



High school students' career decision-making process: Consequences for choice implementation in higher education

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Abstract

This study investigated consequences of high school students' career decision-making process for choice implementation in higher education. A sample of adolescents participated at the end of Grade 12 and was followed during the first and second year in higher education. Linear and logistic regression analyses revealed that students' coping with career decisional tasks at the end of Grade 12 significantly contributed to the several aspects of early choice implementation (i.e., choice actualization, academic adjustment, commitment to the chosen study) during the first trimester in higher education. The importance of these aspects of early choice implementation is demonstrated through their relationship with academic achievement during the first year in higher education.

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1. Introduction

In several theoretical models on the career decision-making process (e.g., Gati & Asher, 2001; Harren, 1979; Tiedeman & O'Hara, 1963; Van Esbroeck, Tibos, & Zaman, 2005), it has been hypothesized that the way individuals cope with decisional tasks during a career decision-making process has important consequences for implementing the career decision.

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In line with these models but at a more specific level, it has been suggested that higher levels of self and environmental exploration will result in a higher degree of congruence between the person and the chosen career, which in turn will result in higher levels of satisfaction, adjustment, certainty, and identification with the choice (e.g., Greenhaus & Sklarew, 1981; Grotevant, 1987; Singh & Greenhaus, 2004; Stumpf, Colarelli, & Hartman, 1983). Similar hypotheses have been formulated with regard to the effect of commitment to a career choice on these aspects of choice implementation (e.g., Harren, 1979) and on choice actualization (i.e., the likelihood of corresponding choice entry behaviors; Lent, Brown, & Hackett, 1994). Despite this theoretical attention, a review of the career decision-making literature reveals a need for empirical studies investigating the hypothesized relationship between individuals' coping with the decisional tasks during a career decision-making process and subsequent choice implementation. In this study, we investigated consequences of the career decision-making process for choice implementation within the context of high school students' choice of a major in higher education.

When studying the associations between a career decision-making process and choice implementation, it may be important to include several aspects or tasks that are important for characterizing a career decision-making process. By investigating the relationship between a comprehensive framework of career decision-making tasks and future choice implementation, the precise impact of a career decision-making process would become clearer. Based on taxonomies of career decision-making problems (Campbell & Cellini, 1981; Gati, Krausz, & Osipow, 1996) and theories about the career decision-making process (e.g., Gati & Asher, 2001; Harren, 1979; Tiedeman & O'Hara, 1963), Germeijs and Verschueren (2006a) differentiated six tasks as core aspects of the career decision-making process: (1) orientation to choice (i.e., awareness of the need to make a decision and motivation to engage in the career decision-making process), (2) self-exploration (i.e., gathering information about oneself), (3) broad exploration of the environment (i.e., gathering general information about career alternatives), (4) in-depth exploration of the environment (i.e., gathering detailed information about a reduced set of career alternatives), (5) decisional status (i.e., progress in choosing an alternative), and (6) commitment (i.e., strength of confidence in and attachment to a particular career alternative).

Previous research has established positive relationships between adolescents' coping with career decisional tasks and subsequent choice implementation (e.g., Seifert, Bergmann, & Eder, 1987; Super, 1985). However, these studies only focused on some aspects or tasks in the career decision-making process, preventing investigating the precise impact of the career decision-making process on choice implementation. For instance, in the study of Seifert et al. (1987) the Career Development Inventory (CDI; Thompson & Lindeman, 1981) was used as a measure of individuals' coping responses. However, the CDI does not differentiate between self-exploration and environmental exploration nor between broad exploration of the environment and in-depth exploration of the environment. The present study aimed to extend the existing research by examining the associations between a differentiated set of career decisional tasks and choice implementation.

Comparable to the multidimensional characterization of a career decision-making process, different aspects can be used to evaluate the quality of choice implementation. Several indicators for the quality of (career) choice implementation have been suggested, including choice actualization, choice satisfaction, adjustment in the chosen option, performance in the chosen option, and choice stability (Brisbin & Savickas, 1994; Gati & Asher, 2001; Harren, 1979; Janis & Mann, 1977; Stumpf et al., 1983; Taborsky, 1994; Tinsley, 2000). In

the existing studies on the relationship between individuals' coping with career decisional tasks and choice implementation (e.g., Seifert et al., 1987; Super, 1985), most of these indicators were conceptualized in the context of occupational choice implementation. In the current study, several aspects of educational choice implementation were investigated. Specifically, three aspects of students' choice implementation during their first year in higher education were studied: (1) whether or not students actually enter the study they intended to choose at the beginning of their first year in higher education (i.e., choice actualization), (2) commitment to the chosen study during the first trimester of the first year in higher education as reported by the students, and (3) academic adjustment during the first trimester of the first year in higher education as reported by the students. Academic adjustment refers to students' success in coping with educational demands including motivation for doing academic work, effort to meet academic demands and efficacy in doing academic work (Baker & Syrik, 1989).

