Exploring Race Differences in Correlates of Seniors' Satisfaction with Undergraduate Education

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This study employed multiple linear regression and decision tree analysis to examine the correlates of overall satisfaction with undergraduate education for white, Asian American, Hispanic and African American seniors enrolled at 17 research-extensive universities. Satisfaction with the overall quality of instruction and social involvement were the strongest predictors of overall satisfaction for all seniors. The predictive importance of other measures of the academic experience, social integration and performance varied both within and across race groups. Findings argue for adopting a variety of strategies to address the needs of different segments of the undergraduate population.

Introduction

Scholars have emphasized the importance of student satisfaction as an aspect of the undergraduate experience (Astin, 1993; Cameron, 1981; Gielow & Lee, 1988; Spady, 1970). Beyond valuing satisfaction as an educational outcome in its own right, research has shown satisfaction is an important mediating factor in students' adjustment and commitment to college (see for example, Bean, 1980; Cabrera, Nora, & Castaneda, 1993; Pascarella et al., 1993; Pascarella, Smart, & Ethington, 1986; Spady, 1971).

Prompted by calls for postsecondary education to become more representative of the demographic composition of the American population and growing recognition of the educational benefits of racially diverse learning environments for all students (Appel, Cartwright, Smith, & Wolf, 1996; Astin, 1993; Hurtado, Milem, Clayton-Pedersen, & Allen, 1998), colleges and universities have attempted to improve the racial and ethnic diversity of their student populations. While the diversity of the postsecondary student body has increased over the past three decades, the undergraduate experience can vary significantly for students of different races/ethnicities. For example, studies document that students of color experience the campus environment as less supportive than their white peers (Loo & Rolison, 1986; Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1996; Schwitzer, Griffin, Ancis, & Thomas, 1999) and are less likely to graduate (National Center for Education Statistics, 1995; Porter, 1990; The Education Trust, 2004).

There is limited and conflicting evidence concerning the association between race and satisfaction with college. Several studies have found significant race differences in satisfaction (Ancis, Sedlacek, & Mohr, 2000; Helm & Sedlacek, 1998; Rorhlick, Alvarado, Zaruba, & Kallio, 1998; Umbach & Porter, 2002) but others have not (Helm & Sedlacek, 1998; Knox,

Lindsay, & Kolb, 1992; Thomas & Galambos, 2004; Umbach & Porter, 2002). Some studies have combined groups of students of color into a non-white race category (Loo & Rolison, 1986; Nettles, Thoeny, & Gosman, 1986), a practice which blurs important distinctions in the perceptions and experiences of African American, Asian American and Hispanic students (Hurtado, Carter, & Spuler, 1996; Minatoya & Sedlacek, 1983). Finally, many studies of race differences in the college experience have been conducted at single institutions (Ancis et al., 2000; Eimers & Pike, 1997; Knox et al., 1992; Thomas & Galambos, 2004; Umbach & Porter, 2002), a practice that necessarily limits the extent to which results can be generalized to other institutions.

Purpose of Study

The current study examines similarities and differences in the correlates of overall satisfaction with undergraduate education for seniors of different races. We draw upon data from multiple institutions to compare and contrast the correlates of overall satisfaction for white, Asian American, Hispanic and African American seniors.

This study poses the following research questions:

1. How do the correlates of seniors' overall satisfaction with their undergraduate education differ by race?
2. Within race, how do the correlates of overall satisfaction differ for seniors who are more satisfied and less satisfied?

Traditional regression methods are used to address the first question while decision tree analysis – a hierarchical clustering method – is used to address the second. Recent research conducted by Thomas and Galambos (2004) has demonstrated the ability of data clustering

analysis to identify distinct predictors of satisfaction for different segments of the student body, and its potential usefulness for informing associated policy and programming decisions. The current study seeks to extend their work by comparing the results of regression and hierarchical clustering analyses for seniors of different races.

Conceptual Framework

Much of the research on satisfaction stems from the work of Spady (1970), and Tinto (1975; 1993). Consistent with these and other models of college impact (Bean, 1980; Pascarella & Terenzini, 1991), satisfaction with undergraduate education has been conceptualized as a function of four general constructs: (1) students' background characteristics, (2) academic integration, (3) social integration, and (4) performance in college.

Students' sociodemographic characteristics are expected to shape the ease with which they become integrated within the academic and social systems of the their college. As noted above, extant research provides conflicting findings concerning the association of race with satisfaction. There is also mixed evidence concerning the relationship of gender (Bean & Vesper, 1994; Endo & Harpel, 1982; Pascarella et al., 1986) and socioeconomic status (Bean & Vesper, 1994; Knox et al., 1992) to satisfaction. Prior research suggests that low parental educational attainment may hamper students' efforts at social and academic integration (Terenzini et al., 1994).

Measures of students' integration within the academic systems of their college are expected to significantly shape overall satisfaction. Studies have found a positive relationship between satisfaction and students' evaluation of the quality of instruction (Bean & Vesper, 1994) and level of intellectual stimulation in their courses (Spady, 1971). Researchers have also reported a positive relationship between faculty-student interaction and satisfaction (Endo & Harpel, 1982; Pascarella, 1980; Pascarella et al., 1986; Pike, 1991).

Social integration has typically been operationalized as a measure of students' friendships, extracurricular involvement, or subjective sense of "fitting in" or belonging at the institution. Research shows a positive relationship between having a satisfying social life and overall satisfaction (Bean & Bradley, 1986; Bean & Vesper, 1994; Spady, 1971). There have been mixed findings concerning the relationship of extracurricular involvement and satisfaction. In one study, involvement in campus organizations was not significantly related to satisfaction (Bean & Bradley, 1986) while in another, attending extracurricular events was positively related to satisfaction (Pike, 1989). In contrast, there is strong and consistent evidence of a positive association between students' sense belonging at the institution and their satisfaction (Morstain, 1977; Pervin, 1967; Thomas & Galambos, 2004). Satisfaction with racial/ethnic diversity on campus has been less frequently included as a measure of social integration. Thomas and Galambos (2004) found a positive association between this measure and general satisfaction with college.

There is conflicting evidence concerning the relationship of academic performance and satisfaction with college. Some researchers have reported a significant positive association between GPA and satisfaction (Aitken, 1982; Knox et al., 1992; Liu & Jung, 1980). Others have found that satisfaction has a stronger influence on grades than grades have on satisfaction (Bean & Bradley, 1986; Pike, 1991). Research suggests there is a positive relationship between perceived learning and satisfaction with college (Spady, 1971).

