ADOLESCENT EDUCATIONAL EXPECTATIONS

RATIONALIZED, FANTASIZED, OR BOTH?

Stephen L. Morgan

ABSTRACT

Educational expectations are not perfect forecasts of how much education students will acquire. Nonetheless, we should not treat educational expectations as affective fantasies or status-based value orientations. Educational expectations are educational intentions, generated from rational calculations of the costs and benefits of educational training but subject to constant revision in response to new information. This conclusion is supported by an analysis of the association between family-background-adjusted educational expectations of high-school seniors and earnings returns on educational investments of labor market participants between the ages of 26 and 35 years. After an adjustment for family background differences, White high school seniors had lower educational expectations than Black high school seniors in the late 1970s, but increased their expectations relatively more than Black students in the 1980s. Earnings returns on education follow similar patterns across race and sex groups. If educational expectations are overly optimistic, but still based on reasonable cost–benefit calculations, then they can be considered rational fantasies. Further research is needed to determine whether this last possibility is supported by empirical evidence.

KEY WORDS • education • rational expectations • returns to education

Introduction[1]

Rational choice theories of educational attainment conceptualize enrollment and continuation decisions as sequential responses to the costs and benefits associated with alternative choices. Status attainment theories view educational attainment as a behavioral outcome of joint allocation and socialization mechanisms through which parents, teachers and peers push and pull students. Each orientation has theoretical merit, but

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empirical work that draws on both sources of insight remains scarce. One promising avenue toward integration is a theory of educational expectations that is broad enough to incorporate features of both theoretical traditions yet still focussed enough to yield predictions of its own. With a better understanding of how students orient themselves to their futures, we can then tackle the more vexing question of whether educational attainment is most usefully considered to be the result of individual choices of students or the product of socialization and allocation mechanisms constructed by others.

In this article, I lay the groundwork for a combined theory of educational expectations. I will argue that the status attainment theory of educational aspirations needs to be recast as a theory of educational intentions and grounded on the simultaneous cost–benefit calculations of students and their 'significant others'. The formation of intentions by students, in response to information that is only partly under the control and authoritative judgement of their significant others, is the micro-foundation of educational attainment behavior. The reinforcement and contamination processes that are of paramount importance to status attainment theorists can only be evaluated after a believable micromodel of student educational intentions is constructed.

I will first review past conceptualizations of respondent-reported educational plans and then identify the core of rationality within the status socialization theory of educational attainment, both as first presented in the celebrated 'Wisconsin model' (Hauser et al. 1983; Sewell et al. 1969, 1970) and later as reconceptualized following a decade of subsequent research. I will then elaborate a heuristic rational choice model of educational intentions and demonstrate how an operationalization of this model can be considered a generalization of the rational core of status attainment theory. Finally, I will provide a preliminary test of the model through an analysis, performed across race and sex groups between 1976 and 1992, of the effect of exogenous changes in labor market incentives on the educational plans of high-school seniors, net of proxied changes in the resources available to students. Data limitations will prevent the estimation of the structural parameters of the heuristic model, but the findings will nonetheless support the basic prediction that educational expectations are driven both by the earnings benefits of educational attainment and by the availability of resources to cover the costs of further education. No definite answer to the question posed in the title of the article will be offered, but claims that respondent-reported educational plans are affective fantasies or status-based value orientations are not supported by the findings.

Conceptualizations of Respondent-reported Educational Plans

Even though rational choice theory relies on the theoretical existence of rational intentions that precede the execution of decisions, most rational choice researchers choose not to analyze respondent-reported intentions. Instead, these researchers generally invoke revealed expectations assumptions and, when necessary, infer distributions of intentions from observed distributions of behavior conditioned on the costs and benefits of alternative decisions (e.g., Breen and Goldthorpe 1997; Gambetta 1987; Manski and Wise 1983).

Charles Manski (1993, 1995; see also Dominitz and Manski 1996) has argued that more research on the formation of income expectations that lead to enrollment decisions is needed before rational choice theories of educational attainment can move forward. However, Manski believes that nothing can be learned from the efforts of sociologists who have studied respondent-reported educational plans for the past 40 years. While Manski's frustration with the lack of formal modeling behind social-psychological theories of expectation formation is understandable, there are kernels of insight within this past research that deserve our attention.

Since the 1950s, hundreds of surveys and small-scale sociological studies have elicited respondent-reports of educational plans, typically through simple questions such as 'How far in school do you expect to get?' Many sociologists and social psychologists remain intrigued by responses to these questions. In the 1970s, status attainment researchers claimed that educational plans are an adequate operationalization of the latent 'educational aspirations' that drive educational attainment by converting intrinsic ambition and alter-induced motivation into effort (see Spenner and Featherman 1978). Critics of early status socialization research questioned this conceptualization, arguing that educational plans also vary with perceptions of the opportunity structure (see Kerckhoff 1974, 1976, 1977). Alexander and Cook (1979, 202–3) wrote:

> expressions of intent or expectation ... could, for example, be but vague preferences, flights of fancy conjured up on the spur of the moment, merely reports of a foregone conclusion known practically since birth, or realistic appraisals of the likely course of events.

More so than other status attainment researchers, Archibald Haller endeavored to make explicit the social psychological underpinnings of status attainment models (Duncan et al. 1968; Haller 1968, 1982; Haller and Butterworth 1960; Haller et al. 1974; Haller and Portes 1973).

Initially, Haller (1968) claimed the support of Kurt Lewin and exhorted sociologists to reserve the term 'expectations' for only those expectations held by significant others about the future behavior of a referenced individual.[2] Haller preferred the terms 'idealistic aspirations' and 'realistic aspirations' to the increasingly common distinction between an individual's own 'aspirations' and 'expectations'. After more than a decade of controversy, however, Haller (1982) appeared to accept the validity of the criticism of Kerckhoff, Alexander and others, acknowledging that an individual's plans arise from consideration of a web of latent expectations about the future. Haller stopped just short of admitting that respondent-reported plans are probably a better measure of expectations than the goal-directed aspirations that he considered to be a more important construct. As a working conceptualization, I will adopt Alexander and Cook's last conjecture, toward which Haller was also gravitating, and consider respondent-reported educational plans to be measures of intent that are based largely on reasonable appraisals of future events.[3]

The Rational Core of the Status Socialization Theory of Educational Plans

In the original Wisconsin model of status attainment (Sewell et al. 1969, 1970), the distribution of college plans among Wisconsin high schools seniors is explained by exogenous variation in parents' socioeconomic status and students' mental abilities, but only indirectly through the intervening variables of academic performance and significant others' influence (SOI). Conceptualized as educational aspirations, these college plans then explain a substantial portion of the variation in educational attainment and, together with occupational aspirations formed through similar processes, subsequent occupational attainment.

The original Wisconsin model emerged in only 3 years from 1967 to 1970. In its time, it was both a theoretical tour de force and a demonstration of methodological sophistication. In hindsight, its underlying status socialization theory was underdeveloped. Reflecting upon the original model, Haller (1982, 10) wrote:

> At the time of its appearance ... its authors appear to have seen it as an explanation for the influence of origin statuses on status attainments and nothing more. Only later ... was it recognized explicitly that most of the effects of the aspirations and of the significant others have as yet unknown sources having nothing to do with the statuses of the parents of the subjects. As of the time of this writing, it appears that this important lacuna remains unfilled by empirical data.

Because it is reasonable to assume that the sources of the mysterious effects of plans and SOI on subsequent behavior are the exogenous sources of their generation, I will focus in this article on the effect on educational plans of the costs and benefits of educational training that both students and significant others jointly perceive.

