EXPLAINING ACADEMIC PROGRESS VIA COMBINING CONCEPTS OF INTEGRATION THEORY AND RATIONAL CHOICE THEORY

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In this article, elements of rational choice theory and integration theory are compared on the basis of their explanatory power to explain variance in academic progress. It is argued that both theoretical concepts could be combined. Furthermore the distinction between social and academic integration which integration theory makes is abandoned. Empirical tests, using AMOS (Analysis of Moment Structures), show that an extended model, comprising both integration and rational choice theory, provides the best explanation of academic progress.

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KEY WORDS: academic progress; integration; rational choice; structural equation models; longitudinal studies.

INTRODUCTION

The classical approach to student attrition and study careers is to use theories that focus on the integration of students in higher education (Spady, 1971; Tinto, 1993). To date, several models inspired by integration theory have been compared and combined (Cabrera, Nora, and Castaneda, 1993; Sandler 1998). However, despite all efforts, empirical tests of most integration theory-based models do not explain a satisfactory amount of the variance in academic progress. There are also other theories that could be useful in explaining variance in academic progress. The first aim of this article is to take a critical look at the integration-based student departure models, especially inconsistencies in the interpretation of the concept of integration. Second, we try to improve the model by drawing on elements from rational choice theory. This study reveals that an extended model comprising concepts taken from both the integration and rational choice models provides the best explanation of academic progress.

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CONCEPTUAL FRAMEWORK

The conceptual framework of this research project comprises three elements that are examined in combination: integration theory, rational choice theory, and the longitudinal aspect.

Integration Theory

Every study of academic progress and student attrition needs to start with the seminal literature by Spady (1971), Tinto (1988), and Pascarella and Terenzini (1983). These studies explain variance in academic progress as a result of the level of students' integration into their institution of higher education. Within this framework, student attrition can be seen as a lack of agreement between the standards and values of the student and those of the environment and, therefore, as unsuccessful integration. According to Tinto (1993), most student integration models feature the concepts of social integration and academic integration. But what is meant by these concepts and what is the difference between them? Tinto (1993) built on ideas developed by Durkheim, who spoke of social and intellectual integration:

> The former refers to that form of integration which results from personal affiliations and from the day-to-day interactions among different members of society. The latter comes from the sharing of values, which are held in common by other members of society. (Tinto, 1993, p. 101)

Tinto considers the educational institution to consist of an academic system and a social system, and therefore makes a distinction between academic and social integration. Academic integration is seen as academic achievement and interaction with the faculty, while social integration refers to extracurricular activities and contact with peers (Tinto, 1993). Both forms of integration contain an objective and a subjective aspect. Unfortunately, the distinction between academic integration and social integration made by Tinto (1993) and many others leads to some conceptual and measurement problems.

A conceptual problem is that while some authors define "interaction with faculty" as academic integration (Tinto, 1993), others define it as social integration (Braxton, Milem, and Sullivan, 2000). Some authors (Pascarella, Duby, and Iverson, 1982) make a distinction between two kinds of faculty contacts: on the one hand, contacts with faculty that involve discussion and advice are seen as academic integration; on the other hand, nonclassroom interaction with faculty and informal social contacts with faculty are seen as social integration. The problem associated with measuring the two concepts is that the diversity of measurements is large. In many studies, academic integration is only measured by objective measures, such as obtained grades or amount of credits earned at a certain time. Although this is a good way to measure objective academic integration, it has little to do with the subjective aspect of academic integration. Cabrera, Castaneda, Nora, and Hengstler (1992) measured academic integration

in two questionnaire items concerning academic experiences and performance. A very extensive indicator for academic integration using grades, intellectual development, quality of education, and contacts with faculty concerning discussion and advice can be found in the study by Pascarella et al. (1982). The indicators used for social integration are also very diverse. For example, Cabrera et al. (1992) used two questionnaire items concerning friendship with other students. Pascarella et al. (1982), measure social integration as the frequency and quality of a student's relationship with peers, the quality of their nonclassroom faculty interactions, and the frequency of their informal social contact with the faculty. Braxton, Sullivan, and Johnson (1997), in their valuable review of the empirical support for the propositions derived from Tinto's theory, do not discuss the measures of Tinto's constructs the studies use. They only mention that peer reviewers judged the measures used to have face validity. It is therefore not clear if the studies compared use the same measures of the constructs.

In theory, it might be conceivable to draw a distinction between social and academic integration, but as we have seen from the above examples, operationalization remains a very complicated business. The reason for this is that these forms of integration are interrelated, making it difficult to distinguish between them in a concrete fashion. Interactions with a community and sharing values with that community can hardly be considered as two separate things as one inevitably shares some basic values with the people with whom one interacts. While Tinto (1993) himself points this out on several occasions, he nonetheless tries to distinguish between social and academic integration in his model. We feel that fuzziness in the two forms of integration makes distinguishing between them impracticable. Consequently, in our research we will not make this distinction, but will approach integration as a complex concept containing different dimensions, such as a dimension concerning the interaction between the actors of a study community and a dimension concerning the fit between student and community.

In research on academic progress and persistence in higher education, integration theory has long been the leading theoretical framework. As we have seen, almost every researcher tries to improve the model and the measures of the concepts in the model. Models are adjusted to apply to other groups of students, for example commuter students, or minority groups. However, due to its focus on problems that occur when no integration takes place, integration theory may have some weaknesses that are fundamental. For example, the model pays little attention to the active role individual students play in decisions that have to be made during their study career. Students may adjust their goals as they go along. We therefore feel that it is time to look toward another theoretical direction to establish a better understanding of study careers. The idea of combining theoretical perspectives to overcome the limitations of a theory has been either supported or attempted by several researchers (De Graaf, Need, and Ultee, 2000; and see for a review, Braxton et al., 1997). In this article, we will introduce and discuss rational choice theory, which takes the active rational individual as its premise.

