

Contextual Factors and College Retention of Single Mothers

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Abstract

Retention is the percentage of first-time bachelor's degree-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall. Current student retention rates indicate public postsecondary institutions retain approximately two thirds of freshmen students to their second year of college and only one third of these students will graduate. Among all university undergraduate students, the share of single mothers nearly doubled over the past 20 years (from 7 percent to just over 13 percent). Although the percentage of single mothers experiencing some form of postsecondary education has increased over the decades, single parents often face more barriers than traditional students. College institutions have only recently begun acknowledging the value of nonacademic factors that may influence academic success, retention and subsequent graduation of students. The purpose of this research study was to test a hypothesized model about contextual factors associated with retention of single mother college students. Statistical indices indicated significant direct and/or indirect effects of contextual variables on retention. The identification of these predicting factors can inform the development of retention strategies leading to increased graduation rates of single mothers.

Keywords: Contextual factors, single mothers, retention and logistic regression

Introduction

Retention is the percentage of first-time bachelor's degree-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall. Current student retention rates indicate public postsecondary institutions retain approximately two thirds of freshmen students to their second year of college and only one third of these students will graduate. Among all university undergraduate students, the share of single parent nearly doubled over the past 20 years (from 7 percent to just over 13 percent). Although the percentage of single parent experiencing some form of postsecondary education has increased over the decades, single parents often face more barriers than traditional students. College institutions have only recently begun acknowledging the value of nonacademic factors that may influence academic success, retention and subsequent graduation of students.

It is noteworthy that women represent a majority of undergraduate students in all settings, many of whom are low-income and have dependent children. For this subset of the student population, the stakes are particularly high (Institute for Women's Policy Research, 2012). While the U.S. economy has shown signs of recovery, present data from the U.S. Census Bureau show that the number of single parent in the United States increased to 10.4 million in 2011, up from 10.2 million a year earlier (Robert, Povich, & Mather, 2012-2013).

The promotion of social mobility among single mothers require improving access to higher education while increasing financial support to facilitate academic success, which has the potential to enhance equality of opportunities and transform their lives.

Academic success is defined by the National Center for Education Statistics (NCES) (2012) as a measure determined by the student Grade Point Average (GPA). There is a growing body of evidence suggesting that academic success invariably plays a pivotal role in empowering single mothers to reenroll and eventually graduate from college. Unfortunately, single mothers are often unable to pursue educational goals due to scarcity of resources including, financial and social support. Instead, they become socioeconomically relegated to a situation of working poor, possibly homeless, and a burden upon government assistance programs (Bolman & Deal, 1995). In fact, many single mothers are unable to enter the workforce as their low skill levels render them unemployable. Bolman and Deal (1995) cautioned that the perpetuation of this underlayment mechanism of poverty leads to an overwhelming social and economic failure for the individual and for the system.

The identification of factors associated with academic success leading to retention can inform the development of strategies to promote the retention and graduation of single mothers. Subsequently, the purpose of this research study was to test a hypothesized statistical model of contextual factors associated with retention. Contextual variables were defined as student characteristics, which included: financial support, academic goals, social involvement academic major, academic level, institutional commitment, and social support. The study examined the following research question:

- RQ1. Is there a significant relationship between individual student characteristics (age, gender, major, academic level, student status, social involvement) and academic success (grade point average) leading to the retention of single mother students?
- RQ2. Which are the main contextual factors responsible for academic success?
- RQ3. Is there a significant relationship between academic success (Grade Point Average) and retention of single mother students?

Related Research

The literature is scant in explaining the influence of contextual factors responsible for the retention of single mothers enrolled in undergraduate programs. Smart, Feldman, and Ethington (2006) identified three primary reasons for this lack of understanding regarding academic success and retention of single mothers:

- a) Current conceptual models are too vague and incomplete
- b) Research studies are mostly focused on behaviors of traditional students.
- c) Not enough research studies exploring the impact of contextual factors on retention.

Several scholars (Astin, 2005; Bean, 2001; Braxton, 2000; Carey, 2004; Beck & Davidson, 2001; Seidman & Tinto, 2005) avowed the importance of studying the impact of academic and non-academic factors associated with retention of single mothers in educational programs. The current research study literature shows abundant evidence that the strongest predictor of socio and economic upward mobility of single mothers is higher educational achievement. A research study conducted by Seidman (2005) found that women with higher education experience, as compared to those having only a high school diploma or those having less than a high school education, measured significantly higher in terms of socio and economic upward mobility.