Haller's theory of status socialization, much of which appears to have been developed in the years following the introduction of the Wisconsin model, proposes three mechanisms by which students formulate educational plans: self-reflection, imitation and adoption. Underneath the behaviorist flesh, each of these processes has a rational core.

The self-reflection mechanism is drawn directly from Lewin's field theory and is present in the Wisconsin model as the direct path from grade point average to college plans. Through causal attribution to internal capabilities, students form educational plans after evaluating their past academic successes. Without evidence that students hold irrational beliefs about their past performance and/or their future potential, we should consider self-reflection to be a rational process.

However, because learning tasks encountered in high schools and colleges are not equivalent, students cannot rely on past performance outcomes as accurate indicators of likely future success with as much assurance as could the dart-throwing and problem-solving subjects on whose behavior Lewin developed his theory of aspirations. To overcome their lack of knowledge about learning tasks in higher education, students must use imitation and adoption mechanisms to supplement their own self-reflection when constructing educational plans. Drawing inspiration from the form of behavorist social psychology advocated by George Herbert Mead, Haller posited the existence of two types of significant others toward whom students orient themselves. Students imitate the educational plans of 'models' (typically admired peers) and adopt the educational expectations held for them by 'definers' (typically parents or teachers).[4]

Jointly summarized by the direct effect of SOI on college plans in the original Wisconsin model, these last two mechanisms are prima facie non-rational. Because Haller maintained (without any evidence) that the adoption mechanism dominates the imitation and self-reflection mechanisms, he claimed that educational plans are the result, more than anything else, of student desires to conform to the expectations of others. Because of Haller's influential work, status socialization theory is generally regarded as a model of reinforcement behavior bereft of rational calculation. The accuracy of this perception depends on the degree to which: (i) the expectations of significant others are based on

non-rational criteria and (ii) the adoption mechanism dominates rational self-reflection.

Two implicit sources of SOI, each corresponding to nested levels of socialization within which status attainment is forged, can be inferred from the verbal description surrounding the original path model. Status-differentiated but otherwise non-specific SOI arises from societal differentiation along the distribution of status. Attendant allocation processes channel children of similar-status parents into positions in the educational system in which significant others furnish for adoption non-specific expectations for all students within range of their influence. Within comparable positions in the educational system, student-specific SOI arises from the judgment decisions of 'definers'. Similar to student self-reflection, significant others judge a student's likelihood of success in future educational endeavors on prior academic performance and exhibitions of mental ability. Significant others also judge the appropriateness of further education for a student after considering the socioeconomic status of a student's family (although according to the original theory, it is not clear whether significant others respond more to the availability of resources or a more mysterious cultural potential for survival). After considering the characteristics of each student, significant others then form student-specific educational expectations that students themselves adopt.[5]

It is difficult to discern whether or not status-differentiated but otherwise non-specific expectations of significant others are rational. Such a claim would be as difficult to evaluate as the functional theory of social stratification proposed by Davis and Moore. However, the student-specific expectations that significant others hold can be regarded as rational constructions because they are based on the recognition of student and family characteristics, and on reasonable appraisals of how these characteristics will affect a student's future success.

Thus, although it is not generally recognized, there have always been some 'rational' expectations within the theory of status socialization. Under the causal assumptions of the Wisconsin model, it is assumed that expectations exist in the minds of significant others and that some of these expectations are based on rational appraisals of student potential. Students then adopt the expectations that others have of them and add these to their own expectations formed independently through their own rational self-reflection.

The existence of rational expectations at the core of status attainment theory does not validate the Wisconsin model. Because status socialization theories do not clearly specify the sources of the reinforcing SOI

effects that purportedly induce action through imitation and adoption, the Wisconsin model cannot reject the null hypothesis that students' educational plans and the expectations of significant others are correlated outcomes simultaneously produced by rational calculation of the same exogenous determinants. As presented by Haller and his colleagues, the process by which peer 'models' form their expectations must by definition be the same process enacted by students. Moreover, 'definers' formulate expectations about the futures of students through a series of cognitive evaluations similar to those used by students in the process of self-reflection.

The primary difference between the status socialization theory of the Wisconsin model and the rational choice model that I will propose below is a further shift in focus away from the cognitive evaluations of significant others toward the cognitive evaluations of students. A rational choice theory starts with the assumption that adolescents form their own educational expectations after considering the same factors as their significant others and then proposes that we first search for explanations based on shifts in costs and benefits that neither students nor significant others control. Only after we determine the explanatory power of these exogenous determinants can we evaluate more complicated explanations based on contamination and reinforcement processes.

A Heuristic Rational Choice Model of Educational Attainment Intentions

Having established that there is a rational core to the status socialization theory of educational plans, I now switch gears and present a schematic model of educational attainment intentions that is based on assertions derived from rational choice theory. I will link this heuristic model to the previous discussion of the Wisconsin model of educational plans when I claim that both models share features of a common operationalization.

Rational choice theory maintains that enrollment decisions, and the implicit intentions that lead to their enactment, are generated by two exogenous sources of constraints—the opportunity and direct costs of alternative choices. Accordingly, Figure 1 presents a heuristic model in which educational intentions are driven by labor market incentives and the availability of resources to meet the costs of education. High school students plan to pursue post-secondary education only when they believe high levels of educational certification provide benefits such as labor market returns in increased earnings, job security and autonomy.

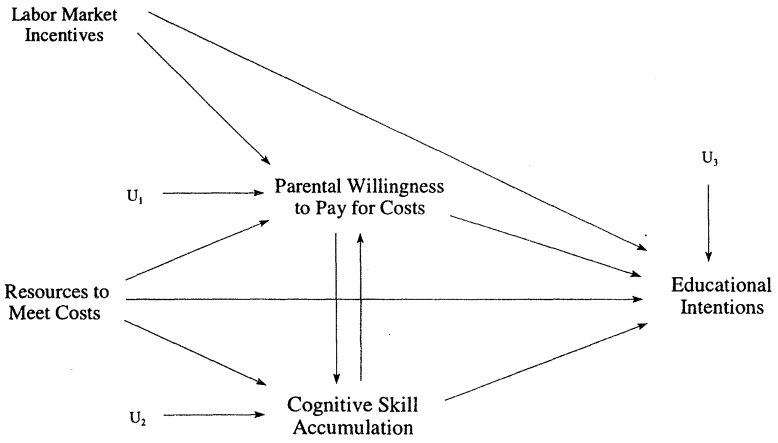

Figure 1. A heuristic rational choice model of educational attainment intentions

High school students will not plan to attend post-secondary education unless they feel they can pay the direct costs of educational training—from savings, loans and parental contributions. Figure 1 presents a heuristic rational choice model of the generation of educational intentions that emphasizes these two exogenous determinants of educational intentions—labor market incentives and resources to meet the costs of education.

The model presented in Figure 1 further asserts that a substantial portion of the exogenous impact of labor market benefits and resource-availability is channeled through two intervening mechanisms—parental willingness to pay the direct costs of education and the prior cognitive skill accumulation of students. When labor market returns on education and the availability of resources to invest in education increase, parents recognize that both the salience and feasibility of post-secondary educational attainment increase for their children. Under these conditions, parents will become more willing to pay for post-secondary education, and student recognition of this increased willingness will increase student plans to complete college (even without considering the students' independent calculations of their parents' ability to pay). The second intervening mechanism operates through the portion of 'cognitive skill accumulation' that is the result of effort. Students for whom funds to invest in education are readily available are more likely to prepare themselves for advanced educational training.