Besides these three aspects of early choice implementation, the variable academic achievement was investigated in the current study. Given the large numbers of students who interrupt or fail to complete programs of study in higher education (Wintre, Bowers, Gordner, & Lange, 2006) it is important to identify possible risk factors for low academic achievement. Based on theoretical models (e.g., Tinto, 1993; Livingston, 1982) and empirical research on student attrition and achievement (e.g., Gerdes & Mallinckrodt, 1994; Lacante et al., 2001; Napoli & Wortman, 1998; Pascarella & Terenzini, 1980), it may be expected that choice actualization, commitment to the chosen study, and academic adjustment at the beginning of higher education are predictive of students' academic achievement during the first year in higher education. Previous research on risk factors of low academic achievement has been criticized for not distinguishing between different modes or reasons for academic failure (Wintre et al., 2006). Therefore, in the current study we distinguished in addition to a category of students who succeeded in their first year (i.e., pass), two categories for academic failure: students who took all exams but failed (i.e., fail), and students who stopped their study before participating in any or all exams (i.e., stop).

In sum, the current study aimed to investigate longitudinally the hypothesized but understudied relationship between a career decision-making process and choice implementation. Specifically, the effect of students' process of choosing a study in higher education on subsequent choice implementation during the first year in higher education is examined. Based on the theoretical models on career decision-making (e.g., Gati & Asher, 2001; Harren, 1979; Tiedeman & O'Hara, 1963; Van Esbroeck et al., 2005) and existing research on the relationship between coping behaviors and occupational choice implementation (e.g., Seifert et al., 1987; Super, 1985) we hypothesized a positive effect of adolescents' coping with the six career decisional tasks on (1) choice actualization in higher education, (2) student's commitment to the chosen study during the first trimester in higher education, and (3) students' academic adjustment during the first trimester in higher education. Finally, we expected that these three aspects of early choice implementation were in turn important for academic achievement in the chosen option (i.e., pass, fail, and stop). Because previous research showed that gender and general cognitive ability are predictive of academic adjustment and success (e.g., Furnham, Chamorro-Premuzic, & McDougall, 2003; Kuncel, Hezlett, & Ones, 2004; Lacante et al., 2001; Napoli & Wortman, 1998), we controlled for both variables in all the analyses.

2. Method

2.1. Participants and procedure

In total, 748 students participated in this study. They came from 25 high schools in Flanders, the Dutch-speaking part of Belgium. Nearly all students were White. They came from the sixth year in high school (last year or Grade 12) and followed the general education track. For high school students in Belgium, the choice of a study in higher education is an important one because they have to choose a specific study (i.e., a major either at academic or at higher professional level) from the first year on. After having successfully completed high school and having received a certificate, Belgian high schools students from the different educational forms (i.e., education in the arts, general, technical and vocational education) have unrestricted access to higher education. The current study focused on students following general education in high school, because this group has the largest proportion of students starting higher education (i.e., 97.3%; Sonar, 2002). The choice of a major in higher education is thus an important career decision for almost all of these students.

We examined students' career decision-making process using a three-wave short term longitudinal design with students receiving the same questionnaire at the beginning (September 2002), middle (January 2003), and end (May 2003) of Grade 12 (Germeijs & Verschueren, 2006b). Questionnaires about the career decision-making process were administered during regular classes. For the current study, data from the end of Grade 12 (May) were used to examine students' level of coping with the career decisional tasks proximate to choice implementation. In total 665 students participated at the end of Grade 12 (300 boys and 365 girls). Mean age for this sample at that moment was 18;0 years ($SD = 6.3$ months).