Rational Choice Theory

Rational choice theory is a strong explanatory theory in economics and soci-ology. According to this theory, individuals base their choices on a cost benefit analysis of the alternatives. This analysis is bound by the social structures in which individuals operate (Elster, 1986). If a student's expectation of success is low and the costs of trying are high, the chance that he or she will drop out is great. Of course, students can never be sure whether they will succeed. The best they can do is estimate the likelihood of graduating (Oosterbeek, 1992; Levhari and Weiss, 1974). This individual assessment of chances of success has proven to have a reasonable explanatory power (De Jong, Roeleveld, Webbink, and Verbeek, 1996; De Jong, Sikkema, and Dronkers, 1997).

Three mechanisms in the cost benefit analysis of educational choices can lead to class differences in educational attainment (Breen and Goldthorpe, 1997; Goldthorpe, 1996). First, a higher family income usually means students have more access to the financial resources they need to obtain a university degree. The assumption here is that all parents are willing to financially support their children. Financial resources can influence the outcome of the cost benefit analysis when a choice has to be made between the two alternatives: to continue studying or to leave. Students with access to sufficient financial resources will allow them-selves more years to complete their degree. The second mechanism involves the social costs of dropping out. Parents and their children will generally try to avoid downward mobility. This means the social costs of dropping out are related to the educational level of the parents. The third mechanism involves the effect of stu-dents' subjective expectations concerning their personal abilities. Students with higher ability have more reason to expect they will be able to obtain a university degree. Furthermore, students with more highly educated parents will rate their chances of success higher than students with less highly educated parents. This is the effect of the socialization process in the family, which gives students with more highly educated parents more academic confidence (Need and De Jong, 2001). These three mechanisms affect educational attainment and can help to ex-plain both student dropout rates and levels of academic progress.

Longitudinal Process

Clearly, a study career is a longitudinal process. To study this process several measurements across time need to be taken. However, collecting longitudinal data requires considerable time and money. Consequently, most studies consist of no more than two measurements. Despite this, the importance of treating and analyzing study careers as longitudinal processes is generally accepted. Stu-dents' experiences in the first year are expected to influence their actions and experiences in the second year. The same process occurs from the second to the

third year, and so on. We assume that the experiences in the first year influence experiences in the third year only indirectly, via experiences in the second year. In other words, the assumption is that similar variables measured at time t only affect similar variables measured at time $t + 1$ and will not affect similar variables measured at $t + 2$.

Toward a Combination of Concepts

Both theories—integration theory and rational choice theory—provide a clear view of the concepts that influence study careers. To test and improve the concepts in both theories, vast amounts of empirical research have been conducted. However, instead of merely discarding the theories as belonging to two incompatible approaches, there is no good reason not to make use of the useful elements that both contain. Students trying to integrate into the student community are likely to be rational actors who make cost benefit analyses. It is conceivable that the influential factors in both theories interact with each other. For instance, if a student cannot succeed in feeling at home or "fitting in," the costs of proceeding will increase. At the same time, the perceived likelihood of success will decrease. Furthermore, if a student does not really believe he/she can succeed, the chances that integration with faculty and students take place will decline. Combining elements from both theories rather than viewing them as competitive may lead to a more realistic representation of the actual process, and thereby to a better understanding of academic progress.

To investigate our idea that a combination of integration theory and elements of rational choice theory provides a more valid conceptual framework, we formulated the following three research questions:

1. To what extent can a model based on integration theory explain academic progress?
2. To what extent can a model based on rational choice theory explain academic progress?
3. To what extent can a model combining both rational choice and integration theory explain academic progress?

We will now present hypotheses for each theoretical framework.

Integration

1. Students from a higher socioeconomic background and with good prior school performance will integrate more easily than students from a lower socioeconomic background and with poorer prior school performance.
2. Students who are more integrated in the first year of their studies will also be more integrated in the second year, and so on.

3. Students who are more integrated will have completed a larger proportion of
   the total study program.

Rational Choice

1. Students from families with more financial resources will expect a longer
    study duration than students from families with less financial resources.
2. Students of higher ability will have a higher perceived likelihood of success.
3. Students with more highly educated parents will have higher expectations of
    their chances of graduation than students with less highly educated parents.
4. Students who expect a longer study duration will have completed a smaller
    proportion of the total program than students who expect a shorter duration.
5a. Students with a high perceived likelihood of success in the first year will
    have a high perceived likelihood of success in the second year, and so on.
5b. Students with a high-perceived likelihood of success will have completed a
    larger proportion of the total program than students with lower perceived
    likelihood of success.

Of course, there are hypotheses that both theoretical perspectives have in
common. Both concepts predict influences from parents' education and family
income: both assume a positive effect from these socioeconomic background
variables and also positive effects from prior school performance. However, in
the rational choice theory the emphasis on financial resources is more specific
and explicit and for our purposes we therefore treat it more explicitly as an
aspect of rational choice. In the section "Models to Be Tested," we will explain
which hypotheses we expect of a model that combines both theoretical concepts.

METHODS AND DATA

Data analysis will be performed on the longitudinal data set (1991–1995)
referred to as *verder studeren* (study careers). Nine hundred eighteen students
from a first-year higher education cohort from institutions throughout the Neth-
erlands received five questionnaires. From the 1995 questionnaire we use only
our dependent variable, the amount of progress. As there are no real campus
universities in the Netherlands, all these students are commuter students.

We start by describing the variables that we use. More detailed information
is displayed in Table 1.