To what extent might we expect race-associated differences in the correlates of overall satisfaction? Once again, the literature offers mixed guidance. Some research has found few differences between the correlates of adjustment to college for minority and nonminority students (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Eimers & Pike, 1997). This

suggests there may also be few race-associated differences in correlates of satisfaction. Conversely, other research suggests that academic integration (Donovan, 1984; Terenzini et al., 1994), feeling that one belongs on campus (Sedlacek, 1987) and perceptions of racial prejudice (Loo & Rolison, 1986) may be stronger correlates of overall satisfaction for minority students. Given this limited and conflicting evidence, we view the current study as an opportunity to systematically explore similarities and differences in the correlates of overall satisfaction for students of different races.

Methodology

Sample and Data

Data were drawn from a senior survey conducted by 17 private, selective, research extensive universities in spring 2002. The survey was administered via the Internet and mail to seniors enrolled in their final semester of undergraduate study. Completed surveys were received from 14,320 of 24,585 eligible seniors for an overall response rate of 58%. The following subgroups were excluded from the analysis: international students, Native American students, students reporting multiple races that did not include African American or Hispanic, and students who did not report their race/ethnicity. Mean substitutions, calculated separately by race, were used to replace missing values in the independent variables (missing data did not exceed 2% on any variable). Seniors who reported that a particular survey item was “not relevant” were excluded from the analysis of that item. After listwise deletion of cases with “not relevant” responses, the final sample size was 11,606: 8,022 white seniors, 2,106 Asian American seniors, 745 Hispanic seniors, and 733 African American seniors.

Variables

Operational definitions, factor loadings and reliability coefficients for all variables are shown in Table 1. The dependent variable in this study was seniors' rating of overall satisfaction with their undergraduate education. The original version of this variable had five response categories: very dissatisfied, generally dissatisfied, ambivalent, generally satisfied, and very satisfied. Given the negatively skewed distribution of the data, the first three response categories were collapsed to create a more normally distributed three-category variable (dissatisfied, generally satisfied, very satisfied). Race provided the criterion for comparative analyses. For descriptive analyses, race was forced into single categories: white, Asian American, African American and Hispanic. In a small number of cases (n=44) where students reported being both African American and Hispanic, students were coded as African American. For multivariate analyses, race was measured with dummy variables for white, Asian American, African American and Hispanic students. The latter two categories were not mutually exclusive; that is, students who reported being African American and Hispanic were counted in both race categories.

[insert Table 1 about here]

There were 15 independent variables employed in the model. Initially, we intended to reduce the independent variables to a smaller number of factors reflecting measures of academic integration, social integration, and gains achieved in college. Factor analysis performed on the pooled sample suggested a three-factor solution for integration measures corresponding to constructs for satisfaction with instructional quality, interaction with faculty, and social involvement on campus. However, these solutions did not hold up consistently when factor analysis was performed within each race group. Some variation was evident across white, Asian

American and Hispanic seniors, but the largest differences were observed in the factor structures and item loadings produced for African American seniors. This argued for retaining most variables as single indicators to allow us to examine their specific association to overall satisfaction within and across race groups. Ultimately, we employed three scaled factors; these corresponded to social involvement, gains in self-development and gains in intellectual abilities.

Our multivariate model of overall satisfaction included measures of students' sociodemographic characteristics: gender, maternal educational attainment, and perceived financial impact on the family of paying for college. Academic integration was measured by single indicators of students' satisfaction with the overall quality of instruction, quality of instruction in the major, and intellectual excitement in major courses. Social integration was operationalized with a social involvement factor reflecting satisfaction with the sense of community and social life on campus, and single indicators for satisfaction with extracurricular opportunities and campus racial/ethnic diversity. Finally, achievement in college was measured with a single indicator of self-reported grades, and scaled factors of perceived gains in intellectual abilities and self-development.

Analyses

We conducted factor analyses, using principal components as the extraction method and varimax rotation, to create scales of social involvement and estimated gains. Race differences in variables were tested with ANOVA. We used ordinary least squares regression to identify statistically significant predictors of overall satisfaction for each race. Standardized regression coefficients (betas) were examined to compare the relative strength of predictors within each race-specific model. Unstandardized coefficients (b's) were examined to compare the strength of predictors across the models. The statistical significance of race differences in coefficients was

tested by estimating regression models on the pooled sample with race-based interaction terms for all predictor variables (i.e., sex*Asian, financial impact*Asian, etc.). In keeping with Pedhazur's (1997) recommendation, a more liberal p value of .10 was used when testing the significance of race differences among the unstandardized coefficients.

Decision tree analysis was employed to identify the characteristics and experiences that most differentiate satisfied and dissatisfied seniors. Decision tree analysis is a hierarchical clustering procedure that segments a sample in relation to a specified target variable. This analysis employed the CHAID (chi-squared automatic interaction detector) algorithm to identify mutually exclusive subsets of seniors based on their overall satisfaction. When the target variable is continuous, CHAID uses F tests to construct a tree of associations. Clustering is performed using one predictor variable at a time. The independent variable with the strongest association to overall satisfaction becomes the first or parent node of the tree. Subsequent nodes (termed child nodes) are created for each category of that variable that has a significantly different relationship with overall satisfaction. Using this process, successive levels of parent and child nodes are created until no further significant associations with the target variable are found. Separate decision trees were estimated for each race group. Stopping rules for creating nodes were adjusted for sample size. For white seniors, a minimum of 500 cases was set as the stopping rule for creating parent nodes and a minimum of 250 cases was set for creating child nodes. For Asian American seniors, the parent/child stopping rules were set at 125 and 65 cases respectively, and for African American and Hispanic seniors, the parent/child stopping rules were set at 50 and 25 cases respectively.

Results

Descriptive Analyses

As seen in Table 2, there were statistically significant differences by race on all model variables except perceived gains in self-development. Asian American and African American seniors reported significantly lower satisfaction with college, and were generally less satisfied with their instructional experiences and intellectual development. White seniors reported the highest satisfaction with aspects of the campus social environment. The largest race differences were associated with maternal education, satisfaction with racial/ethnic diversity on campus and grades. Compared to white and Asian American seniors, Hispanic and African American seniors had lower maternal educational attainment, were less satisfied with campus diversity, and reported achieving lower grades. Despite the statistical significance of these differences, an examination of effect sizes (calculated as eta-squared) indicated that race accounted for no more than 5% of the variability in any measure.

[insert Table 2 about here]

Regression Analyses

Adjusted R^2 values for the regression models ranged from .35 for Asian American seniors to .45 for Hispanic seniors. Similarities in the correlates of overall satisfaction were evident. Satisfaction with various aspects of instruction, social involvement, grades and perceived gains in intellectual abilities emerged as positive and statistically significant predictors in all models. Seniors' background characteristics, and their satisfaction with extracurricular opportunities and campus ethnic/racial diversity were generally weaker predictors of overall satisfaction. However, differences in the relative importance of correlates were observed across race groups.