Over the course of their educational careers, they will accumulate more cognitive skill through greater effort.[6]

These intervening mechanisms are interdependent. Parents who are willing to pay for their children's further education are more likely to motivate their children to study hard and accumulate the cognitive skill with which to maximize their future educational investments. At the same time, parents will become more willing to pay for further education when their children work diligently at their school work and exhibit talent through skilled performance.

The model presented in Figure 1 also asserts that educational intentions can be explained only partially by the determinants that it specifies. There may be other exogenous determinants of parental willingness to pay (basic parental commitment to children, valuation of education as more than just an economic investment, etc.) and the accumulated cognitive skill of students (IQ, internal motivation, and school effects, etc.). These other factors are summarized, respectively, in the disturbance vectors $\mathbf{U}_1$ and $\mathbf{U}_2$ and are crucial determinants of the reciprocal effects of parental willingness and cognitive skill accumulation. Finally, there may be other exogenous determinants of educational intentions (temperament and locus of control, etc.) that are captured in an analogous disturbance vector $\mathbf{U}_3$. All three groups of 'other factors' are assumed by this heuristic model to be independent of each other and of minor causal importance in comparison with labor market incentives and resource availability.[7]

Can the model presented in Figure 1 be empirically tested? Figure 2 proposes a possible operationalization. Educational attainment intentions are measured by the same respondent-reported educational plans employed in status attainment research. The construct 'labor market incentives' is measured by the earnings returns on the educational investments of employed young adults. Resources are proxied by measures of family background, such as parental education and family income. Parental willingness to pay the direct costs of education is measured by parental encouragement of children to attend college. Accumulated cognitive skill is measured by a cognitive test score.

With the exception of the effects of labor market incentives, all of the relationships between these variables have been evaluated by status attainment researchers. Thus, in order to further evaluate the possible validity of the rational choice model presented in Figures 1 and 2, we need to observe variation in earnings returns on education and examine any possible changes in patterns of educational expectations that plausibly can be attributed to differences in returns on education.

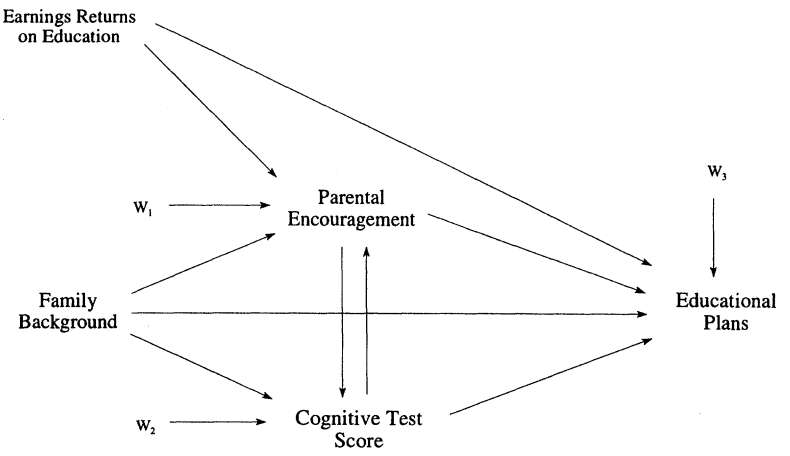

Figure 2. Operationalization of the rational choice model of educational attainment intentions

Further Evaluation: An Examination of the Effect of Variation in Earnings Returns

Variation in earnings returns on education can be measured over time, across groups at a single point in time, or both over time and across groups. Since the 1970s, research has shown that the educational expectations of White students, net of controls such as socioeconomic status and cognitive skill, are lower than those of Black students (Hanson 1994; Hoelter 1982; Hout and Morgan 1975; Kerckhoff and Campbell 1977a, b; Mikelson 1990; Morgan 1996). The standard ad hoc explanation for this consistent finding is that White male students are inherently more rational, perhaps because they are provided with the best information on the high direct costs of post-secondary education. By implication, other students are prone to fantasy, simply because they do not have enough information to temper their wishful thinking.[8]

Morgan (1996) compared the educational expectations of two cohorts of Black and White high school students in the early 1980s and the early 1990s using 'High School and Beyond' and 'National Education Longitudinal Study' data. Net of improvement in social background, Morgan found that educational expectations increased for all students, but more so for White students than for Black students. Since this pattern cannot be explained by either status attainment theory or resource constraint theory, Morgan suggested that labor market

incentives are probably a necessary component of any explanation of trends in educational expectations. Because Morgan did not analyze patterns in labor market incentives, he was unable to offer any direct evidence.

The following analysis assesses the relationship between trends in group specific returns on education and educational expectations. After describing the data sources, I present trends in family-background-adjusted educational expectations of high school seniors, calculated separately for White males, White females, Black males and Black females from a sample of pooled cross-sectional surveys conducted yearly from 1976 to 1992. I then present trends in earnings returns on education for labor market participants between the ages of 26 and 35 years, again calculated separately for White males, White females, Black males and Black females. Finally, I use the estimated returns on education to predict (net of improvement in family background) the educational expectations of high school seniors between 1976 and 1992. The earnings returns will explain away part of the group differences in educational expectations as well as the larger increase for White students in the 1980s, thus providing some support for a rational choice model of educational expectations that is based on exogenous shifts in costs and benefits.[9]

Data and Variables

Monitoring the Future, 1976–92

Yearly since 1975, the Institute for Social Research at the University of Michigan has conducted the 'Monitoring the Future' (hereafter MTF) survey of high school seniors each spring (Bachman et al. 1993). Approximately 125 high schools are sampled each year from the Institute's primary sampling units. Up to 400 seniors from each high school are included in the sample, yielding between 15,483 and 18,924 students each year from 1976 to 1992.

Although the primary aim of the MTF surveys is the collection of information on the drug usage of high-school students, important attitudes and values are ascertained as well. Recently, responses to the core questions that have been repeated every year were gathered into a single file and released as *Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth, 1976–1992: Concatenated Core File* (Bachman et al. 1993). This data set allows for the comparison of trends

in educational expectations between different race and sex groups between 1976 and 1992. Listwise, deletion of missing data across the variables to be utilized in this article yields an analytic sample of pooled cross-sections with 223,395 respondents.

The MTF samples are limited in generalizability. Only those students who graduate from high school (or are about to graduate from high school) are available to be interviewed in the spring of their senior years. Thus, the 15–20 percent of adolescents who do not complete high school are not represented in the MTF samples. As a result, inappropriate generalizations from these samples to the adolescent population as a whole would presumably lead to systematic over-estimation of the educational expectations of all types of students and perhaps also to distorted estimates of race and sex differentials in expectations (since drop-out patterns differ between these groups, even net of family background determinants). Thus, it is important to remember that the estimates of the educational expectations presented in this article represent only a subset of adolescents, the vast majority of whom will graduate from high school.

The variables utilized in the following analysis are summarized in Table 1. The variable 'Educational Expectations' was created from responses to five different questions. Students chose between four answers: 'definitely won't', 'probably won't', 'probably will' and 'definitely will', in response to the following question: 'How likely is it that you will do each of the following things after high school? Attend a technical or vocational school. Serve in the Armed Forces. Graduate from a 2-year college program. Graduate from college. Attend graduate or professional school after college'. If a student chose 'definitely will' in response to 'Attend graduate or professional school after college', regardless of what he or she may have answered for any of the other items, their value for years of educational expectation was set at 19. If a student answered anything less than 'definitely will' for graduate or professional school, but answered 'definitely will' for 'Graduate from college', their educational expectation was set at 16. Likewise, if they answered 'definitely will' to the technical, vocational or 2-year college prompts, but anything less than 'definitely will' for college or graduate school, they were given educational expectations of 14 years. Finally, if they did not answer 'definitely will' to any of the post-secondary education prompts, they were assigned 12 years as an educational expectation (unless they indicated in a separate question that they did not expect to graduate from high school, in which case they were given 11 years as an educational expectation).