- Background variables

The following background variables are included: educational level of par-
ents, income of parents, sex and age of student, high school grade point average
and whether the student is "traditional" or "nontraditional"; traditional students

TABLE 1. Variables and Scales

1991

Background variables

Sex	Men 52%	Women 48%
Age	Mean 19.6	SD 6.3
Grade point average in secondary education	Mean 6.9	SD 0.6
Educational level parents (range 1: primary educ. to 5: university)	Mean 3.4	SD 1.2
Income parents (range from 0: no income to 12: very high income)	Mean 8.8	SD 3.3
Traditional students	Yes 87%	No 13%
Expected duration in years	Mean 4.7	SD 1.1
Expectation	Mean 77.2	SD 19.3

*Scale*s

Satisfaction a	Mean 6.4	SD 1.4

Alpha reliability .70

	Item-Total Correlations
The course program is of good quality	.528
I am satisfied with the contact I have with my fellow students	.385
The teaching skills of my teachers are poor *	.342
The study is what I expected it to be	.386
I am satisfied with my interaction with teachers	.455
The atmosphere at the university where I study is good	.426
My degree course is "mass-produced" education *	.571

1992

Propaedeutic certificate obtained the certificate after one year or not	No 52%	Yes 48%
Expectation	Mean 87.3	SD 15.9

*Scale*s

Satisfaction b	Mean 5.9	SD 1.8

Alpha reliability .75

	Item-Total Correlations
I dislike my fellow students*	.332
I like the atmosphere at the faculty	.541
My interaction with teachers are satisfactory	.603
It was easy to interact with teachers	.576
The student counseling is inefficient*	.410
The number of students in the courses I attended was too large*	.396

TABLE 1. (*Continued*)

Fitting in	Mean 7.4	SD 1.5
Alpha reliability .71		

	Item-Total Correlations
I am happy with my present situation	.476
My best friends think that what I do suits me well	.494
I receive a lot of support from my friends	.579
I receive a lot of support from my family	.459

1993

Expectation	Mean 90.7	SD 11.8
*Scale*s		
Academic fit	Mean 7.3	SD 1.6
Alpha reliability .87		

	Item-Total Correlations
I think about enrolling in another course*	.624
The course is not what I expected it to be; it is disappointing*	.774
Now and again I get tired of thinking about my course *	.564
I find my course to be generally interesting	.782
I like to learn new things in my course	.685
Usually I enjoy starting a new day at college	.409
Generally speaking I have fun studying	.841
I am satisfied with my choice of course	.786

Study climate	Mean 5.1	SD 1.3
Alpha reliability .77		

	Item-Total Correlations
The atmosphere at the faculty is good	.442
Most teachers appreciate being asked questions outside college hours	.453
There are plenty of opportunities to affect what is happening in the course	.466
It is easy to interact with teachers	.656
I am generally dissatisfied with the amount of access to teachers*	.340
Teachers let you know immediately if your work is not up to standard	.371
The feedback on your work is insufficient*	.340
Teachers and counselors provide enough social and emotional support	.559
My counselors and/or teachers know me personally	.502
My counselors and/or teachers have my files at hand when I need to talk to them	.579

TABLE 1. (*Continued*)

			Item-Total Correlations
Contact	Mean 7.3	SD 1.5	
Alpha reliability .83			
I have got plenty of friends amongst my fellow students			.641
It is easy for me to make new friends			.648
I have plenty of contact with fellow students			.673
I often feel lonely*			.499
I find it difficult to make contact with other students*			.657
I am satisfied with my social life			.575
1994			
Expectation	Mean 93.7	SD 10.6	
1995			
Academic progress	Mean 76.6	SD 18.3	

Notes: We report items, item-total correlations, and the Cronbach's α of each scale. All items were scored on an 11-point scale: 0 = "this does not apply to me at all," to 10 = "this is very applicable to me." Items marked with an * were reverse scored.

are students who followed a straight path to higher education. This means that they completed 6 years of high school education, obtaining the standard high school diploma that allowed them to enter the university directly. Nontraditional students followed a less direct path. For example, they completed only 5 years of high school and subsequently underwent some form of vocational training before finally moving on to the university.

- Rational choice

Rational choice was measured in the first year with a variable reporting number of years students expected to need for graduation. In addition, students reported their perceived likelihood of success every year: "expectation 1991," "expectation 1992," "expectation 1993," "expectation 1994." These variables are all expressed as percentages, ranging from 0 to 100.

- Integration

The 1991, 1992, and 1993 questionnaires did not contain exactly the same items, and the 1994 questionnaire did not contain any items that measured integration. We could not construct scales distinguishing between social and academic integration. This confirmed our idea that social and academic integration are empirically inseparable. In constructing the scales, we first used principal

component factor analyses to examine if one or more factors were present. Second, we performed a reliability analysis on the items that formed one factor. If the Cronbach's α was sufficiently high, we constructed Likert-type scales. The lowest α reliability we found for a scale was .70, which is quite acceptable. In Table 1, we report the item total correlation of each item and the Cronbach's α coefficient for each scale. There are six scales for integration. In 1991, one scale—"satisfaction a"—describes the satisfaction of the students with their study and the quality of contact with teachers and fellow students. In 1992 there is one scale called "satisfaction b," which is also about the satisfaction of the students with their course and the quality of contact with teachers and fellow students. A second scale from the data in 1992, "fitting in," is about a general sense of well-being in the present situation. With the data of 1993 we constructed three scales. "Academic fit" refers to satisfaction of students with their course and the pleasure they do or do not experience studying. "Study climate" is a scale about the conditions for a satisfying climate, not only concerning the content of the course but also the contact with teachers. Finally, the scale "contact" is about the quality and quantity of interaction with students.

We consider all the scales that contain items that could traditionally be indicated as social and academic integration as constructs of the integration concept. An example is the academic fit scale measured in 1993. An item such as "I find my course to be generally interesting" could be considered as an academic integration item. Another item in that scale, "generally speaking I have fun studying," could be considered to be a social integration item. Satisfaction with the organization, teachers and fellow students and a sense of well-being and fitting in, are aspects of integration that are present in all the years we had data (on integration) available.