[insert Table 3 about here]

Background Characteristics. The relationship of background characteristics with overall satisfaction varied significantly by race. Asian American seniors were the only group for whom being female was significantly associated with overall satisfaction. All else being equal, Asian American females were more satisfied with their undergraduate experience than their male peers. The most striking race-related differences were associated with measures of maternal educational attainment. Having a mother with less than graduate education was a statistically significant and comparatively important negative predictor of satisfaction only for Hispanic seniors. In contrast, lower maternal education was a positive, albeit statistically insignificant, correlate of overall satisfaction for Asian American seniors. Seniors' perception of the impact on their family of paying for college was significantly and negatively correlated with the overall satisfaction of white and Asian American seniors. The financial impact coefficient for African American seniors differed significantly (positive and larger) from the coefficient for seniors of other races.

Academic Integration. Measures of academic integration were important correlates of overall satisfaction for all seniors. Satisfaction with the overall quality of instruction was the key predictor within this cluster. It was the strongest predictor of overall satisfaction for African American, Hispanic and Asian American seniors, and was a significantly stronger predictor for African American seniors compared to seniors of other races. Satisfaction with instructional quality and intellectual excitement in the major were also statistically significant and moderately important predictors of overall satisfaction for all seniors. Satisfaction with class size was a significant but comparatively less important correlate of overall satisfaction for white and Hispanic seniors; the coefficient for class size for Hispanic seniors differed significantly from that for seniors of other races. Satisfaction with faculty availability out of class was a significant

and moderately important predictor of overall satisfaction for white and Asian American seniors only.

Social Integration. For seniors of all race groups, satisfaction with social involvement was the social integration measure with the strongest relationship to overall satisfaction. It was a significantly stronger predictor for white seniors compared to seniors of other races, and comparatively weaker predictor for Asian American and Hispanic seniors. Whites were the only race group for whom satisfaction with opportunities to participate in extracurricular activities was significantly associated with overall satisfaction. Satisfaction with racial/ethnic diversity on campus was a statistically significant predictor only for African American seniors. Whites were the only race group for whom there was a negative association between satisfaction with campus racial/ethnic diversity and overall satisfaction. The campus diversity coefficient was significantly larger for African Americans and smaller for whites than for seniors of other races.

Performance. Self-reported grades and perceived gains in intellectual development were positive and statistically significant predictors of satisfaction for all seniors. However, grades were a comparatively stronger predictor for Asian American and Hispanic seniors, and weaker predictor for white seniors. Perceived gains in self-development were significantly associated with overall satisfaction for all but African American seniors. The self-development gain coefficient was significantly smaller for African American seniors compared to other races.

Decision Tree Analyses

Figures 1 through 5 display complete decision tree results for each race group. Each box or "node" in a decision tree diagram represents a cluster of seniors. "Mean" refers to the mean score for overall satisfaction for seniors within that node; "%" is the percentage of seniors contained in the node.

[insert Figure 1 and 2 about here]

Figures 1 and 2 summarize the decision tree results for white seniors. The aspect that most differentiated white seniors who were more satisfied with their undergraduate experience from those who were less satisfied was satisfaction with the quality of instruction. White seniors with the highest overall satisfaction (M = 2.89, node 33) had the following profile of campus experiences: high satisfaction with the quality of instruction, high satisfaction with opportunities to participate in extracurricular activities, high satisfaction with social involvement, and high satisfaction with intellectual excitement in courses in the major. In contrast, white seniors with the lowest overall satisfaction (M = 1.40, node 4) were both less satisfied with the quality of instruction in their courses and less satisfied with the level of intellectual excitement in their major courses. For white seniors in the middle range of satisfaction with the quality of instruction, mean overall satisfaction was further differentiated by a mix of academically- and socially-oriented measures: satisfaction with opportunities for extracurricular involvement, satisfaction with instruction in major courses, gains in intellectual abilities and self-development, satisfaction with social involvement, and grades.

There were similarities and differences in the correlates of overall satisfaction produced by decision tree and regression analyses. Quality of instruction and measures of social involvement were identified in both as the strongest correlates, although their order of relative importance differed in the two analyses. The importance of extracurricular opportunities and perceived gains emerged in both analyses, as did the less important association between grades and overall satisfaction. Weaker correlates from the regression model for whites (e.g., maternal education, financial impact and class size) did not appear in the decision tree results.

[insert Figure 3 about here]

In the decision tree analysis, the overall satisfaction of Asian American seniors was most strongly associated with overall quality of instruction and social involvement (see Figure 3). Asian American seniors with the highest overall satisfaction (mean = 2.87, node 18) had the following profile: high satisfaction with the quality of instruction and social involvement, and high estimation of gains in self-development. For seniors reporting lower gains in self-development, overall satisfaction was further differentiated by satisfaction with the availability of faculty outside class (mean = 2.63, node 26). In contrast, Asian American seniors reporting the lowest satisfaction with their college experience (mean = 1.32, node 4) were in the lowest range of satisfaction scores for quality of instruction and social involvement. For those seniors in the mid-range of satisfaction with quality of instruction, other significant correlates emerged: opportunities for extracurricular involvement, grades, intellectual excitement in major courses, social involvement, self-development gains, and, finally, gender and the financial impact on the family of paying for college.

Consistent with regression findings, decision tree results confirm the importance of instructional quality, social involvement, grades and self-development as correlates of Asian American seniors' overall satisfaction, and the lesser influence of demographic characteristics. Gains in intellectual abilities and satisfaction with the quality of instruction in major courses – both important predictors in the regression model for Asian Americans – did not appear as significant correlates in the decision tree analysis.

[insert Figure 4 about here]

As shown in Figure 4, a clear pattern of hierarchical associations with overall satisfaction emerged for Hispanic seniors. Seniors' satisfaction with the overall quality of instruction had the strongest association with overall satisfaction, followed by satisfaction with their social

involvement on campus. The cluster of Hispanic seniors reporting the highest overall satisfaction (mean = 2.88, node 12) also reported the highest satisfaction with the overall quality of instruction and social involvement. Conversely, Hispanic seniors who reported the lowest satisfaction with their overall undergraduate experience (mean = 1.19, node 4) were least satisfied with the overall quality of instruction and social involvement. For seniors in the middle ranges of satisfaction with instructional quality, overall satisfaction was further differentiated by perceived gains in intellectual abilities, satisfaction with instructional experiences in the major, grades and satisfaction with the out of class availability of faculty.

The importance of instructional quality, social involvement, grades and intellectual gains as correlates of Hispanic seniors' overall satisfaction is consistent with regression results. However, other predictors from the regression model – gains in self development, maternal education and class size – did not surface as significant correlates of overall satisfaction in the decision tree analysis.