The next academic year (November 2003) all 748 students received a questionnaire on early choice implementation by mail or e-mail (for 510 students we had an e-mail address). Students were asked to send the questionnaires back in a self-addressed stamped envelope or by e-mail. Students who did not respond, received a reminder in December 2003 by mail or e-mail. From the 665 students who participated at the end of Grade 12, we received from 224 students (81 boys and 143 girls) their questionnaire on early choice implementation. This sample was used to answer the research questions regarding the effect of the decisional tasks on commitment (second research question) and on academic adjustment (third research question) during the first trimester of the first year in higher education. For all these students we had data on academic achievement (i.e., pass, fail, stop) during the first academic year, based on data gathered in November 2004 (see further). These data were used to investigate whether early commitment and academic adjustment in turn predict achievement during the first year in higher education (fourth research question).

Comparison of the students who dropped out of the study between the end of Grade 12 and the first trimester of the first year in higher education ($n = 441$) with the longitudinal sample of 224 students, revealed no differences in students' scores on career decisional tasks at the end of Grade 12. Only for the Orientation scale, students in the dropout group scored significantly lower ($t(660) = 2.11, p < .05$, Cohen's $d = .17$) than students in the longitudinal sample. In addition, differences in students' age were revealed ($t(663) = 2.30, p < .05, d = .19$), with students from the dropout group being older than students from the longitudinal sample. However, in both cases effect sizes were small. There was also a

significant gender difference for dropping out of the study ($\chi^2(1, N = 665) = 10.74, p < .01$), indicating that more boys than girls dropped out of the study.

In November 2004, all 748 students received again a questionnaire on choice implementation in higher education by mail. Students who did not respond were phoned and were asked to still participate in our study. During the phone conversation students were also asked to name the study they had started after high school (i.e., in September 2003). In addition, to probe academic achievement students were asked whether they succeeded in their first year, failed (but took all exams), or stopped their study (i.e., did not participate in all exams or did not take any exams). From the 665 students who participated at the end of Grade 12, a total of 425 students answered the questions on the kind of study they had entered as well as on academic achievement during the first year in higher education. This sample of 425 students was used to examine the effect of the decisional tasks on choice actualization (first research question) and to investigate whether choice actualization in turn predicts achievement during the first year in higher education (fourth research question).

Comparison of the students who dropped out of the study between the end of Grade 12 and the beginning of the second year in higher education ($n = 240$) with the longitudinal sample of 425 students, revealed no differences in students' age or scores on career decisional tasks at the end of Grade 12. Moreover, no significant gender effect on dropping out of the study was found.

2.2. Measures

2.2.1. Career decisional tasks

The Study Choice Task Inventory (SCTI; Germeijs & Verschueren, 2006a) was used to measure students' coping with decisional tasks during their process of choosing a study in higher education. The SCTI consists of six subscales that measure the six different tasks as described above. The subscale Orientation to Choice probes students' awareness of the need to make a decision and their motivation to engage in the career decision process (e.g., "I am motivated to make work of choosing a study"). A 9-point scale (going from does not describe me to describes me well) is used as the response scale. Three subscales are aimed at assessing exploratory behavior: the Self-Exploratory Behavior scale (e.g., "I have talked with my friends about my interests"), the Broad Exploratory Behavior scale (e.g., "I glanced through general summaries about the structure of higher education"), and the In-depth Exploratory Behavior scale (e.g., "I have talked to a teacher to get more information about these studies"). For these scales three response categories (i.e., never, sometimes, often) are used to indicate the frequency of exploratory behavior during the last and current school year. The subscale Decisional Status consists of two questions, which are based on the Occupational Alternatives Question (Slaney, 1980). The questions are adapted to the situation of choosing a study in higher education ("list all studies you are considering now" and "which study is your first choice (if undecided, write undecided)"). Numerical values are given to four possibilities in responding: (1) no first choice, no alternatives, (2) alternatives without first choice, (3) first choice with alternatives, and (4) first choice with no alternatives. The sixth subscale of the SCTI is the Commitment scale (e.g., "Are you certain about this study?"), which is based on eight items of the Commitment scale of the Groningen Identity Development Scale (GIDS; Bosma, 1985). The other items of the GIDS could not be used at the end of Grade 12 because they are not applicable to the situ-

ation where a choice has not been implemented yet. Answers on the Commitment scale are given on a 6-point scale ranging from (1) *not at all* to (6) *yes, very*. Only students who indicated having a first choice in the Decisional Status scale (i.e., score 3 or 4) were asked to rate the degree of commitment to their choice.