In addition to the scales, we have the variable "propaedeutic certificate" as a measure of integration. In the Netherlands, this obligatory certificate is received by students when they have earned the 42 credits of the first-year program. The certificate is meant to function as a selection mechanism. However, in reality not even half of the total student body succeeds in earning this certificate in one year. Many students do not acquire the credits necessary for the certificate until later on in their second year of study. Although students can continue studying if they have not yet obtained this certificate by the end of their first year, the moment at which a student obtains this certificate has proven to be a good indicator of students' ability to meet academic standards. The propaedeutic certificate variable, measured in 1992, is dichotomous, with a score of 1 indicating that a student obtained this certificate after one year of study and a value 0 indicating a student has not yet earned the certificate. This is in fact our objective measure of integration, and it is a measure that traditionally would be considered as an objective measure of academic integration.

- Academic progress after 5 years

The final dependent variable is the percentage of the total credits of a course that students completed after 5 years (in 1995) varying from 0 to 100.

To analyze the direct and indirect effects on the dependent variable academic progress in our models, we use the structural equations program AMOS (Arbuckle and Wothke, 1995). AMOS' full information maximum likelihood estimation uses all the information contained in the observed data. Therefore, it is not necessary to delete cases. (For more information, see F.A.Q. at http://www.smallwaters.com/.)

MODELS TO BE TESTED

Our theoretical models are displayed in Figs. 1–3. In all of the figures, the variables are chronologically ordered. We start with the exogenous variables, the background variables, which of course were measured in 1991. Figure 1 shows the effects we expect based on the integration theory and hypotheses outlined above. The integration model contains the background factors, the six integration scales and the variable "propaedeutic certificate." This variable is placed between the variables measured in 1991 and 1992. This is because the question of whether or not a student earned the propaedeutic certificate concerns the first year but was only posed in the 1992 questionnaire, at the start of the second year.

Figure 2 shows the rational choice model, and Fig. 3 shows the effects we expect to find in the extended model. In the extended model it is our expectation that rational choice variables and integration variables will interact in a specific manner. Taking the year 1991 as an example: if the amount of satisfaction with teachers, students, and faculty is high, this will positively affect the subjective chance of success. In estimating this chance of success, a more satisfied student will estimate with the satisfying and stimulating environment and experiences in his head. That is the interaction we expect within each year, a positive effect of the integration variable on the rational choice variable. Between years, we expect the rational choice variables to have an effect on the integration variable in the next year. For instance, a student who thinks he/she has a very good chance to succeed will continue in good spirits and will be more likely to become even more integrated later.

To answer the questionnaire items concerning integration, students have to reflect on their situation. The perceived likelihood of success will prompt students to think ahead. Students make a rational choice, and this choice affects their decision to continue studying and their integration in the future. Integration variables measured in one year will therefore be expected to influence the rational choice variables measured in the same year. In addition, rational choice
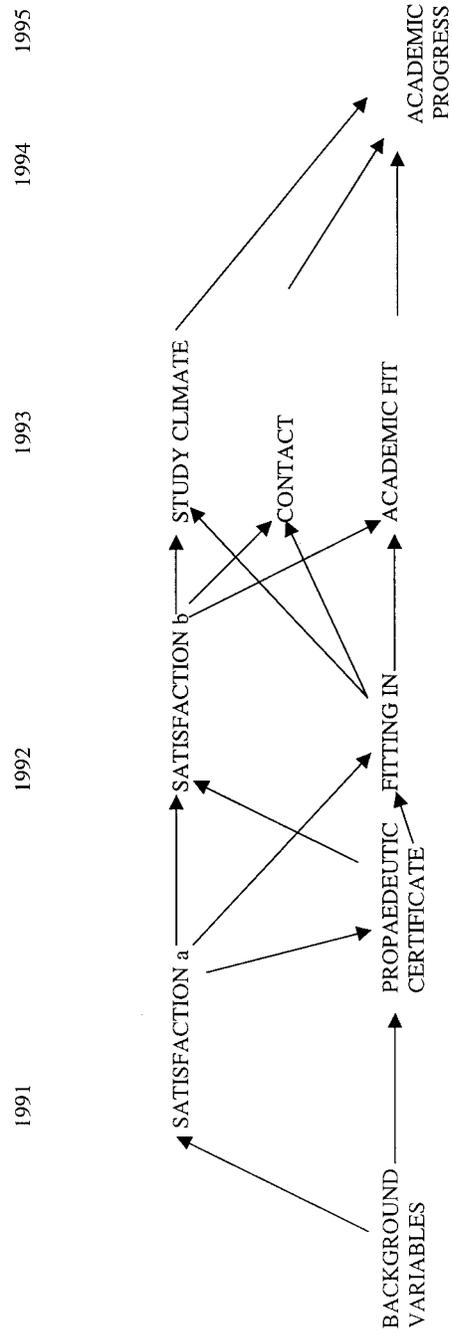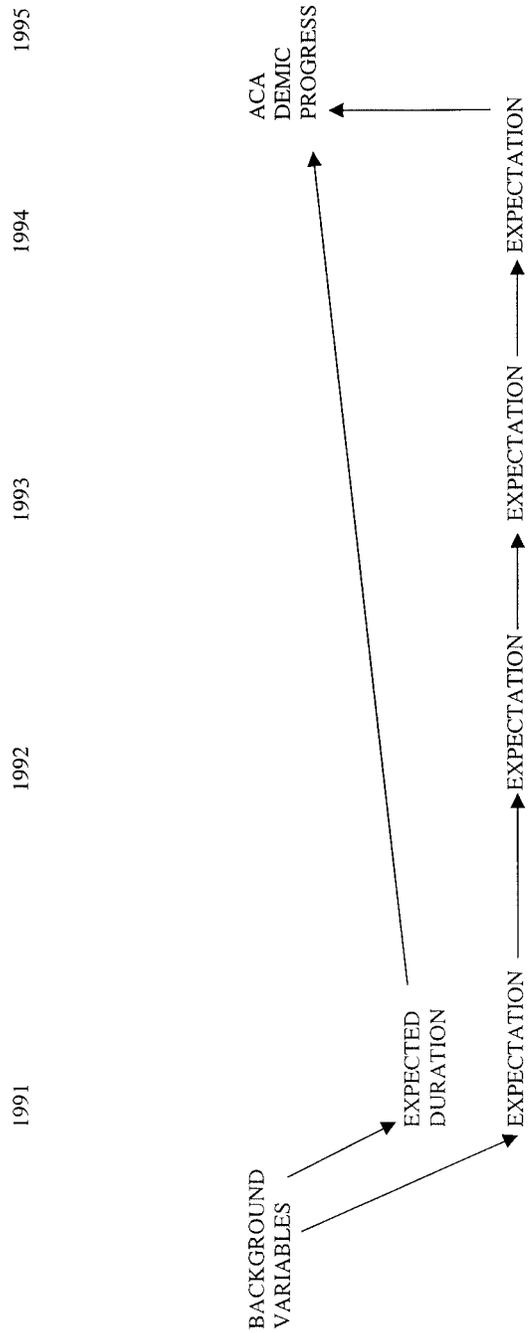
FIG. 1. Expected paths in the Integration model.