Table 1. Summary of variables used in analysis, pooled sample of high-school seniors, 1976–92 (N = 222, 395)

	Mean	*SD*	*Minimum*	*Maximum*
Educational expectations	14.223	2.393	11	19
Percentage earnings returns on years of education:				
All workers, aged 26–35	10.103	2.191	7.039	15.171
FTFY workers, aged 26–35	9.785	1.659	7.302	13.202
Race–sex group:				
White female	0.446	0.497	0	1
Black male	0.052	0.222	0	1
Black female	0.064	0.245	0	1
Family background:				
Father's education	13.477	3.030	8	19
Mother's education	13.207	2.562	8	19
From single-parent household	0.221	0.415	0	1
Region-urbanicity:				
North–central, non-SMSA	0.106	0.308	0	1
Northeast, SMSA	0.175	0.380	0	1
Northeast, non-SMSA	0.046	0.210	0	1
South, SMSA	0.193	0.394	0	1
South, non-SMSA	0.129	0.335	0	1
West, SMSA	0.120	0.324	0	1
West, non-SMSA	0.030	0.171	0	1

Data are weighted. Reference categories are 'White Male' and 'North-Central, SMSA' for race/sex and region/urbanicity, respectively. Sources: Bachman et al. 1993, *Monitoring the Future Surveys, 1976–1992.* Moffitt 1995, *March Current Population Surveys, 1976–1992.*

Several characteristics of this constructed educational expectations variable deserve note. Responses to the Armed Forces prompt were ignored, as I assume that students understood that the question inquired about how likely they were to do any of the options at some time after leaving high school, not necessarily immediately after leaving high school. Joining the Armed Forces does not necessarily preclude an individual from pursuing post-secondary education. However, one might argue that the Armed Forces provide apprenticeship training that has generalized value in the labor market. If so, a plan to enter the Armed Forces may constitute a distinct form of post-secondary educational expectation, broadly conceived. This may be so, but I have chosen to construct a conservative estimate of what constitutes a post-secondary educational expectation. For the same reason, I have also not

considered a 'probably will' response to be an educational expectation at any level. Therefore, it should be kept in mind that the expectations variable used in this analysis is a relatively definite measure of educational plans, at least from the perspectives of the respondents.

The family background covariates that I will employ in the following analysis are the number of years of mothers' and fathers' education and a dummy variable for single-parent households. I will parameterize race–sex group with three dummy variables (with White male as the reference category) and region-urbanicity with seven dummy variables (with North-Central, SMSA as the reference category). The only variables that will be utilized in the following analyses that are not drawn from MTF data are the earnings returns on education calculated separately for race–sex group from 1976 to 1992. To obtain these earnings returns, data from samples of labor market participants must be analyzed.

Current Population Surveys for March, 1976–92

Current Population Survey (hereafter CPS) data are collected every month by the US Census Bureau. Households are sampled from a population that includes the civilian non-institutionalized population of the United States living in housing units, members of the Armed Forces living in housing units not on a military base, and members of the Armed Forces living in civilian housing units on a military base. Each March, the annual demographic supplement solicits from each adult living in sampled households detailed information on their income and earnings in the previous year. In this paper, I use individual level extracts from the 1976 to 1992 surveys, as compiled by Robert Moffitt (1995). However, since the earnings data refer to the year preceding each March survey, the trends observed in this paper have a built-in lag of 1 year.

Following the lead of labor economists who regularly compute rates of return on education with CPS data, I have excluded from analysis those individuals who worked in agricultural occupations or who were self-employed. Beyond these restrictions, I estimated returns on education using weekly earnings for two non-mutually exclusive samples: (i) all workers between the ages of 26 and 35 years who had positive earnings, and (ii) all workers between the ages of 26 and 35 years who had positive earnings and who worked for at least 35 hours a week for at least 40 weeks (hereafter full-time, full-year or FTFY workers).

Over this time period, there are some coding inconsistencies in the CPS, but most are of no consequence for the following analysis (such as changes in the occupation and industry codings). There are, however,

important changes in the coding of two central variables—educational attainment and earnings. For every year, educational attainment is top-coded at 18 years. In 1992, unlike in previous years, educational attainment is bottom-coded at 10 years. Therefore, in order to ensure consistency, educational attainment values lower than 10 in previous years were recoded to 10. To protect the anonymity of respondents, yearly earnings are top-coded on the public release data files. From 1976 to 1981, the highest possible value for individual earnings in the previous year is 50,000 dollars. After an increase to 75,000 dollars in 1982, the top-code was raised to 99,999 dollars in 1985 and remained there through 1992. Again, following the lead of labor economists (e.g. Katz and Murphy 1992), earnings values for these individuals were imputed by multiplying the top-code in each year by 1.45. However, since on average less than one-half of one percent of respondents were top-coded initially, such imputation has only minimally altered the results reported here.[10] Nonetheless, it is important to note that the increase in the value of the top-code may result in an artificial jump in earnings inequality, and therefore perhaps in the rate of return, in each applicable year. Such artificial increases would appear in the estimates for 1981 and 1984.

In order to calculate the earnings returns on education, I followed the traditional method developed by Mincer (1974). The natural logarithm of weekly earnings was regressed on years of completed education (ranging from 10 to 18), years of labor force experience (estimated by the function: age − education − 6), years of experience squared, three region dummies, a non-SMSA dummy and a marriage dummy.[11] The OLS regression coefficient for the years of education variable is traditionally referred to as a percentage 'rate of return', even though it is generally recognized that this coefficient is not a true rate of return on an investment in the accounting sense because it does not recognize any of the costs of educational training other than foregone earnings.

For all workers aged 26 to 35 years and again for FTFY workers aged 26 to 35 years, I estimated 68 different 'rates of return'—one for each race–sex group for 17 different yearly cross-sections. Because the analytic samples of Blacks were only approximately one-tenth as large as those of Whites, there was more 'noise' in the estimated trends in rates of returns for Blacks than for Whites.[12] I therefore smoothed the trends separately by race–sex group to obtain comparably 'noiseless' trends for all race–sex groups.[13] Finally, I multiplied the rates of return by 100 to place them on a percentage metric and to yield more easily interpretable partial regression coefficients.