It is noteworthy that single mothers represent the largest and fastest growing segment of the low-income population. The U.S. Census Bureau (2013) defined low-income as twice the federal poverty threshold. Using the 2013 American Community Survey, students are classified as low income if their income level was in the bottom quartile; that is, the family income was at or below \$41,472. According to the U.S. Census Bureau, the poverty rate for single mothers and their children rose from 32.5 percent in 2009 to 34.2 percent in 2010. Unfortunately, legislated policies often perpetuate systems that promote the scarcity of resources for single mothers and their children. This phenomenon is addressed in the research study literature as the "feminization of poverty" (Pearce, 1978). Single mothers, more often than not, are relegated to a life of unmet expectations and limited opportunities as they become "disenfranchised, disempowered and with no civic voice" (Polakow, 1993, p. 172). Regrettably, access to resources and services are continuing to deteriorate for single mothers and their families as the economic recession continues and income is declining, government funding is being reduced and women enter a labor market that is unequal and discriminatory (Albelda, 2012; Smith, Brooks-Gunn, Klebanov, & Lee, 2000).

Some of the policies (Personal Responsibility and Work Opportunity Reconciliation Act of 1996), supposedly developed to promote socio economic upward mobility of females trapped in the poverty cycle have led many women to temporary low-paying, gender-stereotyped jobs that do not offer a path out of poverty. Often, the only type of training provided is that which will afford the recipient a minimum-wage job. These disadvantaged participants need the means and access to acquire the necessary tools to compete in the current technologically driven job market and experience upward mobility. Higher education has the potential of been the most practical means by which financially disadvantaged single mothers may achieve self-sufficiency and become productive members of society (Adelman, 1999; Adelman, 2006; Bean, 2005; Carey, 2005).

Beyond providing educational access to single mothers, institutions of higher learning are constantly challenged to improve student academic success and retention. The implications for the static retention rate among the fast expanding single mothers student population is the lack of adequate support mechanisms to promote academic success within situations of higher learning. At any rate, skilled human capital produced through higher education adds significant value to the economy. For these reasons, identification of resources to promote academic success of a growing number of single-mother college students entering a four year institution of higher learning must be addressed (Carey, 2005; Seidman, 2005).

Method

This quantitative descriptive research study included a set of research question and hypotheses, which evolved from gaps in the literature related to the impact of non-academic factors on the retention of single mother students. Data for this study was collected from a sample comprised of 166 single mothers, undergraduate students, which contained no identifiable personal information from any of the participants. The sample was randomly selected from Prairie View A&M University in the spring of 2014.

The sample size was determined by power analysis using Lenth's (2006-09) computer software employing a medium effect size of 0.3, alpha set at 0.05, and power of .80, the desired sample size for this study was calculated as 144 participants. Prior to data collection a research application was submitted to the Institutional Review Board (IRB) and a protocol number was provided subsequent to approval.

The study used binary logistic regression to identify significant predictors of retention among single mothers. Logistic regression assesses the effect of multiple independent variables presented simultaneously to predict membership of one or more dependent variable categories. Thus, the dependent variable was operationalized as dichotomous variable and regressed on a set of independent variables- contextual factors. Binary logistic regression is a suitable statistical method for assessing the relationship between one nominal-level, dichotomous dependent variable and several independent variables as it treats the dependent variables as a probability value. Interpretation of the logistic regression analysis was done through the regression coefficient B, exponential B, standard error, and the Wald statistic (Dattalo, 1994; Menard, 1995).

Instrumentation

Study participants were given a questionnaire packet including the *Student Profile* survey containing relevant demographic and student characteristics. The variables examined included student age, gender, major, academic level, student status and social involvement on and off campus. The *Student Profile* survey contained thirty one items and took approximately 10 minutes to complete. The *Student Profile* survey also included items to measure student attitude-belief and expectation-performance reflecting changes from freshman to senior year.

The instrument was initially normed internationally with 3,000 participants from Israel, South Africa, Argentina, India, Nigeria, and Germany. The instrument was changed and then normed in the United States and Canada with 3,831 participants. The present version of the instrument has age, gender and academic specific norms. The *Student Profile* survey psychometric properties were reviewed by Impara and Plake (2001) in the *Buros Mental Measurements Yearbook*. Internal consistency of the instrument was reported by an average internal consistency coefficient of .76. Test-retest reliability was provided for South African sampled with average coefficients of .85 and .75 for 1- to 4-month time periods.