FIG. 2. Expected paths in the Rational Choice model.
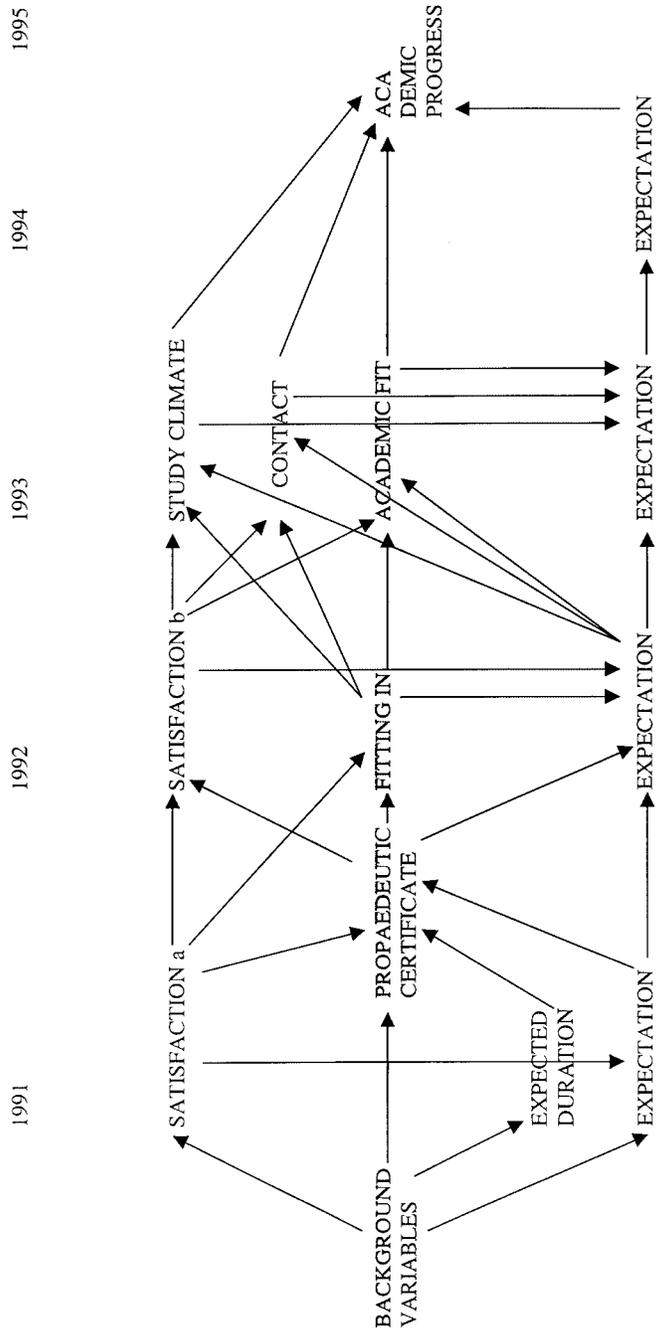
FIG. 3. Expected paths in an extended model of academic progress.

variables measured in one year will be expected to influence integration variables in the next year. The effects expected are all positive, except the one from expected duration to propaedeutic certificate. We are aware that some of the variables commonly used in integration models, such as commitment and motivation, are not analyzed here. We have chosen to work with fewer variables because we want to focus on rational choice and integration and because we want to avoid very complex models and capitalizing on chance.

RESULTS

Each model is discussed separately. Fit measures, which indicate how well the theoretical model fits the data, are reported in Table 2. The chi-square measure of fit is very sensitive to sample size. Because we have a large sample of 918 students, almost every model will probably have a significant χ^2, indicating a bad fit. We report three other fit measures that are less sensitive to sample size (Arbuckle and Wothke, 1995; Hox and Bechger, 1998). The normed fit index (NFI) has values from 0 to 1, with 1 indicating a perfect fit. A rule of thumb is that an NFI below .90 requires improvement of the model. The Tucker Lewis Index (TLI) is quite similar to the NFI, but it compensates for the complexity of the model. A TLI above .90 indicates a moderately good fit, and above .95 indicates a good fit. Finally, the root mean square error of approximation, RMSEA, is designed to assess the approximate fit of a model in relation to the degrees of freedom. The more below .05 RMSEA is, the more a close fit is suggested.