[insert Figure 5 about here]

Figure 5 displays the decision tree results for African American seniors. As was observed in the regression analysis, satisfaction with the overall quality of instruction was the primary measure that differentiated African American seniors who were most satisfied with their undergraduate experience (mean = 2.43, node 3) from those who were less so (mean = 1.36, node 1). African American seniors who were most satisfied with the quality of instruction and most satisfied with their social involvement on campus reported the highest overall satisfaction with college (mean = 2.74, node 12). For seniors falling in the middle range of satisfaction with quality of instruction, overall satisfaction was further differentiated by satisfaction with social involvement, instruction in courses in the major and grade achievement. Finally, the lowest

overall satisfaction among African American seniors was associated with low satisfaction with the quality of instruction and perceiving smaller gains in intellectual abilities (mean = 1.14, node 4).

Consistent with regression results, decision tree findings support the primacy of quality of instruction in shaping African American seniors' overall satisfaction with college, followed by social involvement, intellectual gains, instruction in the major, and grades. Interestingly, maternal education emerged as a significant correlate in the decision tree analysis. For African American seniors who were very satisfied with the overall quality of instruction but comparatively less satisfied with their social involvement, having a mother with less than a bachelor's degree was associated with significantly higher overall satisfaction (mean = 2.41, node 17) than having a mother with a bachelor's degree or higher (mean = 2.08, node 18).

Limitations

The design of this study benefits from the participation of multiple institutions. Nevertheless, our results may only be generalized to other selective research-extensive universities. As involvement effects on satisfaction may not be fully realized until the senior year (Bean & Kuh, 1984; Pike, 1991), it is defensible to restrict research participants to seniors. However, this means our survey data only reflect the experiences and perceptions of students who have successfully persisted to their final semester of undergraduate study. We know from our own institution that African American and Hispanic seniors have lower survey participation rates than white and Asian American seniors. Further, there are race differences in our graduation rates, favoring white and Asian American seniors; that said, these differences are considerably smaller than at less selective institutions, and the gap in degree attainment is narrowing. We do not have access to institutional files from the other universities participating in

this survey but assume the same patterns apply. Taken together, this raises the possibility of non-response bias in survey results. Variables for the model were necessarily restricted to those available in the survey instrument. The model would be strengthened by the inclusion of measures of seniors' high school achievement, whether or not the university attended was their first choice, expectations of college, actual rather than self-reported grades, and measures of informal interactions with other students during college.

Decision tree results are highly dependent on the measurement scale of the variables, stopping rules, and clustering algorithm employed. Changing any of these conditions can produce very different clustering patterns. Because of this variability and the associated likelihood of producing spurious relationships, decision tree analysis is not appropriate for hypothesis testing. However, we believe it is a useful procedure for exploring data, particularly when used in combination with other analysis methods.

Discussion

This study employed multiple linear regression and decision tree analysis to examine race-specific correlates of seniors' overall satisfaction with college. There was substantial consistency between the correlates identified by the two methods. The strongest correlates from regression analyses were generally replicated within the decision tree results. However, regression and decision tree analyses identified different secondary correlates of overall satisfaction. This is a consequence of the analytical procedures utilized by the methods. Multiple linear regression identified the strongest correlates of overall satisfaction for each race group of seniors as a whole. Decision tree identified the strongest correlates of overall satisfaction for subgroups of seniors within each race. Thus, a variable may be significantly correlated with overall satisfaction for a subgroup of seniors within race, but may not be significantly correlated with

overall satisfaction for the whole race group; the converse also holds true. Considered together, the two methods offer a richer understanding of the correlates of overall satisfaction for seniors of different races than would be possible through using either method on its own.

For the most part, seniors' background characteristics do not appear to be important correlates of overall satisfaction. However, some differences were found both across and within race. In regression and decision tree analyses, Asian American females were significantly more satisfied with their college experience than their male counterparts. Gender was not a significant correlate of overall satisfaction for seniors of other races. These results parallel mixed findings concerning the relationship between gender and satisfaction in previous research (Bean & Vesper, 1994; Endo & Harpel, 1982; Pascarella et al., 1986; Umbach & Porter, 2002).

In regression analyses, low maternal educational attainment was a significant and comparatively strong negative correlate of overall satisfaction for Hispanic seniors only. Hispanic seniors also reported significantly lower maternal educational attainment than seniors of other races. The negative association between low maternal education and satisfaction might reflect greater difficulties experienced by these seniors in adapting to highly selective university environments. Yet, decision tree results suggest a positive association between low maternal educational attainment and overall satisfaction for the cluster of African American seniors who were very satisfied with the quality of instruction but relatively dissatisfied with their social involvement on campus. Our data do not shed light on the reasons for this seemingly inconsistent finding.

Perception of the financial impact on the family of paying for college was negatively associated with overall satisfaction for whites and Asians only. Other data from this survey shows that parental resources were a significantly greater source of funding and institutional

financial aid was a significantly lesser source of funding for white and Asian seniors, while the converse was true for Hispanic and African American seniors. This difference in funding strategies appears to color seniors' overall satisfaction.

Consistent with past research (Bean & Vesper, 1994; Spady, 1971; Tinto, 1986) academic and social integration was strongly associated with seniors' satisfaction with their college experience. Two measures – overall quality of instruction and social involvement – had a strong influence on satisfaction for all seniors. The relative importance of other integration measures appears to vary both across and within race groups.

The quality of the classroom experience figures prominently as a correlate of overall satisfaction for seniors of all races. Satisfaction with the overall quality of instruction was the strongest predictor of overall satisfaction in the regression models for Asian American, Hispanic and particularly for African American seniors; it was the second strongest predictor for white seniors. In decision tree analyses conducted for each race group, overall quality of instruction was the variable that most distinguished seniors who were satisfied with their overall educational experience from those who were not. In both analysis methods, measures of instructional experiences within the major emerged as significant but comparatively less important correlates of overall satisfaction.

Satisfaction with class size and faculty availability out of class were positive but generally less important correlates of overall satisfaction across races. In regression results, satisfaction with class size was significantly associated with overall satisfaction for white and Hispanic seniors. Satisfaction with faculty availability was a statistically significant correlate in regression models for white and Asian American seniors, and appeared as a lower-order correlate for clusters of Asian and Hispanic seniors in decision tree results. Given compelling evidence of the

positive impact of faculty-student interaction on a variety of educational outcomes (Astin, 1993; Kuh & Hu, 2001; Pascarella & Terenzini, 1991), we might have expected faculty availability to be a stronger predictor of overall satisfaction. When faculty availability was entered on its own in the regression models after controlling for background characteristics, it had a large and statistically significant association with overall satisfaction for all seniors. However, as measures of instructional quality and social involvement were added to the models, faculty availability became a progressively less important predictor. This is consistent with prior research (Hearn, 1985; Thomas & Galambos, 2004).