Data Analysis

Once data was collected, scores from the *Student Profile* survey were used to generate descriptive statistics and analyze all variables. Next, correlation statistics were performed with Statistical Program for Social Sciences (SPSS) for regression analyses to test the study research question. To answer the research question regarding the impact of student characteristics on academic success the researcher used a binary logistic regression as it permits the examination of a predictor variable and dependent variable while holding other variables constant (Dattalo, 1994; Morrow-Howell & Proctor, 1992). The students reported Grade Point Average (GPA) was re-coded into a dichotomous variable for the purpose of running a binary logistic regression. Subsequently, academic success was used as a dependent variable assessed by the students' binary GPA scores entered in an SPSS data file as HIGH (>3.0 or higher) and LOW (<3.0 or lower) GPA groups.

For the purposes of this study, student characteristics were converted to numerical or categorical variables (Hosmer & Lemeshow, 1989). In addition, cross-tabulation was used to test whether a significant relationship existed between High / Low GPA and Academic Levels (used to define retention). Figure 1 shows the results of the cross tabulation analysis. Furthermore, a Spearman correlation analysis was used to examine the association between the variables. The data showed violation of normality and linearity, which was confirmed by the Shapiro Wilks test.

Since the study employed a small sample size a Shapiro Wilks test of normality was used and results showed that $p \leq 0.05$ level of significance and the H_0 should be rejected indicating the observed distribution does not fit the normal distribution. Since the research data is not normally distributed and the data consisted of a random sample of numeric and non-numeric observations Spearman correlation was chosen. Spearman correlation coefficient analysis assessed the strength of the bivariate relationship between academic success and each of the 9 predictor variables. All correlations in this study were tested at the $p < .05$ level of significance. The correlation matrix is shown in Table 2.

The logistic regression analysis focused on the coefficients for the independent variables. The column labeled B, provide the unstandardized coefficients, which are the values for the logistic regression equation for predicting the dependent variable from the independent variable. The Regression Coefficient B was interpreted as estimate for the amount of change in the long odds of the dependent variable for one unit change in the independent variables (*Educational goal, Academic Level and Income*) while controlling for the other variables in the equation. It is noteworthy that each Regression Coefficient B represented “the change in the natural logarithm of the odds ratio” (Wright, 1995, p. 223).

All independent variables in this analysis had standard errors smaller than 2.0. The S.E. or Standard Error is an index of the accuracy of the logistic regression equation, and the equivalent of the standard deviation. When the standard errors of the estimate are smaller the prediction tends to be more accurate as it indicates a better model fit. A sample size resulting in a power of .80 can use the Wald statistic to test whether a coefficient equal zero as Wald statistic is the square of the ratio of the coefficient to its standard error. The significance of the coefficients is determined by a “Wald Test.” Thus, the Wald statistic (chi-square distribution) was used to test whether contextual factors were a significant predictor of the outcome variable at $p < .05$. The $\text{Exp}(B)$, which is the exponentiation of the coefficients or the odds ratios for the predictors was used to assess the relative odds or odds ratio for the contextual variables in the model (Menard, 1995; SPSS, 2012). Table 6, summarizes the logistic regression results of the contextual variables.

Results

The results of the present study reflect the statistical analyses done in two parts. The first part of the analysis summarizes descriptive statistics regarding the characteristics (Sex, Age, Enrollment Status, Class Standing, First in Immediate Family To Attend College, Employment status, Residence, Family Income and Educational Goal) of the study participants as shown in Table 1.

Table 1: Demographic Characteristics of Participants (n= 166)