1. Integration Model

In Table 3 the standardized effects of the integration model are displayed. The model does not fit very well. Although the NFI and the TLI are high enough, the RMSEA is not good and the chi-square indicates a bad fit, although this latter result is in line with our expectations. The percentage of explained variance in the integration model is small (18 percent). The model shows that background variables have no significant effect on integration variables with the exception

TABLE 2. Fit Measures and Explained Variances of Academic Progress of the Three Models

	χ^2	(df)	p	NFI	TLI	RMSEA	p	Explained Variance (%)
Integration model	226	(62)	.000	.992	.990	.056	.11	18
Rational choice model	95	(37)	.000	.997	.996	.041	.91	26
Extended model	205	(113)	.000	.995	.996	.030	.99	33

TABLE 3. Integration Model: Standardized Direct, Indirect, and Total Effects on Academic Progress

	Direct Effects	Indirect Effects	Total Effects
Sex			
Age			
GPA		01	.01
Education-parents			
Parental income			
Traditional student			
Satisfaction a 1991		.13	.13
Propaedeutic certificate	.34	.09	.43
Fitting in 1992		.10	.10
Satisfaction b 1992		.04	.04
Study climate 1993			
Contact 1993			
Academic fit 1993	.21		.21

of a very small effect for grade point average. We should partly reject the first hypothesis about the effect of education and income of parents and prior school performance on integration. The second hypothesis about the positive effect of integration in one year on integration in the following year is confirmed. We stated in our third hypothesis that all integration scales and variables influence academic progress, but not all of them turn out to have significant positive effects. The "contact" and "study climate" scales have no effect on academic progress. The scale "academic fit" does have a positive effect. "Propaedeutic certificate" has the largest effect; students who obtain their certificate in the first year are more successful. This is the most powerful integration variable. The explained variance would probably be higher if the 1994 survey had also contained integration variables.

2. Rational Choice Model

While fitting the rational choice model (and the extended model), it was necessary to add extra paths to the model. We had to draw paths between nonconsecutive years, thereby violating the assumption we made in the section "Longitudinal Process." An example is the direct effect of expectation measured in 1992 on academic progress in 1995. Another example is the effect of "expectation 1992" on "expectation 1994." This indicates that it is too theoretical to assume all effects of similar variables to proceed neatly from year to year and that they do not directly affect variables measured in subsequent years.

As can be seen in Table 4, expectations have rather strong effects on academic progress.[1] The variable "expectation 1992" has the largest total effect. As

TABLE 4. Rational Choice Model: Standardized Direct, Indirect, and Total Effects on Academic Progress

	Direct Effects	Indirect Effects	Total Effects
Sex			
Age			
GPA		.03	.03
Education-parents		−.02	−.02
Parental income			
Traditional student		.08	.08
Expectation 1991		.09	.09
Expected duration	−.29		−.29
Expectation 1992	.21	.12	.33
Expectation 1993		.12	.12
Expectation 1994	.26		.26

already mentioned, a high-perceived likelihood of graduating in 1992 leads to a higher percentage for academic progress in 1995. The "expectations in 1993 and 1994" appear to be less important. A reason for the large effect for "expectation in 1992" is probably that in their second year the students have had a chance to see if they are able to make sufficient progress. They can compare their progress with the norm of earning the propaedeutic certificate at the end of the first year of study. The start of the second year is the moment to conclude that you are either on the move or that you are not doing well and might not make it at all.

With the exception of the chi-square measure, the fit measures for this model are good. The percentage of variance explained in this model is 26%, which is a higher percentage than the amount of explained variance in the integration model. Some of our hypotheses have been confirmed, while others have not. The first hypothesis about the effect of parent's income cannot be confirmed. The second hypothesis is confirmed but with a very small effect; the direct effect of grade point average on perceived likelihood of success is .09. The effect of parental education on the perceived likelihood of success is larger (.15), confirming hypothesis 3. Furthermore, there is a strong direct effect on academic progress for the number years students think they need to graduate. Finally, both hypotheses 5a and 5b, concerning the cumulative effects of expectations and the positive effect of expectation on academic progress, are confirmed in these analyses.

3. Extended Model of Academic Progress

Total and direct effects of all the variables on other variables in the extended model of study progress are displayed in Table 5. It appears that integrating both models has added value. We expected interaction between rational choice

TABLE 5. Standardized Direct (dir) and Total (tot) Effects of the Extended Model[a]

	Age		GPA		Sex		Traditional Student	
	Dir	Tot	Dir	Tot	Dir	Tot	Dir	Tot
Expected duration	−.11	−.11	−.07	−.07		.00	−.27	−.27
Satisfaction a 1991		.00	.10	.10	.10	10	−.08	−.08
Expectation 1991		.00		.03		.03		−.02
Propaedeutic certificate		.01	.29	.32	.10	.11	.11	.12
Fitting in 1992		.00		.06		.04		−.01
Satisfaction b 1992		.00		.10		.07		−.03
Expectation 1992		.00		.07		.04		−.00
Study climate 1993		.00		.05		.04		−.01
Contact 1993		.00		.04		02		−.00
Academic fit 1993		.00		.06		.04		−.00
Expectation 1993		.00		.05		.03		−.00
Expectation 1994		.00		.04		.02		−.00
Academic progress		.04		.13		.04		.11