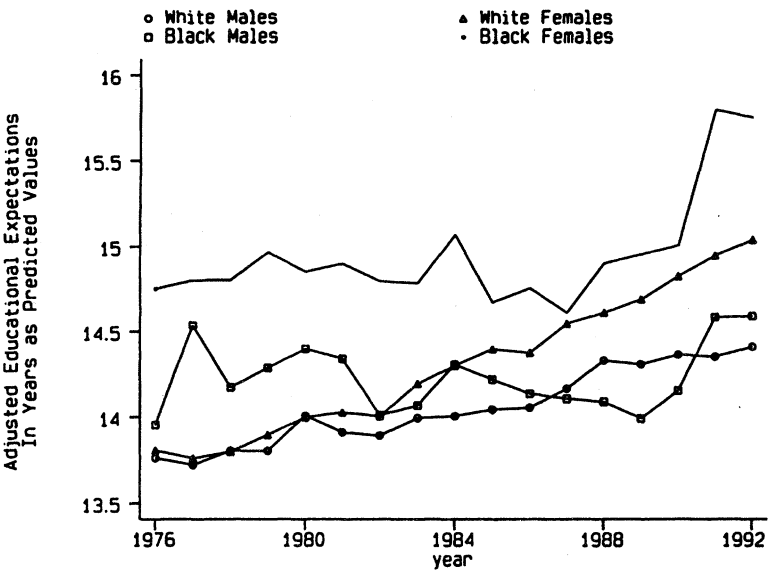

Figure 3. Family-background-adjusted educational expectations of high school seniors, 1976–92

Findings

Do the 'Monitoring the Future' surveys document trends in expectations that are similar to those reported by Morgan (1996)? Based on analysis of other data sources, Morgan claimed that the educational expectations of all students increased between the early 1980s and the early 1990s, but that increases were largest for White females, followed in magnitude by those of White males, Black females and then Black males. Figure 3 presents family-background-adjusted educational expectations of high school seniors from the MTF surveys for White males, White females, Black males and Black females.[14] This figure provides a description of the between-group and over-time variation in educational expectations that I will model later in an attempt to judge the explanatory power of the earnings returns on education.

Net of improvement in family background, the expectations of White males increased steadily between 1976 and 1992, in total by more than one-half of a year. Likewise, net of similar improvement in family background, the educational expectations of White females increased by more than 1 full year. For Black students, trends in expectations are less

smooth. However, because only 11.6 percent of the pooled sample is Black, much of the extra bounce in the trend lines of Blacks is noise that results from greater sampling error. We should therefore exercise caution when interpreting these simple predicted values for Blacks. Nonetheless, Figure 3 suggests that, net of family background, the educational expectations of Black females were higher than those of all other groups, but that their net expectations did not appear to increase until the 1990s. Similarly, the educational expectations of Black males were initially higher than those of White males and White females, but did not increase by any substantial degree until the 1990s. In short, the family-background-adjusted educational expectations of Blacks were considerably higher than those of same-sex Whites until the mid-1980s. By the early 1990s, Whites had closed much of the racial gap in educational expectations. These patterns are similar to those reported by Morgan (1996).

Can the patterns of net educational expectations presented in Figure 3 be further explained by earnings returns on education? As described in the Data and Variables section above, I calculated yearly estimates of earnings returns on education for labor market participants between the ages of 26 and 35 years, estimated separately for the same race–sex groups across which educational expectations were calculated above. Figures 4 and 5 present smoothed trend lines of these estimates for two non-distinct samples, all workers with positive earnings and FTFY workers.

Both figures share a common pattern. Returns for Blacks were higher than those of Whites of the same sex until the mid 1980s. Thereafter, Whites closed the gap in earnings returns.[15] (The only major difference between the trends in returns for all workers and FTFY workers are the relatively higher returns for women in the 'all worker' sample. Possible effects of these differences will be discussed later.) The basic trends in returns that are presented in Figures 4 and 5 resemble the trends in family-background-adjusted educational expectations that were presented in Figure 3. Before explicitly modeling educational expectations and attempting to formally assess the explanatory power of earnings returns, I will explain why returns on education were higher for Blacks at the beginning of the time series and why returns increased for all groups throughout the 1980s.

In the 1970s, the returns on education for Blacks surpassed those of Whites. Equivalently, labor market inequality became more closely related to educational attainment for Blacks than for Whites. Why? Smith and Welch (1986) provide a plausible answer. It had been

accepted that one of the main causes of the higher rate of intergenerational transmission of poverty in the Black population was the inability of Blacks to realize labor market returns on their educational training (Duncan 1969). For some researchers, labor market discrimination placed Blacks at the end of every job queue, yielding the lowest earnings in the least desirable jobs within occupations for which they had secured prerequisite credentials. For other researchers, the inferior quality of Black schools was the main culprit. Presented with fewer opportunities to learn in a given year of education than White students, Black students were less able to enhance their job relevant skills. Thus, that Blacks ended up in the lowest paying jobs was not surprising; at every educational level, they were judged to be less productive.

Smith and Welch (1986) showed that between 1940 and 1980, the labor market prospects of Blacks gradually improved. However, improvement was not uniform across the educational distribution. Especially between 1950 and 1970, the Black to White wage ratio for highly educated workers increased much more than the Black to White ratio for other workers. By the 1970s, the relationship between education and earnings was stronger for Blacks than for Whites, reversing

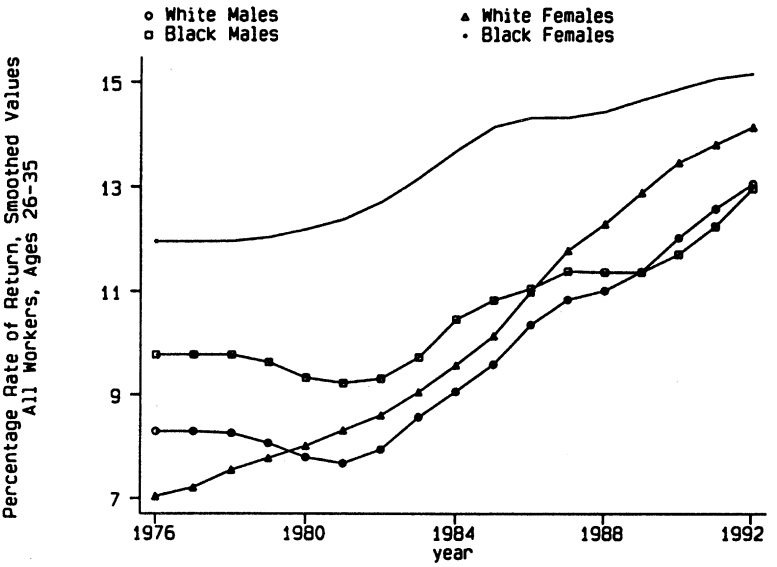

Figure 4. Earnings returns on education for all employed workers with positive earnings, aged 26 to 35 years, 1976–92

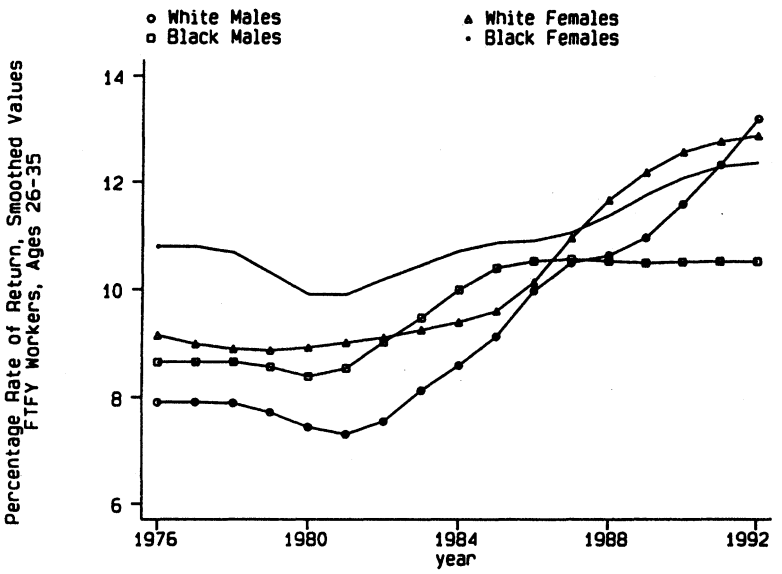

Figure 5. Earnings returns on education for full-time, full-year workers, aged 26 to 35 years, 1976–92

Duncan's classic finding. The explanation for this reversal was a combination of disproportionate increases in the quality of available education and reductions in labor market discrimination for relatively well-off Blacks, produced respectively by the uneven advancement of desegregation and affirmative action (see also Hout 1984).