	<i>f</i>	%
Age		
24 and younger	147 (147.0)	88.6 (88.6)
25 to 34	12 (12.0)	7.2 (7.2)
35 to 44	5 (5.0)	3.0 (3.0)
45 to54	2 (2.0)	1.2 (1.2)
Enrollment Status		
Full-time (12 credit hours or more)	156 (156.0)	94.0 (94.0)
Part-time (under 12 credit hours)	10 (10.0)	6.0 (6.0)
Class Standing		
Freshman	1 (1.0)	.6 (.6)
Sophomore	23 (23.0)	13.9 (13.9)
Junior	51 (51.0)	30.7 (30.7)
Senior	91 (91.0)	54.8 (54.8)
First in Immediate Family To Attend College		
Yes	81 (81.0)	48.8 (48.8)
No	82 (82.0)	49.4 (49.4)
Employment status		
Full-time (40 hrs. or more)	45 (45.0)	27.1 (27.1)
Part-time (less than 40 hours)	68 (68.0)	41.0 (41.0)
Not employed	53 (53.0)	31.9 (31.9)
Residence		
Student housing	57 (57.0)	34.3 (34.3)
Parents home	19 (19)	11.4 (11.4)
Rent room or apt. off campus	63 (63.0)	38.0 (38.0)
Own off-campus apartment or home	24 (24.0)	14.5 (14.5)
Family Income		
\$20,000 and Lowest	44 (44.4)	26.5 (26.5)
\$21,000 tru \$40,000	38 (38.0)	22.9 (22.9)
\$41,000 tru \$60,000	29 (29.0)	17.5 (17.5)
\$61,000 tru \$80,000	34 (34.0)	20.5 (20.5)
\$81,000 tru 100,000	11 (11.0)	6.6 (6.6)
\$100,000 tru Highest	21 (21.0)	12.6 (12.6)
Educational Goal		
Bachelor's degree	82 (82.0)	49.4 (49.4)
Master's degree	79 (79.0)	47.6 (47.6)
Transfer to another institution	1 (1.0)	0.6 (0.6)

Of the 166 single mother students participating in the study 91 (54.8 %), were seniors, 51 (30.7 %) were juniors, 23 (13.9 %) were sophomore, and 1 (.6%) were freshman. Most of the respondents were Black/African American, (89.4%). The age range of the majority 147 (88.6 %) of student participants was 24 and younger (SD = .524). Approximately half of the undergraduate student participants (49.4 %) had someone in their immediate family who attended college. The participant students' cumulative grade point average (GPA) ranged from D to A with the majority (54.2%) reporting a GPA of a B, while 13.3% reported a GPA of A, 31.3% reported a GPA of C and 1.2% reported having a D for GPA. Of the 166 students who participated in the study, 156 (94.0 %) undergraduate single mother students were enrolled full-time (12 credit hours or more per semester) with 10 (6.0 %) students' enrolled part-time (less than 12 credit hours per semester).

Of the 166 respondents, 68 (41.0 %) students work part-time or less than 40 hours per week while 45 (27.1 %) work full time and 53 (31.9 %) students were not employed.

The majority 63 (38%) of the participants live in rented apartments off campus, while 24 (14.5 %) live in their own off-campus apartment or home and 19 (11.4 %) live in their parent's home. Furthermore, 82 (49.4 %) of the students participating in this study reported they target the completion of Bachelor’s degree as their educational goal and 79 (47.6%) said they target the completion of a master’s degree as their educational goal.

The second part of the results discusses answers to the research question. A set of independent variables reflecting contextual factors was used to ascertain whether academic success (Grade Point Average) was a significant predictor of retention. Firstly, a Spearman correlation was run to test the association between single mothers’ contextual factors and their GPA. The bivariate relationship between the dependent variable and most of the predictor variables was not significant in relation to academic success; however, three variables were found to be significant. They were: Educational goal, academic level and income as shown in Table 2.

Table 2: Inter-Correlations and Descriptive Statistics

	Enrollment	Age	Edu Goal	Acad Level	Employ	Reside	First in coll	Income	GPA	Mean	S D
Enrollment	1.00									1.94	.24
Age	-.21	1.00								2.17	.52
Edu. Goal	.08	-.03	1.00							1.55	.81
Acad Lev.	-.07	.04	-.08	1.00						3.40	.75
Employ	-.02	.07	.11	-.18	1.00					2.05	.77
Reside	-.02	.06	.06	.20	-.18	1.00				2.32	1.12
First in Coll	.11	-.06	-.08	-.04	-.16	.03	1.00			1.52	.54
Income	.03	.21	.12	.01	.14	.04	-.32	1.00		2.76	1.50
GPA	.00	.15	.18	.24	-.02	-.05	-.12	.24	1.00	3.80	.67

Note: n=166; Correlations greater than .17 are statistically significant (p ≤ .05).

Furthermore, logistic regression analysis of contextual scores on binary GPA group (HIGH/LOW) was conducted to test the two research questions:

- RQ1. Is there a relationship between individual student characteristics (age, gender, major, academic level, student status, social involvement) and academic success (grade point average) leading to the retention of single mother students?
- RQ2. Which are the main contextual factors responsible for academic success?