	Parental Education		Expected Duration		Satisfaction a 1991		Expectation 1991	
	Dir	Tot	Dir	Tot	Dir	Tot	Dir	Tot
Expected duration	.12	.12						
Satisfaction a 1991		.00		.00				
Expectation 1991	.16	.16		.00	.29	.29		
Propaedeutic certificate		.01	−.12	−.12	.21	.21		
Fitting in 1992		.00		−.01	.32	.34		.00
Satisfaction b 1992		.00		−.02	.55	.58		.00
Expectation 1992		.04		−.02		.23	.24	.24
Study climate 1993		.00		.00		.31		.00
Academic fit 1993		.00		−.01		.29		.06
Contact 1993		.00		.00		.19		.03
Expectation 1993		.02		−.01		.18		.13
Expectation 1994		.02		−.01		.13		.11
Academic progress		−.03	−.27	−.31		.15		.06

	Propaedeutic Certificate		Fitting in		Satisfaction b 1992		Expectation 1992	
	Dir	Tot	Dir	Tot	Dir	Tot	Dir	Tot
Fitting in 1992	.09	.09						
Satisfaction b 1992	.14	.14						
Expectation 1992	.13	.17	.37	.37				
Study climate 1993		.08	.22	.22	.40	.40		

TABLE 5. (*Continued*)

	Propaedeutic Certificate		Fitting in		Satisfaction b 1992		Expectation 1992	
Academic fit 1993		.10	.35	.45	.19	.19	.24	.24
Contact 1993		.06		.33	.11	.11	.13	.13
Expectation 1993		.10		.29		.05	.46	.53
Expectation 1994		.08		.21		.02	. 20	.45
Academic progress	.27	.32		.15		.03	.13	.25

	Academic Fit		Contact		Expectation 1993		Expectation 1994	
	Dir	Tot	Dir	Tot	Dir	Tot	Dir	Tot
Expectation 1993	.14	.14	.15	.15				
Expectation 1994		.07		.07	.48	.48		
Academic progress	.13	.15		.02		.09	.19	.19

[a]The variable "income parents" is left out of this table because it had no effects at all in this analysis.

variables and integration variables, as can be seen in Fig. 3. In Fig. 4, we have drawn the paths that were found to be significant in the analysis. The hypotheses are confirmed at many points in the model; 28 of the 35 expected paths were significant. For example, being integrated positively affects the expectations held by students. In 1992 to 1993, the expectation variables also have positive effects on integration a year later. Academic fit and the variable "propaedeutic certificate" are again important integration variables that effect academic progress both directly and indirectly. A number of background variables, such as "traditional student," "grade point average," and "educational level of parents," play a part in the model, although their role is a modest one. Thirty-three percent of explained variance is larger than in the other models. This model seems to fit the data very well on all fit measures, with the exception of the chi-square measure.

CONCLUSION

We now discuss some possible empirical limitations for the generalizability of our research. We use data collected in the Netherlands. The education system in our universities differs from that of other European countries and also from that of the United States. Furthermore, we have no campus universities in our country. Nonetheless, we feel that there are definite similarities in the problems with which universities in different countries are faced. Attrition and a slow study pace seem to be problems familiar to all western countries. A further point of criticism of our study might be that there are some inconsistencies in the
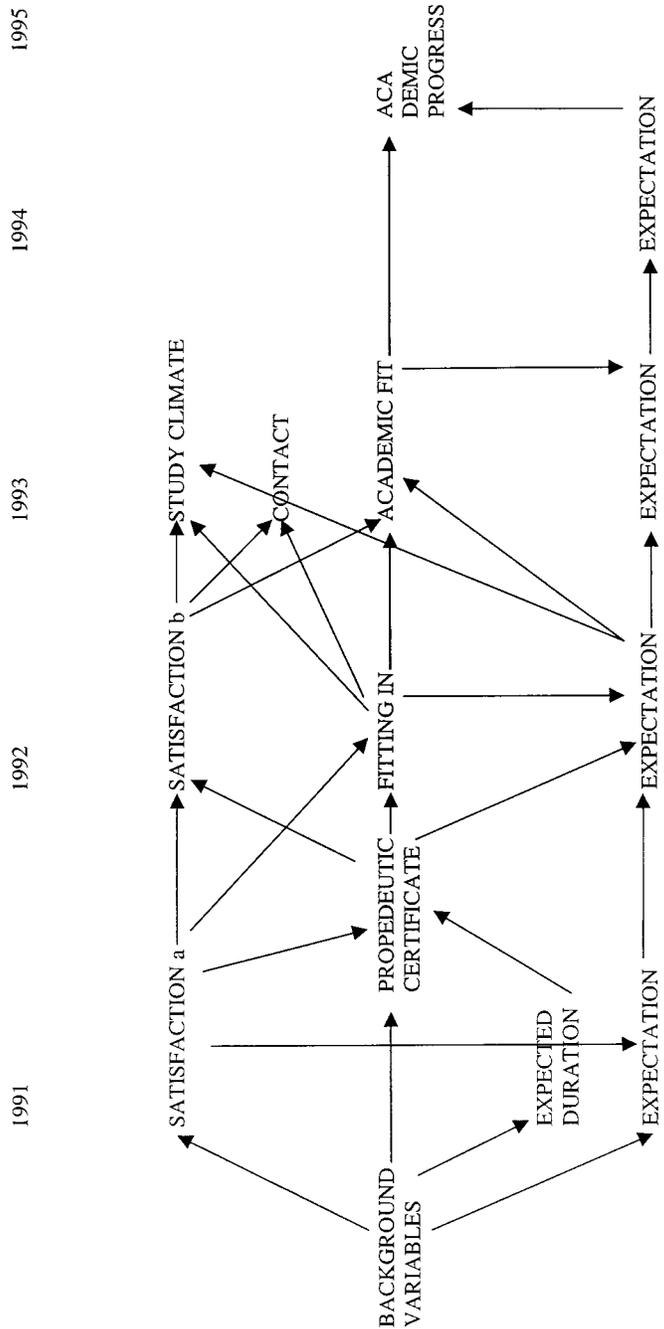
FIG. 4. Significant paths in the extended model of academic progress.

questionnaires that provided the data we use to test our ideas. However, it should be remembered that the data are unique in its large number of time points. It is rare to have access to such a broad longitudinal data set.