After quality of instruction, social involvement – the factor employed here captured seniors' satisfaction with their sense of community and social life on campus – appears to be the next most important correlate of overall satisfaction for seniors of all races. In regression results, it was no less than the second strongest predictor in all four models. In decision tree analyses, it emerged as a second-level correlate of overall satisfaction for all but white seniors. The influence of other measures of social integration seems to vary by and within race. Having opportunities for extracurricular participation has a stronger association with overall satisfaction for white seniors than for seniors of other races; this may reflect higher rates of participation in extracurricular activities by white students. However, in decision tree results, extracurricular opportunities also appeared as the second strongest correlate of overall satisfaction for almost two-thirds of Asian American seniors. Satisfaction with campus diversity had a significantly larger beta coefficient and was only a statistically significant predictor of overall satisfaction for African American seniors.

Consistent with some prior research (Aitken, 1982; Knox et al., 1992; Spady, 1971), we found that grades and perceived intellectual development are significant correlates of overall

satisfaction for seniors of all races, albeit of less importance than quality of instruction and social involvement. Grades were a comparatively less important correlate for white seniors, and more important correlate for Asian American and Hispanic seniors. Self-development gains appear to be salient predictors of overall satisfaction for all but African American seniors. Freshman surveys conducted at a number of the institutions participating in this study show that African American students rate their personal development and social skills significantly higher than entering students of other races. In this survey, there were no significant race differences in seniors' perceived gains in self-development since entering college. Thus, the nonsignificant correlation between self-development gains and overall satisfaction may reflect a ceiling effect for African American seniors.

Implications for Practice

Study results suggest two institutional strategies may be most likely to enhance the overall satisfaction of white, Asian American, Hispanic and African American seniors alike: improving the quality of undergraduate instruction and strengthening students' sense of belonging on campus.

Clearly, the quality of instruction is a key determinant of how seniors' feel about their overall undergraduate experience – even among students attending research-focused institutions. Campus efforts to enhance the quality of instruction for undergraduates – such as increasing opportunities to be taught by senior faculty, reducing class size, providing professional development to faculty, offering incentives for teaching innovations, ensuring teaching performance is an important criterion in tenure and promotion decisions, and recognizing departments and faculty for teaching excellence – have the potential to produce associated gains in student satisfaction.

Secondly, students who feel a sense of social belonging are more likely to be satisfied with their undergraduate experience. Institutions are encouraged to consider ways to strengthen the sense of community and social engagement for their undergraduate students. Strategies to accomplish this can range from large-scale initiatives such as establishing living/learning programs to smaller-scale efforts such as offering more venues on campus for students to informally socialize. Extracurricular activities, at least as currently configured, appear to offer an avenue for social engagement that reaps greater benefits for white seniors' overall satisfaction. This suggests that institutions should consider building in a more diverse array of extracurricular opportunities to better address the needs and interests of students of other races.

Beyond being taught well and feeling socially engaged, student satisfaction is associated, although to a lesser degree, with academic achievement and gains in intellectual abilities and self-development. Ensuring the availability of academic support, assigning projects that develop and require higher cognitive skills, and building in opportunities for students to test and stretch their personal and interpersonal skills through group projects might contribute to students' sense of development and hence, to overall satisfaction.

Finally, study results suggest the extent to which institutions can offer a racially diverse student body and educational experience should enhance the overall satisfaction of non-white seniors, particularly African Americans. Students from backgrounds of lower parental education may benefit from additional assistance in adapting to the college environment, perhaps through the provision of orientation or mentoring programs. Our results suggest that such interventions may benefit Hispanic students the most.

Implications for Research

Study results suggest the value of estimating separate regression models by race. Our findings reflect the experiences of seniors enrolled in elite, research-extensive universities. Future research should include students enrolled in different types of postsecondary institutions.

An implicit objective of this study was to explore the utility of using two different analytic methods to identify race differences in satisfaction correlates. Certainly, we would not advocate dropping regression methods in favor of decision tree or other data mining techniques. However, decision tree analysis provides a different perspective that can complement regression results. Perhaps its greatest contribution is to remind us of the heterogeneity of the undergraduate student experience, even within race groups. Such awareness is crucial when planning programs and services for undergraduates.

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TABLE 1. Listing and Operational Definitions of Variables

Variable	Factor Loading	Operational Definition
Overall satisfaction		Overall satisfaction with undergraduate education (1 = dissatisfied, 2 = generally satisfied, 3 = very satisfied)
Sex		1= female, 0 = male
White		1 = yes, 0 = no
Asian American		1 = yes, 0 = no
Hispanic		1 = yes, 0 = no
African American		1 = yes, 0 = no
Mother less than BA		1 = yes, 0 = no (reference is graduate degree)
Mother has BA		1 = yes, 0 = no (reference is graduate degree)
Financial impact		Impact on family of paying for college (1 = none/slight, 2 = moderate, 3 = considerable, 4 = severe)
Quality of instruction*		Satisfaction with overall quality of instruction
Instruction in major*		Satisfaction with quality of instruction in courses in major field
Intellectual excitement*		Satisfaction with intellectual excitement in courses in major
Class size*		Satisfaction with size of classes
Faculty availability*		Satisfaction with faculty availability outside classroom
Social involvement:		3-item scale of social involvement on campus. *Alpha = .77*
Campus community*	.80	Satisfaction with sense of community on campus
Community where live*	.74	Satisfaction with sense of community where live
Social life*	.72	Satisfaction with social life on campus
Extracurricular opportunities*		Satisfaction with opportunities to participate in extracurricular activities
Campus diversity*		Satisfaction with ethnic/racial diversity of the campus
Grades		Self-report of overall grades: 1 = B or less 2 = B+, 3 = A-, 4 = A
Intellectual gains:		6-item scale of gains in intellectual skills and abilities since entering college. *Alpha = .78*
Think analytically**	.74	Think analytically and logically
Think creatively**	.69	Create original ideas and solutions
Acquire new skills**	.68	Acquire new skills and knowledge on own
Execute projects**	.64	Plan and execute complex projects
Indepth knowledge**	.63	Gain indepth knowledge of a field
Synthesize ideas**	.61	Synthesize and integrate ideas and information
Self development gains:		3-item scale of gains in self development since entering college. *Alpha = .68*
Develop self-esteem**	.80	Develop self-esteem/self-confidence
Resolve conflicts**	.79	Resolve interpersonal conflicts positively
Understand self**	.66	Understand myself: abilities, interests, limitations, personality

*1 = very dissatisfied, 2 = generally dissatisfied, 3 = generally satisfied, 4 = very satisfied