The variables in the equation, Table 3. shows the logistic coefficient (B) as estimate for the effect associated with intercept-only model, which is (odds) = .730. In other words, it represents "the change in the natural logarithm of the odds ratio" (Wright, 1995, p. 223). The Exponential B (Exp(B) = 2.074) represents the odds ratios or exponential values of the regression coefficient for constant. Since the Exp(B) is greater than one, the exponential coefficient of the constant is transformed into negative, implies that the overall model was statistically reliable in predicting academic success leading to retention.

Table 3. Logistic Regression of Binary High/Low GPA Groups variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.730	.166	19.390	1	.000	2.074

Moreover, Table 4. shows statistical evidence of the presence of a relationship between the dependent variable and the combination of independent variables. The model chi-square is 20.598, which is statistically significant at p<0.001. The null hypothesis that there is no difference between the model with only a constant and the model with independent variables was rejected. The existence of a relationship between the independent variables and the dependent variable was supported. Subsequently, the study first research question (Is there a relationship between individual student characteristics and academic success) has been answered.

Table 4. Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	18.554	3	.001
	Block	18.554	3	.001
	Model	18.554	3	.001

In order to determine if the research study had a good model to explain variation in the dependent variable, the Cox and Snell pseudo R² statistic reported in Table 5. was examined. The statistical indices displayed in Table 5. indicated that 10.6 to 14.8 of the variance in the outcome variable was explained by the three independent variables in the model. Larger pseudo r-square statistics could have explained more of the variation in the dependent variable in the model.

Table 5. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	190.872 ^a	.106	.148

Table 6. include the Logistic Regression coefficients of the independent variables. Tabachnick and Fidell (2007) recommend presenting the results in odds ratio when the study is interested in the impact of the independent variables, controlling for the effects of other variables in the model. According to Mertler and Vannatta (2002), the odds ratio “represents the increase or decrease in the odds of being classified in a category when the predictor variable increases by one” (p.318). Tables 6. summarizes the logistic regression results of HIGH/LOW GPA groups. The results indicated two variables had significant statistics: *Academic Level* and *Household Income* variables. Predictor variables that were particularly non-significant with the dependent variable were excluded for the logistic regression analysis.

Table 6. shows the results of the logistic analysis which explores the main factors that influence academic success. The variable Educational Goal yielded a b of .046, SE = .227, Wald = .040, P < .841. and the Exp(B) was 1.047. Statistical indices indicated this variable does not make a contribution to the model as P is larger than the acceptable .05 level of significance. For Academic Level, the b was .875, SE = .236, Wald = 13.801, P < 001.and the Exp(B) was 2.400. When the variable (single mothers) changes from freshman to sophomore, there is an 8.8 increase in the probability of single mothers raising their GPA.