Germeijs and Verschueren (2006a) provided evidence for the reliability and validity of the SCTI. Evidence for the construct validity of the SCTI was found from confirmatory factor analyses supporting its hypothesized multidimensional structure. Evidence for the convergent validity was offered by finding the predicted connections with existing measures of career exploration (CES; Stumpf et al., 1983) and career decision-making difficulties (CDDQ; Gati et al., 1996). Construct validity evidence was also provided by two known-groups validation analyses. In the current study Cronbach's alpha indices for Orientation to Choice (12 items), Self-Exploratory Behavior (20 items), Broad Exploratory Behavior (5 items), In-depth Exploratory Behavior (10 items), and Commitment (8 items), were .86, .90, .81, .74, and .85, respectively in the sample of 224 students. Cronbach's alpha indices were comparable in the sample of 425 students (ranging from .74. to .90).

2.2.2. Choice implementation

2.2.2.1. *Commitment to the study.* To probe the degree of commitment to the chosen study in higher education, the Commitment scale of the GIDS (Bosma, 1985) was used. In addition to the eight items of the GIDS, which were also used in the current study to probe the degree of commitment before choice implementation at the end of Grade 12 (see Commitment scale of SCTI), eight additional items of the GIDS (e.g., "Do you feel involved in this study?") were used to assess the degree of commitment to the study during choice implementation. Bosma (1992) found support for the validity of the Commitment scale of the GIDS when investigating differences between groups that were expected to differ in terms of strengths of commitments in several identity areas. In the current study, Cronbach's alpha for this scale was .93 in the sample of 224 students who participated at the beginning of the first year in higher education.

2.2.2.2. *Academic adjustment.* To probe academic adjustment during the first year in higher education, a Dutch translation (Beyers & Goossens, 2002) of the Academic Adjustment scale of the Student Adaptation to College Questionnaire (SACQ; Baker & Syrik, 1989) was used. The Academic Adjustment Scale of the SACQ consists of 24 items (e.g., "I have been keeping up to date on my academic work."), referring to the educational demands of the experience in higher education. The items probe students' attitudes towards academic goals and academic work, how well they apply themselves to academic work, and the effectiveness of their academic efforts. Beyers and Goossens (2002) provided support for the validity of the Dutch translation of the SACQ in a sample of Belgian university students. With regard to the Academic Adjustment scale of the SACQ, they found evidence for the concurrent validity from correlations with an alternative measure of academic motivation and for the predictive validity (e.g., from relationships with grade point average). In the current study, Cronbach's alpha for this scale was .90 in the sample of students who participated at the beginning of the first year in higher education.

2.2.2.3. *Choice actualization.* In the questionnaire administered during the first trimester of the second year in higher education, students were asked (either by mail or by phone) to name the study they entered at the beginning of the first year in higher education. The

name of the study they intended to choose at the end of high school (filled out in the scale of Decisional Status) was compared with the name of study they entered at the beginning of the first year in higher education. Students who had entered the choice as was intended, were categorized in the group of ‘choice actualization’, whereas students for whom the study in higher education differed from the one named at the end of Grade 12 were classified as ‘not actualizing their choice’.

2.2.3. Cognitive ability

To control for cognitive ability, the short form of the Raven Advanced Progressive Matrices Test (APM-SF) was used (Arthur & Day, 1994; Arthur, Tubre, Paul, & Sanchez-Ku, 1999). The APM-SF consists of 12 items from the original 36 items, aimed at maintaining the overall progressive difficulty of the long form and the unidimensional factor structure. Based on research about the reliability and validity of the APM-SF (Arthur & Day, 1994; Arthur et al., 1999; Bors & Stokes, 1998), this test has been recommended to researchers who need a sound assessment of general intelligence in a short time frame. The APM-SF was administered at the second measurement moment during Grade 12 (i.e., January 2003). The Kuder-Richardson 20 index for internal consistency was .84 in our study.

3. Results

To investigate the main research questions, linear and logistic regression analyses were used. Gender and cognitive ability (as measured by the short form of the Raven Advanced Progressive Matrices Test) were included in all the regression analyses as control variables.

3.1. Effect of career decisional tasks on choice actualization (research question 1)

To investigate the effect of the decisional tasks at the end of Grade 12 on choice actualization at the beginning of the first year in higher education binary logistic regression analysis was used. Whether or not students started the study as intended, was treated as the binary dependent variable in this analysis. A logistic regression analysis with the six decisional tasks as dependent variables was performed to examine the unique effects of each decisional task controlled for the other decisional tasks.