**1 = weaker now, 2 = no change, 3 = stronger now, 4 = much stronger now

TABLE 2. Variable Means and Standard Deviations by Race

	White		Asian Am		Hispanic		African Am			
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	*F*	Eta^2
Overall satisfaction	2.25	.67	2.06	.65	2.16	.69	2.00	.67	68.29 ***	.017
Sex	0.53	.50	0.56	.50	0.56	.50	0.65	.48	13.85 ***	.004
Mother less than BA	0.18	.38	0.26	.44	0.46	.50	0.36	.48	148.52 ***	.037
Mother has BA	0.32	.47	0.32	.47	0.24	.43	0.26	.44	11.17 ***	.003
Financial impact	2.30	.91	2.52	.89	2.47	.97	2.52	.93	43.17 ***	.011
Quality of instruction	3.29	.63	3.10	.63	3.29	.63	3.16	.62	55.83 ***	.014
Instruction in major	3.37	.69	3.14	.73	3.35	.72	3.21	.72	65.86 ***	.017
Intellectual excitement	3.08	.69	2.29	.73	3.08	.67	2.99	.69	29.95 ***	.008
Class size	3.17	.68	3.05	.67	3.16	.67	3.18	.67	19.56 ***	.005
Faculty availability	3.32	.65	3.18	.66	3.26	.68	3.23	.66	25.98 ***	.007
Social involvement	2.22	.53	2.11	.52	2.12	.54	1.98	.52	71.12 ***	.018
Extracurricular opportunities	3.41	.63	3.32	.65	3.33	.68	3.32	.64	17.34 ***	.004
Campus diversity	2.93	.76	2.95	.78	2.64	.95	2.38	.85	136.98 ***	.034
Grades	2.51	.91	2.45	.92	2.05	.90	1.73	.78	205.60 ***	.051
Intellectual gains	2.04	.30	2.00	.31	2.06	.32	2.02	.30	14.22 ***	.004
Self development gains	2.18	.44	2.19	.45	2.19	.46	2.22	.47	1.24	.000

*** $p < .001$ based on one-way ANOVA.

TABLE 3. Coefficients for OLS Regression on Overall Satisfaction by Race

	White (n=8,022)			Asian (n=2,106)			Hispanic (n=745)			African American (n=733)		
	b	Beta	Sig	b	Beta	Sig	b	Beta	Sig	b	Beta	Sig
Background Characteristics												
Female	-.015	-.011		.064	.049	**###	-.069	-.049	#	-.018	-.013	
Mother < BA	-.009	-.005		.037	.025	##	-.166	-.119	***###	-.013	-.009	
Mother has BA	-.027	-.019	*	.048	.034	###	-.157	-.097	**###	-.012	-.008	
Financial impact	-.027	-.036	***	-.030	-.040	*	-.034	-.048		.028	.039	##
Academic Integration												
Quality of instruction	.218	.204	***	.199	.193	***	.264	.241	***	.288	.264	***#
Instruction in mjr courses	.096	.098	***	.076	.086	***	.110	.115	***	.095	.102	**
Intellectual excitement	.077	.079	***	.076	.085	***	.107	.104	**	.109	.113	***
Class size	.029	.029	**	.034	.035		.088	.088	**#	.016	.016	
Faculty availability out of class	.062	.060	***	.064	.064	***	.035	.034		.022	.022	
Social Integration												
Social involvement scale	.321	.250	***###	.242	.194	***##	.210	.164	***##	.256	.197	***
Extracurricular opportunities	.053	.049	***	.032	.032		.041	.040		.039	.038	
Ethnic racial diversity	-.003	-.003	#	.009	.011		.015	.021		.065	.083	*##
Performance												
Overall grades	.059	.080	***###	.093	.130	***#	.108	.140	***#	.086	.100	***
Intellectual gains	.207	.093	***	.244	.117	***	.261	.120	***	.330	.147	***
Self development gains	.138	.091	***	.128	.089	***	.154	.102	***	.048	.034	#
Adjusted R^2	.382			.354			.450			.362		

Asterisks denote coefficients statistically significant within race: *** $p < .001$, ** $p < .01$, * $p < .05$.

Pound signs denote unstandardized coefficients significantly different compared to other races: # $p < .10$, ## $p < .05$, ### $p < .01$.

FIGURE 1. Decision Tree Results for White Seniors, High Satisfaction with Quality of Instruction

