, 274, 53-80.

Duderstadt, J. J., Atkins, D. E., & Van Houweling, D. (2002). *Higher education in the digital age: Technology issues and strategies for American colleges and universities*. Westport, CT: American Council on Education and Praeger Publishers.

Green, W. D. (2006, May 1). We've overlooked one of our greatest assets. *Newsweek*, 22.

Grubb, W. N. & Lazerson, M. (2005). Vocationalism in higher education: The triumph of the educational gospel. *The Journal of Higher Education*, 76(1), 1-25.

Hancock, V. E. (1993). *Information literacy for lifelong learning. ERIC Digest*. Syracuse, NY: ERIC Clearinghouse on Information Resources. (ERIC Document Reproduction Service No. ED 358 870)

Heeringa, S. & Liu, J. (1997). Complex sample design effects and inference for mental health survey data. *International Journal of Methods in Psychiatric Research*, 7(1), 221-230.

Henry, G. T., & Basile, K. C. (1994). Understanding the decision to participate in formal adult education. *Adult Education Quarterly*, 44(2), 64-82.

Horn, L. (1996). *Nontraditional undergraduates: Trends in enrollment from 1986-1992 and persistence and attainment among 1989-90 beginning postsecondary students*. (NCES

97-578). Project Officer: C. Dennis Carroll. U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved from http://nces.ed.gov on June 27, 2004.

Hossler, D., Braxton, J., & Coopersmith, G. (1989). Understanding student college choice. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research*, Vol. V, 231-288. New York: Agathon Press.

Houle, C. O. (1961). *The Inquiring mind.* Madison: University of Wisconsin Press.

Johnstone, J. W. C. & Rivera, R. J. (1965). *Volunteers for learning: A study of the educational pursuits of adults*. Hawthorne, NY: Aldine.

Karabel, J. (1972). Community colleges and social stratification. *Harvard Educational Review*, 42, 521-562.

Karabel, J. (1986). Community colleges and social stratification in the 1980s. In L. S. Zwerling (Ed.). The community college and its critics. *New Directions for Community Colleges*, No. 54, 13-30.

Kim, K. & Creighton, S. (2000). *Participation in adult education in the United States: 1998-1999*. (NCES 2000-027). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Kim, K., Hagedorn, M., Williamson, J., & Chapman, C. (2004). *Participation in adult education and lifelong learning: 2000-01*. (NCES 2004-050). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Kleiner, B., Carver, P., Hagedorn, M., & Chapman, C. (2005). *Participation in adult education for work-related reasons: 2002-03*. (NCES 2006-040). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy. (2nd ed.)*. New York: Cambridge University Press.

Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Thousand Oaks, CA:Sage Publications, Inc.

Long, J. S. & Freese, J. (2003). *Regression models for categorical and limited dependent variables using Stata*. College Station, TX: Stata Press.

Lundberg, C. A. (2003). The influence of time-limitations, faculty, and peer-relationships on adult student learning: A causal model. *Journal of Higher Education*, 74(6), 665-688.

Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive guide (2nd ed.)*. San Francisco: Jossey-Bass Publishers.

Merriam, S. B., & Cunningham, P. M. (Eds.). (1989). *Handbook of adult and continuing education*. San Francisco: Jossey-Bass Publishers.

Morstain, B. & Smart, J. C. (1977). A motivational typology of adult learners. *Journal of Higher Education*, 48(6), 665-679.

National Research Council. (2002). *The knowledge economy and postsecondary education: Report of a workshop*. Committee on the Impact of the Changing Economy on the Education System. P. A. Graham and N. G. Stacey (Eds.). Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Nowotny, H., Scott, P., & Gibbons, M. (2001). *Re-thinking science: Knowledge and the public in an age of uncertainty*. Cambridge, UK: Polity Press.

Peterson, M. W. & Dill, D. D. (1997). Understanding the competitive environment of the postsecondary knowledge industry. In M. W. Peterson, D. D. Dill, & L. Mets (Eds.),

Planning and management for a changing environment (pp. 3-29). San Francisco: Jossey-Bass.

Peterson, M. W., Dill, D. D. & Mets, L. (Eds.). (1997). *Planning and management for a changing environment*. San Francisco: Jossey-Bass.

Pincus, F. L. (1980). The false promises of community colleges: Class conflict and vocational education. *Harvard Educational Review*, 50(3), 332-361.

Rosenberg, V. (2002, July). *Information literacy and small business*. White Paper prepared for UNESCO, the U. S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy, for use at the Information Literacy Meeting of Experts, Prague, The Czech Republic. http://www.nclis.gov/libinter/infolitconf&meet/papers/rosenberg-fullpaper.pdf

Rowley, D. J., Lujan, H. D. & Dolance, M. G. (1998). *Strategic choices for the academy: How demand for lifelong learning will re-create higher education.* San Francisco: Jossey-Bass Publishers.

Rubenson, K. (1989). The sociology of adult education. In S. B. Merriam & P. M. Cunningham (Eds.). *Handbook of adult and continuing education* (pp. 51-69). San Francisco: Jossey-Bass Publishers.

Smart, J. C. (Ed.) (1989). *Higher Education: Handbook of Theory and Research, Vol. 5*. New York: Agathon Press.

Smart, J. C. (Ed.) (1986). *Higher Education: Handbook of Theory and Research, Vol. 2*. New York: Agathon Press.

Twigg, C. A. (2002). The impact of the changing economy on four-year institutions of higher education: The importance of the Internet. In National Research Council. *The knowledge*

economy and postsecondary education: Report of a workshop. Committee on the Impact of the Changing Economy on the Education System. P. A. Graham and N. G. Stacey (Eds.). Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press. 77-103

Valentine, T. & Darkenwald, G. G. (1990). Deterrents to participation in adult education: Profiles of potential learners. *Adult Education Quarterly*, 29-42.

Wolfgang, M. E. & Dowling, W. D. (1981). Differences in motivation of adult and younger undergraduates. *Journal of Higher Education*. 52(6), 640-648.

Zammuto, R. F. (1986). Managing decline in American higher education. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research*, Vol. 2, 43-84. New York: Agathon Press.