It was decided to use responses from the same students to answer both research questions regarding choice actualization (first and fourth research question). This resulted in a deletion of 48 students from the sample of 425 students, either because these students had not selected a study at the end of Grade 12 yet ($n = 43$, preventing to investigate the effect of the decisional tasks on choice actualization) or because these students had selected a study at the end of Grade 12 but did not enter a study in higher education ($n = 5$, preventing to investigate the effect of choice actualization on academic achievement). In sum, responses from 377 students were used to investigate the research questions about choice actualization.

A comparison of students’ study intentions formulated at the end of Grade 12 and the studies entered at the beginning of the first year in higher education showed that the majority of the students (i.e., $n = 295$, 78%) started in the study they intended to choose at the end of Grade 12. Hence, these students actualized their choice intention. However, there is also a considerable group of students (i.e., $n = 82$, 22%) who started in another study than was intended.

The logistic regression analysis revealed that the model predicting choice actualization from gender, cognitive ability and the six decisional tasks was significant (Model Likelihood Ratio $\chi^2(8) = 35.02, p < .01$). In Table 1 the results of this logistic regression analysis are presented. The analysis showed that students' likelihood for actualizing their choice intention was significantly enhanced by a higher decisional status and a higher degree of commitment to the choice at the end of Grade 12. The odds ratios for decisional status revealed that the odds of starting the intended study compared to entering another study than intended were 2.74 times higher for students who considered only one study at the end of Grade 12 (i.e., score 4 on decisional status) than for students who had a first choice but in addition considered other studies at that time (i.e., score 3 on decisional status). With regard to the effect of commitment on choice actualization, the results showed that for every unit increase in commitment at the end of Grade 12 the odds of actualizing the intended choice as compared with not actualizing it were 1.75 times higher. Neither for the control variables gender and cognitive ability, nor for the other four decisional tasks significant effects were found.

To examine the effect of each decisional task without controlling for the other decisional tasks, six logistic regressions, one for each decisional task, were performed, each time controlling for gender and cognitive ability. These analyses revealed significant effects on choice actualization for the same decisional tasks (i.e., decisional status and commitment).

3.2. Effect of career decisional tasks on commitment to the study (research question 2)

With regard to the research questions about commitment and academic adjustment (second, third, and fourth research question), in the sample of 224 students who participated at the beginning of the first year in higher education, 22 students had not selected a study at the end of Grade 12. The 202 students who had selected one study all started higher education. Although for the 22 students without a choice at the end of Grade 12 all research questions regarding commitment and academic adjustment could be answered, we decided to leave these 22 students out of the analyses to have a sample that was comparable to the sample on which the analyses regarding choice actualization were based. In sum,

Table 1

Odds ratios in logistic regression analysis predicting choice actualization from career decisional tasks ($n = 357$)^a

Predictors	Odds ratio ^c	Confidence Interval (95%)
Gender ^b	1.11	0.63–1.98
Cognitive ability	0.99	0.73–1.33
Orientation	1.10	0.85–1.42
Broad exploration	1.71	0.78–3.76
In-depth exploration	0.78	0.24–2.49
Self-exploration	0.87	0.32–2.37
Decisional status ^b	2.74**	1.52–4.95
Commitment	1.75*	1.10–2.78

^a The number of respondents is lowered due to missing data on some scales.

^b For gender 'female' is the reference category and for decisional status a score of '3' (i.e., considering several alternatives and having a first choice among the alternatives) is the reference category.

^c The Wald statistic is used to test whether the odds ratios are significantly different from 1.

* $p < .05$.

** $p < .01$.

the data used to answer the four research questions came from students who selected a study at the end of Grade 12 which they intended to start and who did start higher education, either in the same or in another study than they intended. As a consequence, scores on decisional status at the end of Grade 12 are limited to 3 (i.e., considering several alternatives and having a first choice among these alternatives) or 4 (i.e., considering only one alternative which is also the first choice). Therefore, decisional status is treated as a categorical variable in these analyses.