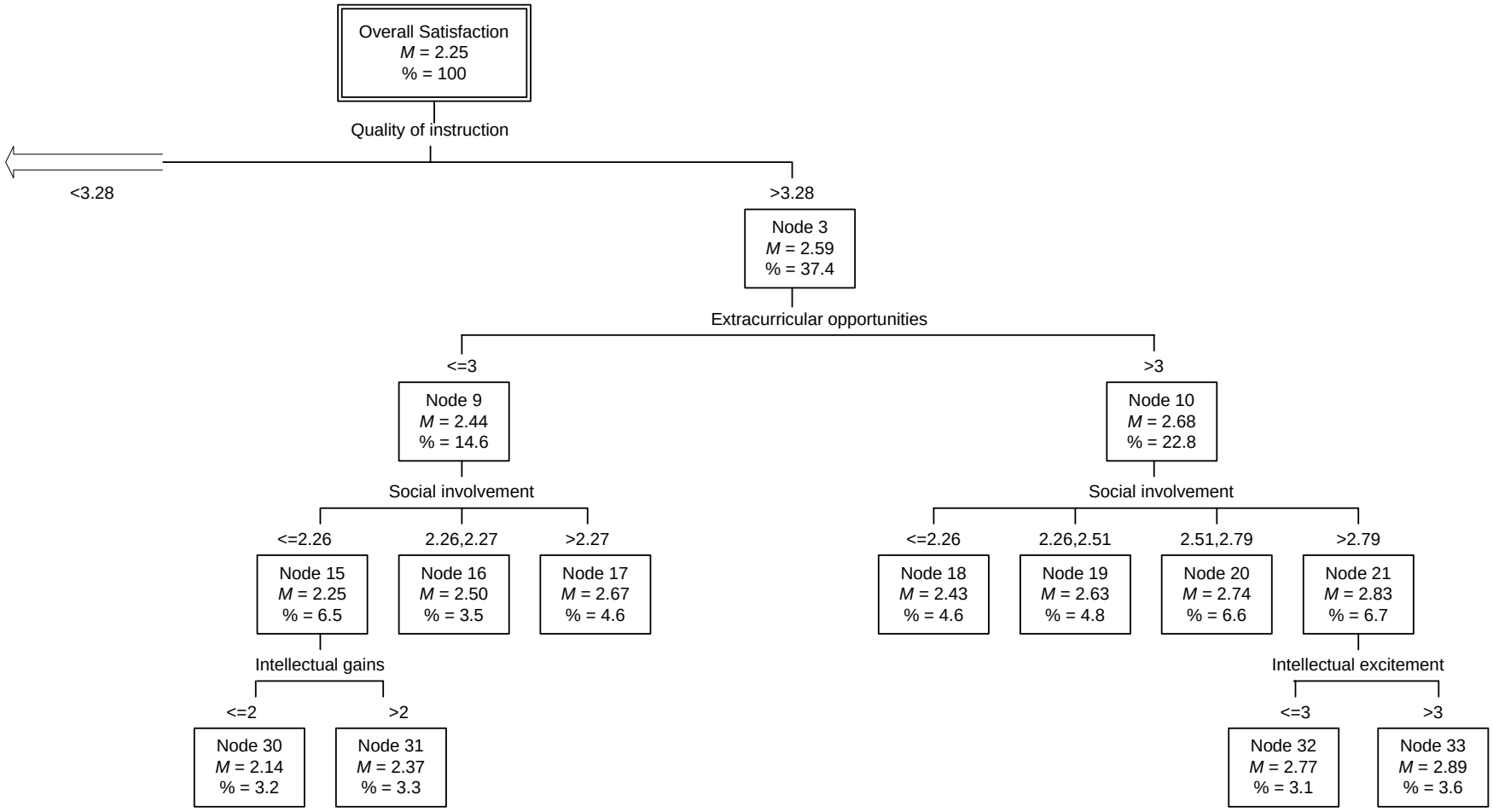

FIGURE 2. Decision Tree Results for White Seniors, Low to Medium Satisfaction with Quality of Instruction