Why did earnings returns on education increase in the 1980s? A large literature in labor economics has sought to explain this recent increase in inequality across educational levels and other worker characteristics (Bound and Johnson 1992; Burtless 1990; Katz and Murphy 1992; Levy and Murnane 1992; Murphy and Welch 1992). Economists have proposed two standard explanations for increases in earnings returns on education—decreases in the supply of skilled labor and increases in the relative demand for skilled labor. While the supply side explanation is surely part of the story, as there was a post-baby-boom demographic shift in this period, the search for trends that may have led to higher relative demand for skilled workers has received more attention. Initial arguments proposed two related explanations for the reduced demand for low skilled workers: de-industrialization (declines in manufacturing employment) and globalization (the export of manufacturing

jobs through shifting trade and product markets). More recently, skill-biased technological change has received the most attention, as research has detected increasing inequality in wages within industries and firms (Berman et al. 1994, 1996). Whatever is the appropriate explanation, the facts are undisputed. Increasingly throughout the 1980s and into the 1990s, the labor market value of education has increased dramatically.

Have the educational intentions of high-school seniors responded to the increasing profitability of investments in education? A comparison of the adjusted educational expectations presented in Figure 3, with the patterns of earnings returns on education presented in Figures 4 and 5, suggests that educational expectations may be driven to some substantial degree by expected earnings returns. In order to assess more formally whether this relationship is supported by the MTF and CPS data, I calculated simple OLS regression estimates of the determinants of educational expectations for the pooled sample of 223,395 high school seniors, using earnings returns as predictor variables. Six models of educational expectations are presented in Table 2.

Three family background controls—father's education, mother's education, and single parent household—are included in the models presented in Table 2. Each of these variables was centered around its weighted grand mean for the pooled sample in order to yield a meaningful intercept parameter for each model. Model I of Table 2 is a regression of educational expectations on these family background control variables, and three group dummy variables—White female, Black male and Black female. The constant of model I indicates that the average net educational expectation of White male high-school seniors between 1976 and 1992 was 14.047 years (i.e., a 2-year, junior college degree). The race–sex group dummy variables indicate that, net of differences in family background, White females, Black males and Black females all expected to pursue more education than White males—approximately 0.244, 0.185, and 0.908 years more, respectively.

Models IIa and IIb add the earnings returns variables as predictors to the independent variables included in model I. An increase of 1 percentage point in the expected earnings returns on yearly investments in education for all workers between the ages of 26 and 35 years increases a high school senior's educational expectations by 0.147 years. Likewise, an increase of 1 percentage point in the expected earnings returns on education for FTFY workers increases a student's educational expectations by 0.166 years. When interpreted as the effect

Table 2. OLS estimates of the determinants of educational expectations for a pooled sample of high-school seniors, 1976–92

	Model					
	I	*IIa*	*IIb*	*III*	*IVa*	*IVb*
Earnings returns:						
All workers,	—	.147***	—	—	.038	—
Aged 26–35		(.007)			(.018)	
FTFY workers,	—	—	.166***	—	—	.040*
Aged 26–35			(.011)			(.014)
Race–sex group:						
White female	.244***	.175***	.086	−2.942***	−2.481***	−3.191***
	(.048)	(.031)	(.067)	(.285)	(.453)	(.333)
Black male	.185*	.046	.120	3.406**	2.991*	2.780
	(.063)	(.047)	(.064)	(1.130)	(1.199)	(1.326)
Black female	.908***	.344***	.626***	1.281	.837	.492
	(.069)	(.066)	(.084)	(1.357)	(1.453)	(1.451)
Linear time trends:						
Year	—	—	—	.044***	.031***	.030***
				(.002)	(.006)	(.005)
by White female	—	—	—	.038***	.032***	.040***
				(.003)	(.005)	(.004)
by Black male	—	—	—	−.038*	−.034*	−.031
				(.014)	(.014)	.016)
by Black female	—	—	—	−.005	−.001	.004
				(.017)	(.018)	(.018)
Family background:						
Father's education	.159***	.154***	.155***	.153***	.156***	.154***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Mother's education	.147***	.136***	.137***	.136***	.136***	.136***
	(.003)	(.002)	(.002)	(.002)	(.002)	(.002)
Single-parent household:	−.188***	−.229***	−.222***	−.230***	−.230***	−.230***
	(.013)	(.010)	(.010)	(.010)	(.010)	(.010)
Constant	14.047	14.121	14.139	14.054	14.071	14.074
R^2	.113	.127	.124	.128	.128	.128
N	223,395	223,395	223,395	223,395	223,395	223,395

* $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed test).

Data are weighted. Other variables included in all models: seven dummy variables for region/urbanicity (see Table 1).

Family background, earnings returns, and region/urbanicity variables are centered around their weighted means for the entire pooled sample (the mean values presented in Table 1). Year is centered deterministically around the middle year of the time series: 1984.

Using STATA's robust regression routine (an extension of methods developed by Huber (1967) and White (1980)), the standard errors reported in parentheses are adjusted for the clustering of students within years. Similar adjustments for clustering within schools is not possible because the public-release MTF data sets do not include school IDs.

Sources: Bachman et al. 1993, *Monitoring the Future Surveys, 1976–1992;* Moffit 1995, *March Current Population Surveys, 1976–1992.*

of expected earnings returns on rationally formed educational intentions, the rational choice model of educational investment is supported by these coefficients.

Comparisons of the coefficients of the dummy variables for race–sex group between model I and models IIa and IIb indicate that a substantial portion of the effect of expected earnings returns on educational expectations is the result of covariation in both over race–sex groups. Model IIa indicates that about one-quarter, three-quarter, and two-thirds of the higher family-background-adjusted educational expectations of White females, Black males, and Black females, respectively can be explained away by expected earnings returns on educational investment. In a similar fashion, model IIb indicates that an alternative measure of earnings returns on education can explain away about two-thirds, one-third, and one-third of the net expectations differences across the same race–sex groups. Models IIa and IIb provide slightly different point estimates of the race–sex group dummy variable coefficients, but both models indicate that a substantial portion of the explanatory power of the earnings returns variables is the result of overall group differences across the entire pooled sample.

In models III and IV, time trends in expectations are examined. In order to capture over-time variation, I chose a linear specification of trends in expectations. In Figure 3, predicted values from a model similar to model III of Table 2 are presented.[14] Inspection of the trend lines presented in Figure 3 suggests that a linear specification of the time trends in expectations is adequate for White male and White female students. Is there reason to parameterize the trends in expectations of Black males and females in a non-linear fashion? Clearly, trying to model all of the bounce in the Blacks' trend lines would be over-fitting the data. It might be reasonable to parameterize the trend in the educational expectations of Black females as a quadratic function, but even this more complex parameterization is probably not justified. As a result, I have specified all time trends as linear in the models that are presented in the last three columns of Table 2.