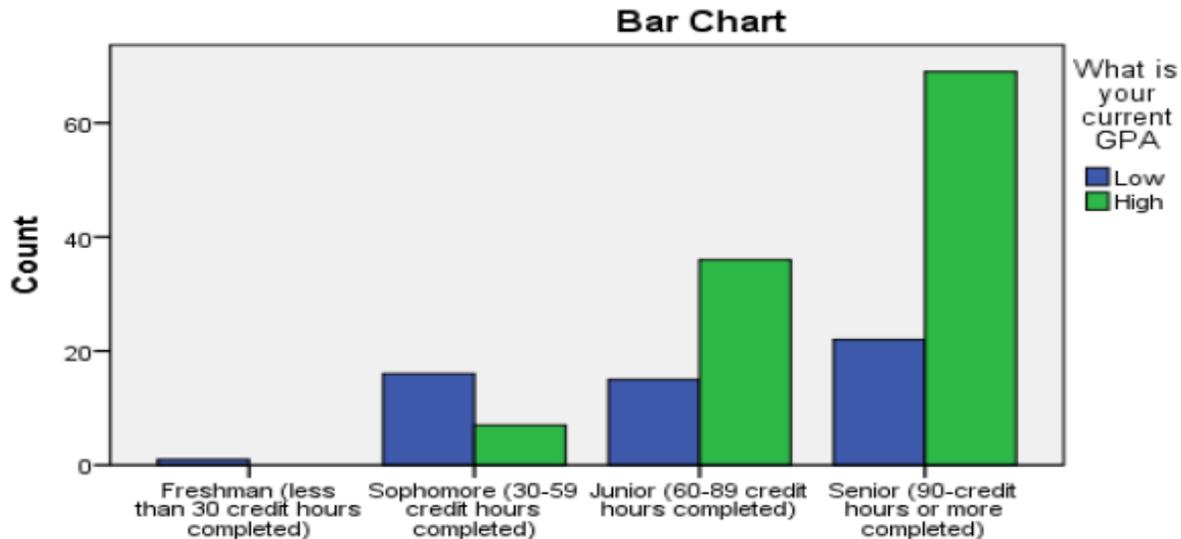
Household Income was also a significant predictor of academic success. Wald statistic for the variable Household Income was 0.047, less than the level of significance of 0.05. The null hypothesis that the b coefficient for the variable Household Income was equal to zero was rejected. This supports the relationship that "survey respondents who had more yearly household income were more likely to have higher GPA. Household Income was treated as an interval variable which was coded so that higher numeric values were associated with survey respondents who had more household income. The value of b was .226, Exp(B) was 1.254 which implies that one unit increase in Household Income increased the log odds of the dependent variable by 22.6. It is noteworthy that none of the independent variables in this analysis had a standard error larger than 2.0. The standard errors for the b coefficients were smaller than 2.0, which indicated no numerical problems, such as multicollinearity among the independent variables. Logistic analysis results satisfactorily answered the study research questions regarding relationship between contextual variables and academic success (GPA). Results indicated the presence of a significant relationship between contextual variables and academic success. In addition, two contextual factors were identified as having a positive impact on Academic Success (GPA): *Academic Level* and *Household Income*.

Table 6: Logistic Regression of Contextual Factors and Binary High/Low GPA Groups Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	Educational Goal	.046	.227	.040	1	.841	1.047
	ACADEMICLEVEL	.875	.236	13.801	1	.001	2.400
	Income	.226	.123	3.364	1	.047	1.254
	Constant	-2.869	.955	9.015	1	.003	.057

Figure 1. Indicates the cross tabulation of single mother students reporting their GPA level (High / Low GPA) within their Freshman year compared to their GPA level) within their Sophomore, Junior and Senior year. There was a significant difference between GPA level (High / Low GPA) and class standing as reported by survey respondents. Results indicated that the freshman class standing had the highest proportion of Low GPA. Junior and Senior class levels had the highest percentage of single mothers with high GPA. The results indicated that students who reenroll tend to have higher GPA as they move to the next class standing level.

Figure 1: Cross tabulation of GPA Academic Level



The Pearson's chi-square test was used to determine if there was a relationship between the two variables: GPA and Academic level / class standing. The significance value was far below .05 level of significance (<.05), which indicated to reject the null hypothesis that the variables are independent and instead accepting the hypothesis that they are related (Menard, 1995). Subsequently, the third research question was positively answered as statistical indices identify the presence of a significant relationship between GPA and Academic Level. When academic level increases GPA increases. Academic level cannot increase without students being re-enrolled *or* successfully completing their program by the current fall. Academic level is therefore used as a proxy variable.

Table 7: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.567 ^a	3	.001
Likelihood Ratio	18.704	3	.001
Linear-by-Linear Association	15.063	1	.001
N of Valid Cases	166		

Practical Implications

The findings of this research study can assist in expanding future research by providing baseline information regarding the participation of single mothers in postsecondary education. Thus, future research can make use of these findings to enhance understanding of the experiences of single mothers in overcoming academic barriers particularly during the freshman and sophomore semesters as they attempt to succeed in postsecondary institutions. Since institutions of higher learning are constantly challenged with improving the academic success of their population, designing data driven intervention strategies that can compensate for some of the barriers and maximize access to resources for these women and their families could be most helpful in their endeavor for academic success.

For instance, personnel at institutions of higher learning can work to create and maintain databases specifically designed to track the academic progress of students identified as single parents with dependent children that are presently within their freshman and sophomore years of education.

Using the data, institutions can continually monitor this groups academic progress, both success and issues encountered. Personnel can further work to implement timely interventions (i.e. - academic counseling, mentorship, etc.) to reduce the possibility of the student dropping out and not returning.

By implementing strategies such as these in an aggressive and equitable fashion, institutions of higher learning should encounter greater academic successes for this groups which should subsequently equate to higher graduation rates, more self-sufficiency, a better quality of life, a reduction in poverty and lastly future economic benefit for society.

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