A linear regression analysis on commitment to the study in higher education with decisional status as independent variable and controlling for gender and cognitive ability, revealed a significant effect of decisional status ($\beta = .25, p < .01$). Students who had a first choice but in addition considered other studies at the end of Grade 12 (i.e., score 3 on decisional status) had a lower score on commitment in higher education than students who considered only one study at that time (i.e., score 4 on decisional status). Table 2 shows the correlations among the scores for the other career decisional tasks at the end of Grade 12 and commitment and academic adjustment during the first trimester in higher education, controlled for gender and cognitive ability. Because there were no significant differences in the correlations of the decisional tasks in high school with commitment and academic adjustment in higher education between students who entered the study as intended ($n = 166$) and students who entered another study than intended ($n = 36$), both groups (i.e., choice actualization or not) were analyzed together for the research questions about the effect of the decisional tasks on commitment and academic adjustment. As expected, scores for all decisional tasks had a positive association with scores for commitment to the study in higher education. Only the correlation between self-exploration at the end of Grade 12 and commitment in higher education failed to reach significance ($r = .11, p = .12$). These results suggest that higher levels of orientation, environmental exploration (broad and in-depth), decisional status, and commitment at the end of Grade 12 are predictive of higher levels of commitment to the study at the beginning of higher education.

To examine the unique effects of the decisional tasks (i.e., controlled for the other decisional tasks) on commitment to the study in higher education, a multiple linear regression

Table 2

Correlations between career decisional tasks in high school, and academic adjustment and commitment in higher education ($n = 192$ – 202)

	1	2	3	4	5	6
End Grade 12						
1. Orientation						
2. Broad exploration	.35**					
3. In-depth exploration	.35**	.62**				
4. Self-exploration	.38**	.48**	.60**			
5. Commitment	.30**	.20**	.27**	.12		
Begin first year higher education						
6. Academic adjustment	.27**	.18*	.26**	.28**	.38**	
7. Commitment	.23**	.17*	.26**	.11	.48**	.76**

Correlations with academic adjustment and commitment are controlled for gender and cognitive ability.

* $p < .05$.

** $p < .01$.

analysis was conducted. The results show that gender, cognitive ability, and the decisional tasks together significantly predicted commitment to the study in higher education ($R^2 = .26$, $F(8, 187) = 8.32$, $p < .01$). As can be seen from Table 3, students with higher levels of in-depth exploration and commitment at the end of Grade 12 were more committed to their study during the first trimester of the first year in higher education. The unique effects of the other four decisional tasks were not significant.

3.3. Effect of career decisional tasks on academic adjustment (research question 3)

A linear regression analysis on academic adjustment with decisional status as independent variable and controlling for gender and cognitive ability, revealed a significant effect of decisional status ($\beta = .15$, $p < .05$). Students who still considered several studies at the end of Grade 12 (i.e., score 3 on decisional status) had a lower score on commitment in higher education than students who considered only one study at that time (i.e., score 4 on decisional status). As can be seen in Table 2, all other decisional tasks had a significant and positive association with academic adjustment during the first trimester of higher education. These results show that students with higher levels of orientation, environmental exploration (broad and in-depth), self-exploration, decisional status and commitment at the end of Grade 12 tend to be more successful in coping with the various educational demands of higher education (i.e., are more motivated for doing academic work, show more academic effort, and feel more efficacious in doing academic work).

A multiple linear regression analysis on academic adjustment with gender, cognitive ability, and the decisional tasks as predictors showed that these variables together significantly predicted academic adjustment in higher education ($R^2 = .23$, $F(8, 187) = 7.07$, $p < .01$). Students with higher levels of self-exploration and commitment at the end of Grade 12 showed higher levels of academic adjustment during the first trimester of the first year in higher education (see Table 3). The unique effects of the other four decisional tasks were not significant. Finally, a significant effect of gender was revealed, with boys showing lower levels of academic adjustment than girls.

Table 3

Standardized regression coefficients in two linear regression analyses predicting commitment and academic adjustment in higher education from career decisional tasks ($n = 196$)

Predictors	Criterion in higher education	
	Commitment	Academic adjustment
Gender ^a	.06	-.15*
Cognitive ability	.08	.03
Orientation	.07	.08
Broad exploration	-.01	-.03
In-depth exploration	.18*	.06
Self-exploration	-.06	.19*
Decisional status ^a	.06	.02
Commitment	.40**	.32**

^a For gender 'female' is the reference category and for decisional status a score of '3' (i.e., considering several alternatives and having a first choice among the alternatives) is the reference category.

* $p < .05$.