Model III adds to model I the variable year (centered around the value of 84, the midpoint of the time series). In addition, model III includes three interaction terms between the centered year variable and each of the three race–sex group dummy variables. In combination with the race–sex main effect dummy variables, the linear time trends specified in model III parameterize the essential features of the trends in group differences in net educational expectations that are presented in Figure 3. Black students had higher net educational expectations than White

students through the mid 1980s, as is indicated by the main effect dummy variables that, because of the centering of the year variable around 1984, must be evaluated at the midpoint of the time series. However, over the whole time period, the net educational expectations of White males increased by more than two-thirds of a year (i.e. [0.044] [16] = 0.704). Adding the year by White female interaction effect to the main effect of year on educational expectations, yields the average yearly increase in net expectations for White females. Across the entire time period, the expectations of White females increased by almost one and one-third years (i.e. [0.044 + 0.038] [16] = 1.312). By the same calculations, model III indicates that under a linear specification of the time trends, the net expectations of Black males increased only one-tenth of a year between 1976 and 1992, and those of Black females increased by slightly less than two-thirds of a year.[16]

At this point, a consideration of the percentage of the pooled variance of educational expectations that is explained by the variables specified in models I through III is enlightening. The R^2 for model I is 0.113. Therefore, the R^2 for model III of 0.128 indicates that the linear time trends that are specified in model III explain an additional 1.5 percent of the variance of educational expectations. However, in direct comparison, the R^2 values for models IIa and IIb indicate that earnings returns explain an additional 1.4 and 1.1 percent, respectively, of the variance of educational expectations over what is explained by the independent variables specified in model I. As a result, it is fair to conclude that earnings returns explain almost as much of the variation in family-background-adjusted educational expectations that is presented in Figure 3 as the linear trend specification of model III. If we believe that linear trends capture most of the important variation that is present in the trends of Figure 3, then earnings returns can account for much of the same variation.

Models IVa and IVb make the same point by adding the linear time trends of model III to the independent variables included in models IIa and IIb. There are several equivalent ways to interpret these last models. The simplest method is to perform an analogous comparison of R^2 across models. In comparison with the additional 1.5 percent of the variance of educational expectations that is explained by the addition of linear time trends to model I, only an additional 0.1 percent and 0.4 percent, respectively, of the variance of educational expectations is explained by the addition of linear time trends to models IIa and IIb. Equivalently, net of all else, the earnings returns and linear time-trend variables are less predictive in models IVa and IVb than in previous

nested models. Expectations vary over these predictor variables in similar patterns.

Discussion

After a summary of the basic findings, I will address two questions. To what extent can these findings be considered a test of the rational choice model of educational intentions? Can the results of other research resolve some of the inconsistencies inherent in these findings and thus strengthen their support of the rational choice model? In conclusion, I will assess the contribution of a rational choice approach to the study of educational expectations, suggest that further research is needed to investigate the supplementary endogenous social effects proposed by the theory of status socialization, and evaluate the working conceptualization adopted in this article that educational expectations are rational appraisals of likely future behavior.

Summary and Limitations of the Findings

The educational expectations of high school seniors increased between the late 1970s and the early 1990s, more so for White students than for Black students, and even net of improvement in family background. The earnings returns on yearly investments in education increased over the same time period for labor market participants between the ages of 26 and 35 years, more so for Whites than for Blacks. The correspondence between family-background-adjusted educational expectations and both group differences and changes over time in the earnings returns on educational investment is strong enough to provide some support for the speculation of Morgan (1996) that labor market incentives are an important determinant of educational expectations.[17]

These findings support the general investment framework that undergirds all rational choice theories of educational attainment. We could more fully evaluate the heuristic model presented in Figure 1 if the MTF data set included information on parental encouragement and cognitive skill. There are many data sets that contain such information, but besides those analyzed by Morgan (1996), none of these has been repeated over time for successive cohorts of same-grade students. Because there is ample support in previous research that parental encouragement and cognitive skills are associated with both family background and educational plans, I chose a research design that could

examine the hypothesis that exogenous variation in earnings returns ought to affect educational plans as well.[18] The trade-off is that the only available data that can address this hypothesis cannot also identify the structural parameters of the mediating mechanisms.

Possible Explanations for Some Apparent Inconsistencies

The adjusted expectations of Black students are not as high and did not increase as much as might be predicted from consideration of trends in earnings returns. Two related explanations may account for this inconsistency: under-adjustment for resource-availability and no adjustment for changing direct costs. Race differences in adjusted expectations may be underestimated across the whole time series because data limitations prevented the inclusion of parents' earnings and family wealth among the social background controls. In addition, the educational expectations of Black students may be more responsive to increases in the direct costs of higher education, since there is at least some evidence that the enrollment decisions of Black students are more responsive to changes in tuition and financial aid (Hauser 1993; Kane 1994). As a result, the increased direct costs of higher education in the 1980s may have offset the increase in the labor market benefits of educational training for Black students relatively more so than for White students. Under-adjustment for resource-availability and no adjustment for changing direct costs would lead to downwardly biased net educational expectation estimates for Black students that became relatively more downwardly biased throughout the 1980s.

Trends in the earnings returns of full-time, full-year White females suggest that the educational expectations of White females should not be, as in Figure 3, initially as low as those of White males. Instead, the expectations of White females should be at least as high as those of Black males through the mid 1980s. Note, however, that the earnings returns of the more comprehensive group of young, employed White females with positive earnings *were* initially as low as those of White males. What might this mismatch imply? An ad hoc interpretation is that White females are more likely than any other group to consider earnings returns in the full labor market—the weekly earnings of all workers, including those working part-time and/or part-year—and that this tendency decreased throughout the 1980s. Given that White females between the ages of 26 and 35 years are more likely than any other race–sex group to voluntarily work part-time (and that this greater likelihood must have decreased throughout the 1980s because full-time labor force

participation of White females increased dramatically), this pattern seems reasonable and its ad hoc explanation satisfactory.

Directions for Further Development of a Generalized Rational Choice Model

A rational choice model that grants considerable autonomy to adolescents seems appropriate for the times. Perhaps in 1957, when the seniors that were surveyed as part of the Wisconsin Longitudinal Survey graduated from high school, it made sense to hypothesize that high school students do not consider earnings returns on education independently of the evaluations of their parents and teachers. But the nature of adolescence has changed since 1957. Adolescence is less structured now than it was then, and socialization mechanisms have lost some of their bite. The degree to which significant others appropriately judge the costs entailed by alternative courses of education may no longer be as important as the processes by which students learn to consider these same costs themselves. Thus, it may be that the adolescent socialization processes that were important 40 years ago can no longer sustain a viable theoretical framework today.

As perhaps best articulated by Stigler and Becker (1977), rational choice theory guides researchers towards explanations based only on variation in prices and incomes. In that spirit, the heuristic rational choice model proposed in this article grounds the correlated expectations of students and their significant others on common consideration of the exogenous costs and benefits of educational pursuits. Race and sex differences in educational expectations are generally considered to result from values, tastes and/or response bias. The empirical findings presented here permit the interpretation that these differences are responses to group differences in average levels of available resources and the expected benefits of educational investment.

These findings are far from conclusive evidence that a rational-choice framework provides the most useful mode of analysis for the study of educational attainment. Nonetheless, a rational-choice framework provides a clear starting point for the analyses of sociologists of education who still hope to find a place within models of educational attainment for Mead's behaviorist inspiration.[19] A rational-choice foundation, rather than explicitly preventing such incorporation, demands the clear specification of the endogenous mechanisms that must be documented by empirical evidence if structural arguments for the salience of imitation and adoption are to gain acceptance among all social scientists.

Finally, should we accept the working conceptualization of respondent-reported educational plans adopted in this article? Or more broadly, as asked in the title, are educational expectations properly conceptualized as rational choices, fantasized guesses, or both? Observed educational expectations are not properly conceptualized as perfect forecasts of educational decisions, because prior research has shown that they cannot perfectly predict educational attainment. However, an expectation–behavior mismatch does not then prove, as is often assumed by those who maintain revealed expectations assumptions, that respondent-reported educational plans are so contaminated with irrational measurement error that they should be regarded as the affective reflection of individual temperament. Other factors can determine decisions that at the time intentions are reported may be unknown to individuals (see Manski 1995).