In this article, we have attempted to explain academic progress in higher education using a combination of concepts from two commonly used theories—integration theory and rational choice theory. We started by examining each theory separately to show how it attempts to explain academic progress. To contrast the two theories, we have focused on their differences. Of course, both theories also have some similarities, primarily concerning the expected effects of background variables. The background variables were included and tested in all three models. However, the expected effect for family income was not found. This could mean that the assumption about the willingness of parents to financially support children is incorrect, or perhaps that the student's perception of their willingness is incorrect. In the Netherlands there are no differences in fees per university, and every student has the right to a study allowance, albeit a modest one. It is possible that the relatively level playing field in the Netherlands could also explain why we find no effects for family income. The educational level of parents did affect the rational choice variables. It seems that this variable influences the amount of confidence that students have. In the integration model, the education of parents did not affect the integration variables. In fact, in the integration model no background factor had an effect, with the exception of the very minor effect of "grade point average."

The rational choice theory seems to provide a simple, clear model that fitted the data reasonably well. The time students expect to need for their studies and the perceived likelihood to succeed were good predictors of academic progress. The more complex integration model explains less variance of academic progress within this data. Earning the propaedeutic certificate in the first year and the amount of academic fit both affected academic progress positively. This model did not fit the data very well.

As can be seen from our combined model, focusing on only one theory to analyze the data would have meant selling ourselves short in terms of explained variation. The interplay between rational choice and integration is important for the power of the model to predict academic progress. We have not simply added some variables from another theoretical perspective to the model, but have succeeded in combining these variables with the existing integration theory. This approach allows for indirect effects of both rational choice and integration variables, which contribute to the explained variance. We have demonstrated that in one period the amount of integration influences the perceived likelihood of graduating in that same period and that conversely the likelihood of graduation affects the amount of integration in the forthcoming period. In our model, not all variables had the effects we expected. From the extended model can be deduced that the rational choice variables "expected duration" and "expecta-

tion," and the integration variables "acquiring the propaedeutic certificate," "satisfaction," and "academic fit," have the largest influence on the academic progress of university students.

IMPLICATIONS FOR PRACTICE

The results stress the importance of the first year of university study. The importance of the freshman year has also been recognized in numerous other studies (Evans, 2000). Important functions of the freshman year are orientation, which leads to a high perceived likelihood of success, and self-selection (i.e., the decision whether to continue studying or to leave). This first year can also have a referring function; some students will need to switch courses instead of plodding along in a course that does not suit them. However, a report made by the Dutch Inspectorate of Education (1997) showed that universities fail to make use of this referring function. We feel that, in general, universities should show more concern for the study progress of their students, not simply requiring speaking to students who are behind schedule, but also showing a broader interest in their progress. Dissatisfied students or students with unrealistic expectations should be referred to counselors to discuss their situation. Such counseling could help students in making effective choices and could encourage them not to postpone decisions too long.

At a recent meeting of the European countries in Bologna, Italy, it was decided that the education systems across Europe need to be increasingly brought into line. To achieve this, it has been proposed that a uniform structure for bachelor's and master's degrees be introduced. This proposal immediately prompted discussion in the Netherlands concerning whether this would mean the abolition of the propaedeutic certificate. We would like to point out that the research discussed in this article emphasizes the importance of the propaedeutic certificate. Students use it as a standard measure by which to gauge whether they are likely to be capable of graduating. Universities also use it to see if students are capable of graduating within the allotted period. The propaedeutic year, therefore, serves as a quality measure and guideline for reviewing changes in the curriculum or in the composition of the student population. We advise that policymakers reconsider their position before simply abolishing the propaedeutic certificate.

IMPLICATIONS FOR FURTHER RESEARCH

This study also underlines the importance of a dynamic longitudinal approach. Not only the first year and the graduation year of study are important; many things happen in between. The assumption that influences proceed only directly from year to year needs to be set aside. Our study shows that variables

measured at $t1$ can affect similar variables at $t3$. The fact that this assumption has been rejected should be kept in mind in other analyses of longitudinal data when using the same variables measured at more than one time point.

In the analyses presented here, we did not make a distinction between social and academic integration. Our data confirmed the idea that they could not be separated empirically. The scales that were constructed contained mostly items that traditionally would probably be placed under either academic or social integration. We let go of the artificial distinction between academic and social integration and treat integration as a complex concept containing several dimensions: at least one interaction dimension, which contains the frequency and quality of contact with the following actors: fellow students, peers, teachers, and faculty staff, and a fit dimension in the sense of belonging or fitting in. In a follow-up study that makes use of more recently collected data we strive to refine our measures of the integration concept. We expect to be able to report on this study in the near future.

We feel that combining theoretical concepts as we have done is a promising approach that can lead to a better understanding of study careers and can allow a larger percentage of explained variance to be obtained. In this article, differences in academic progress between various institutions of higher education and between different courses offered by the same institution have not been discussed. It would be interesting to carry out analyses that take account of such differences, and it is our intention to do so in the near future.

ENDNOTE

1. Some readers might think we should analyze the rational choice model without the "expectation 1994" variable in order to make the comparison with the integration model more fair. If the effect of this variable on the academic progress in the rational choice model is omitted, the explained variance drops from 25% to 21%. In the extended model, omitting this effect leads to a decrease in explained variance of 2%. In both cases, the fit of the model decreased slightly. Because we strived to use all relevant information the *verder studeren* data set contained, we decided against omitting the variable from 1994 from our data.

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