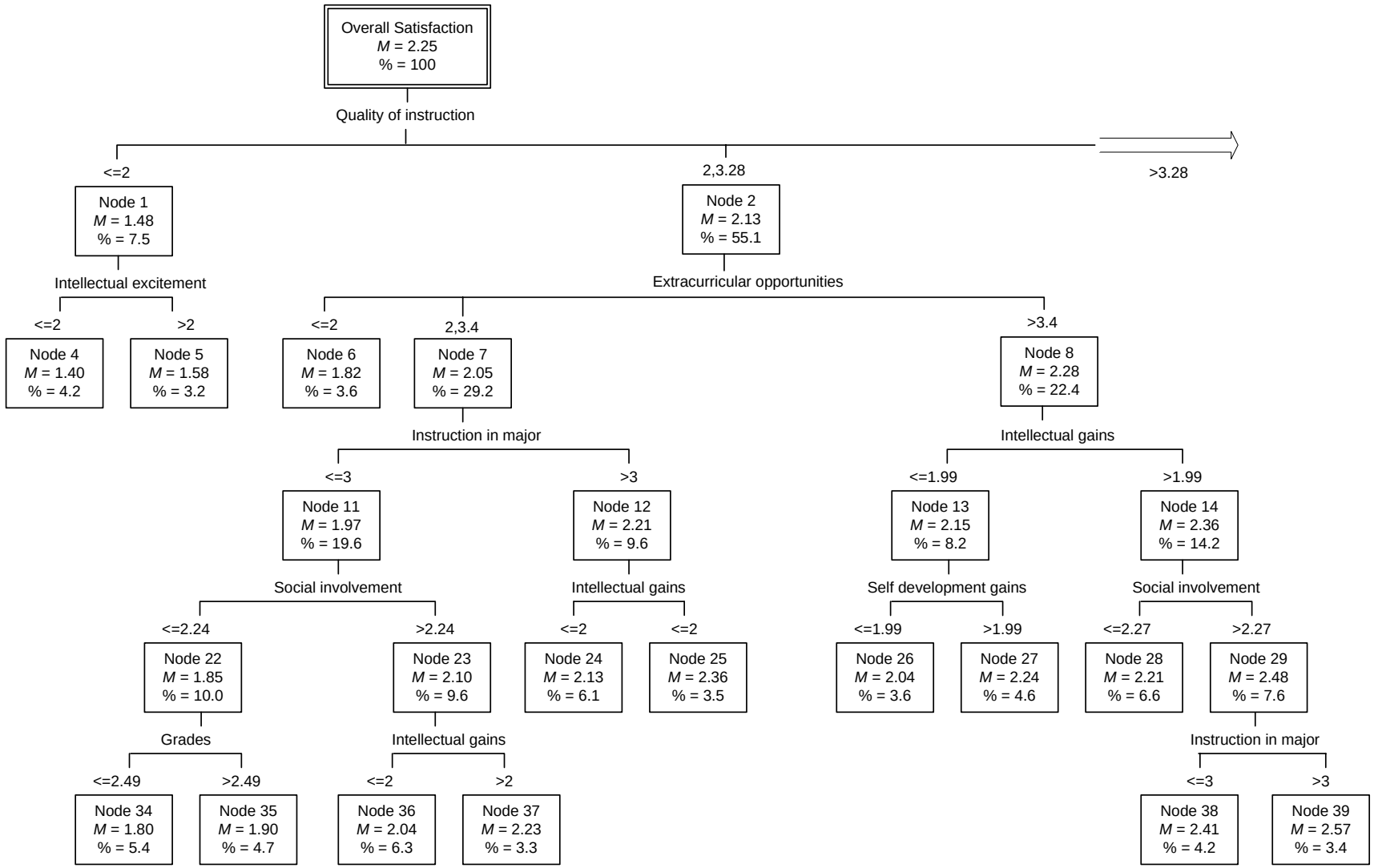

FIGURE 3. Decision Tree Results for Asian American Seniors

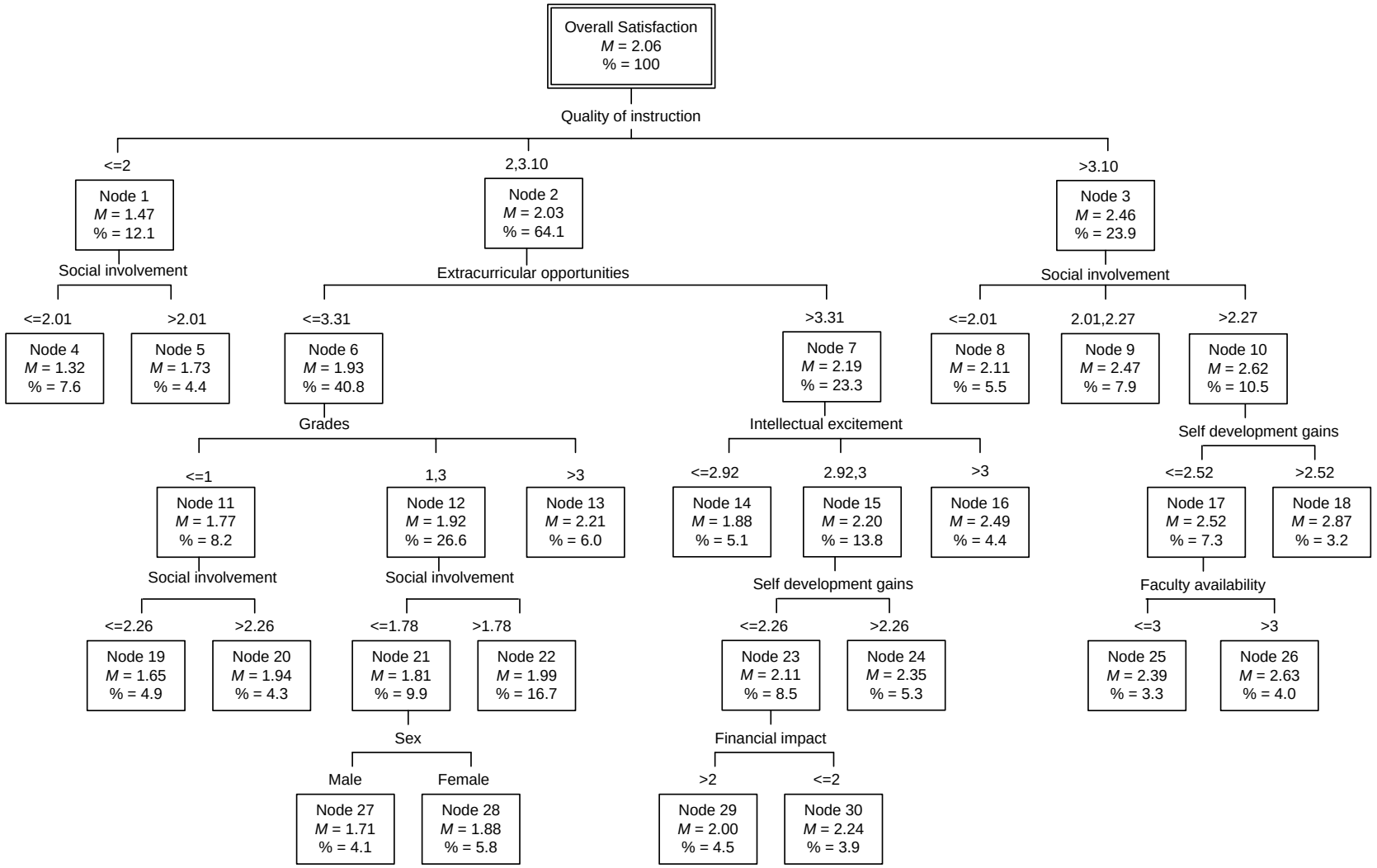

FIGURE 4. Decision Tree Results for Hispanic Seniors

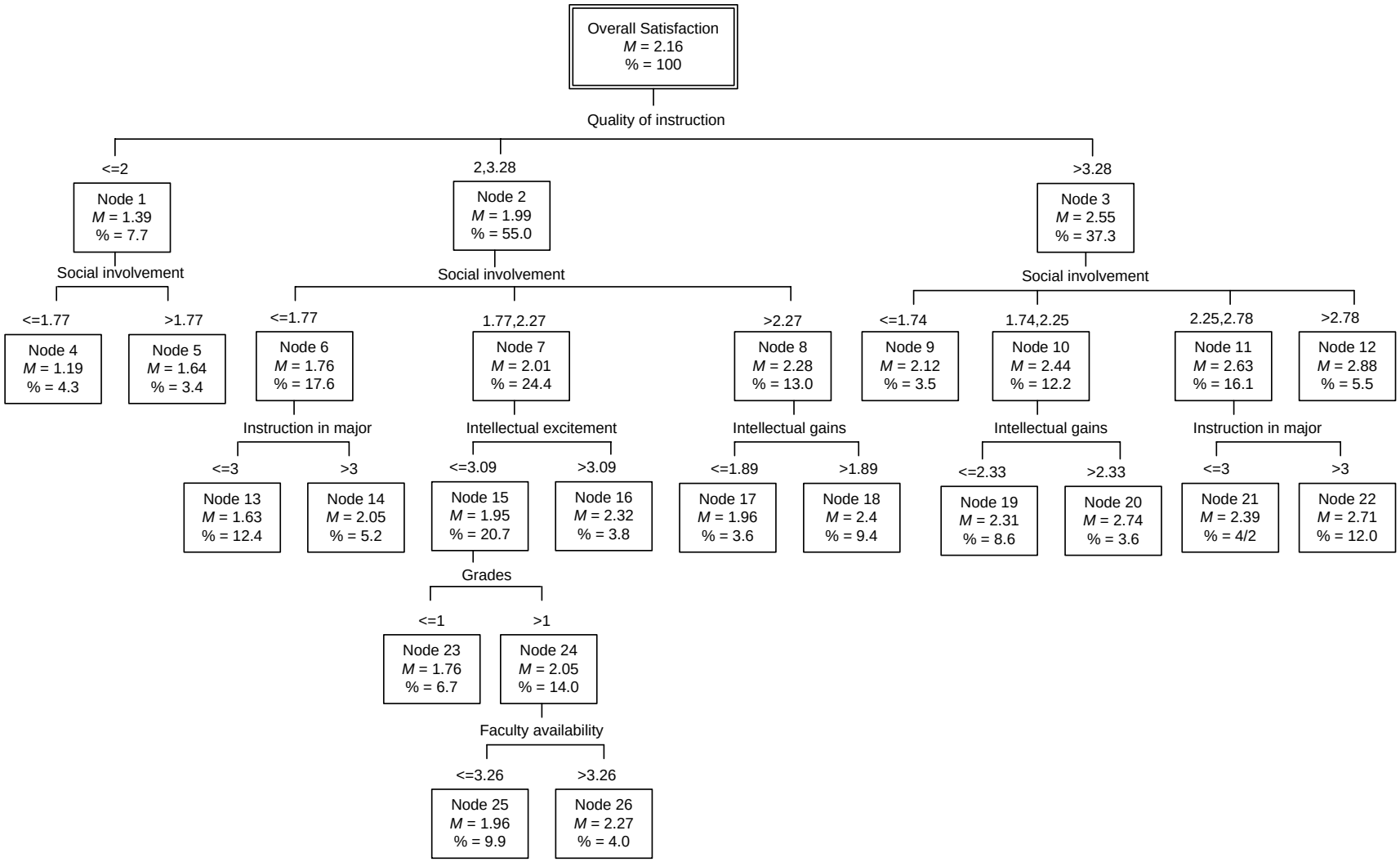

FIGURE 5. Decision Tree Results for African American Seniors