The findings presented here demonstrate that seemingly irrational patterns—such as race and sex differences in family-background adjusted educational expectations—can be explained by well-known rational choice theories of educational investment. Thus, educational expectations are not 'flights of fancy' or 'vague preferences', as Alexander and Cook (1979) muse. Simply because they can be explained by a reasonable theory of rational behavior, educational expectations should be considered rational. But are they solid enough to be considered the 'realistic appraisals' to which Alexander and Cook refer?

Until data are gathered with which we can address the connection between over-time changes in educational attainment and the series of constantly-updated, but apparently rationally-constructed educational expectations that precede them, we should consider educational expectations to be rational fantasies. They are rational by construction but fantastic as prediction. Educational expectations may be questionnaire-induced reflection on a real but iterative planning process during which students choose rational means toward hopeful ends. As products of a diffuse socialization regime that is grounded on the virtues of individual utility maximization and buttressed by the American dream, should we expect anything different from our children?

NOTES

1. Direct all correspondence to Stephen L. Morgan, Department of Sociology, Harvard University, William James Hall, 5th Floor, Cambridge, MA 02138 (Internet: smorgan@wjh.harvard.edu). An earlier version of this article was presented in October 1996 at a joint Graduate Student Research Conference hosted by Stockholm University. I am grateful for the comments of Richard Murnane, Aage Sørensen and

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2. Haller (1968) misrepresents early psychological research on aspirations and expectations. For Lewin and his colleagues, realistic aspirations were expectations. See the classic review essay 'Level of Aspiration' by Lewin et al. (1944).
3. In the discussion section, however, I will suggest that educational expectations should be interpreted as rational fantasies because they appear to be based on rational calculations of the costs and benefits of educational pursuits and yet still seem too optimistic given what we know about patterns of educational attainment.
4. In the original Wisconsin model, SOI is operationalized as a factor composite of the beliefs that students have about the educational expectations that parents, teachers and peers hold for them. This operationalization seems to limit the SOI effect in the original model to one of adoption, although it is possible that this association proxies for some portion of the imitation mechanism.
5. Similar student-specific SOI may arise from the association decisions of students and their 'models', but these processes are substantially more complicated and were not well developed by Haller and his colleagues.
6. The heuristic model presented in Figure 1 assumes, somewhat benignly, that the prior school performance that results in cognitive skill accumulation is not directly produced by adjustment to labor market incentives (net of the indirect effect of labor market incentives that flows through parental encouragement). It is assumed that students only begin to consider labor market incentives on their own as they entertain the possibility of entering the full-time labor force at the end of high school. The model can be easily amended to allow for a direct effect of labor market incentives on prior cognitive skill accumulation (if, for example, it is shown that labor market incentives directly affect the diligence of high-school freshmen). Thus, this model applies to the first instance when individuals begin to consider labor market incentives as guides for future behavior.
7. Complexities can be incorporated into this model without changing any of the conclusions of this article. Resources probably are correlated with some components of $\mathbf{U}_1$ and $\mathbf{U}_2$, etc. For possible other mechanisms, see Haveman and Wolfe (1995) and Hoover-Dempsey and Sandler (1997) for recent review articles, respectively, from economics and psychology, of the effects of parents, schools, and communities on the educational attainments of children.
8. See Hoelter (1982) for an application of this argument to race differences in educational and occupational plans. Hoelter argues, without (he admits) very strong evidence, that Blacks educated in segregated schools have less rational plans than Blacks educated in desegregated schools. Thus, as Blacks are brought closer in proximity to the structural positions that Whites occupy in the status socialization process, their plans become more rational and begin to approximate those of Whites.
9. Analyzing a limited sample of high-school seniors from the state of Virginia, Garrison (1982) finds similar results when comparing the educational plans of Whites and Blacks between 1967 and 1976. Garrison (1982, 58) writes: 'the total decline in college plans is three times larger for whites than for blacks when the effects of father's education are controlled.' Returns on education decreased relatively more so for Whites than for Blacks between 1967 and 1976 (Smith and Welch 1986).
10. Some labor economists just leave the top-codes as they are (e.g., Murphy and Welch 1992).

11. Earnings were adjusted to 1991 dollars according to the Consumer Price Index for urban workers, though this matters little since earnings are analyzed in log-form.
12. Sample sizes vary slightly by year, but the following 1992 figures are typical. There were 8003 White males, 6654 White females, 661 Black males and 805 Black females in the 'all workers' sample. Among these workers, 7670, 5523, 627 and 726, respectively, were FTFY workers.
13. I used a two-stage smoother that first selected medians from among the raw values of intervals around each year under consideration (5-year spans for all years except endpoints and next-to-endpoints that received medians from 1-year and 3-year spans, respectively). In the second stage, the values that were selected through the running-median procedure were filtered through a Hanning linear smoother—a moving average function of width three that weights the midpoint twice as much as those on either side (with the exception of endpoints that are unaltered). I utilized the robust non-linear smoother built into STATA (version 5.0) with the command 'smooth 5eh'.
14. The predicted values presented in Figure 3 are similar to those that could be obtained from model III of Table 2 after replacing the linear time trend, and its interactions with race–sex dummy variables, with 16 dummy variables to parameterize the 17 years of the time series.
15. Because the rates of return were smoothed (see note 13), we should have relatively less confidence in the estimates for 1976, 1977, 1991 and 1992.
16. Increases in educational expectations, as hypothesized earlier and as reported by Hauser and Anderson (1991), are greater in the absence of controls for improvement in family background. When model III is estimated without the family background controls, the coefficients are: −3.040 for White female, 2.157 for Black male, 0.413 for Black female, 0.061 for year, 0.039 for year by White female, −0.028 for year by Black male, 0.0001 for year by Black female (with an R^2 of 0.043).
17. There is, however, a possibility that the degree to which the earnings returns of Whites increased relatively more than those of Blacks has been overestimated here. A larger component of the variation from year to year in the estimates of earnings returns for Black labor market participants is the measurement error that is a function of the smaller number of Black respondents to the CPSs. Measurement error may flatten out the smoothed trend lines relatively more for Blacks than for Whites. Nonetheless, it does seem intuitively plausible that the inequality in the labor market for employed Blacks remained high while the inequality in the labor market for employed Whites became more like that of Blacks (i.e., employed White high-school graduates lost relatively more of their earnings advantage over employed Blacks than did White college graduates).
18. Another implication of the theory in need of empirical examination is the hypothesis that parental encouragement should be responsive to expected future returns on children's educational attainment.
19. As suggested by the arrows between mediating variables and the substance contained in the disturbance vectors in Figure 1, I am one of these sociologists.

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STEPHEN L. MORGAN is a Ph.D. candidate in the Department of Sociology at Harvard University. After receiving an M.Phil. in 1995 from Oxford University, he returned to Harvard to study the sociology of education and labor markets with Aage Sørensen and is now writing a dissertation on the impact of adolescents' and parents' network configurations on student expectations and learning. As a diversion, he continues to conduct collaborative research with his father, William R. Morgan, on social stratification in Nigeria. Their article, 'Education and Earnings in Nigeria, 1974–1992,' will be published in the 1998 issue of *Research in Social Stratification and Mobility*.

ADDRESS: Department of Sociology, Harvard University, William James Hall, 5th Floor, Cambridge, MA 02138, USA.