** $p < .01$.

3.4. Effect of choice actualization, commitment, and academic adjustment on achievement (research question 4)

To examine whether choice actualization, commitment, and academic adjustment in turn predict academic achievement (fourth research question), three multinomial logistic regression analysis were used. The dependent variable academic achievement had three categories (i.e., succeeding in the first year, taking all exams but fail, stopping the study before taking any or all exams).

3.4.1. Choice actualization

Within the sample of 377 students on which the analyses regarding choice actualization were based, 64% ($n = 242$) succeeded in their first year of higher education. Sixty-seven students (18%) stopped with their study before taking any or all exams, and 68 students (18%) took all exams but failed.

The multinomial logistic regression analysis revealed that the model predicting academic achievement from gender, cognitive ability and choice actualization was significant (Model Likelihood Ratio $\chi^2(6) = 23.17, p < .01$). As can be seen from the χ^2 statistics of the effects in Table 4 (Model 1), gender and choice actualization significantly predicted academic achievement. The odds ratios revealed that the odds of succeeding in the first year as compared with stopping were increased for students who actualized their choice intention. In addition, the odds of ‘taking the exams but fail’ as compared with ‘stopping before taking all the exams’

Table 4

Three multinomial regression analyses predicting academic achievement^a from choice actualization, commitment and academic adjustment

Predictors	Effect chi-square ^c	Pass vs. Stop odds ratio (95% CI) ^d	Fail vs. Stop odds ratio (95% CI) ^d
Model 1 ($n = 364$)			
Gender ^b	10.95**	0.81 (0.46–1.44)	2.05 (1.01–4.17)*
Cognitive ability	1.32	0.95 (0.70–1.30)	0.82 (0.56–1.20)
Choice actualization ^b	11.17**	2.65 (1.44–4.85)**	3.22 (1.41–7.38)**
Model 2 ($n = 197$)			
Gender	5.88	0.53 (0.22–1.27)	1.33 (0.46–3.88)
Cognitive ability	3.84	0.64 (0.40–1.03)	0.62 (0.35–1.12)
Commitment	12.06**	2.82 (1.56–5.10)**	2.35 (1.07–5.13)*
Model 3 ($n = 197$)			
Gender	3.43	0.73 (0.30–1.75)	1.58 (0.54–4.60)
Cognitive ability	3.03	0.68 (0.42–1.09)	0.66 (0.38–1.17)
Academic adjustment	17.44**	4.81 (2.12–10.91)**	1.85 (0.71–4.85)

CI, confidence interval.

^a Students who took exams and succeeded (pass) and students who took exams but failed (fail) are compared with students who stopped before taking exams (reference category).

^b For gender ‘female’ is the reference category and for choice actualization the group of students who entered a different study than was intended is the reference group.

^c The chi-square statistic is the difference in $-2 \log$ -likelihoods between the final model and a model where the effect is omitted from the final model.

^d The Wald statistic is used to test whether the odds ratio’s are significantly different from 1.

* $p < .05$.

** $p < .01$.

were also increased for students who actualized their choice. Finally, the significant effect of gender revealed that the likelihood of ‘taking all the exams but fail’ as compared with ‘stopping before taking any or all exams’, was higher for boys than for girls.

To test whether the odds of succeeding in the first year as compared with failing were also significantly predicted by choice actualization, an additional logistic regression analysis was performed with the group of students who took all the exams but failed as the reference group. The results revealed no significant effect of choice actualization on the likelihood of succeeding compared to failing (odds ratio = .82, $p = .60$). Only gender had a significant effect, indicating that the odds of succeeding as compared to failing were decreased for boys (odds ratio = .40, $p < .01$).

3.4.2. Commitment and academic adjustment

Within the sample of 202 students on which the analyses regarding commitment and academic adjustment were based, 70% ($n = 142$) succeeded in their first year of higher education. In this sample 31 students (15%) stopped with their study before taking any or all exams and 29 students (15%) took all exams but failed.

To test the effect of *commitment* during the first trimester of the first year in higher education on academic achievement, a multinomial logistic regression analysis was performed. Results revealed a significant effect of commitment (see Model 2 in Table 4; Model Likelihood Ratio $\chi^2(6) = 21.29$, $p < .01$). In this sample the effect of gender on academic achievement failed to reach significance. Higher levels of early commitment to the study increased (1) the likelihood of succeeding as compared to stopping, and (2) the likelihood of failing (but taking all the exams) as compared to stopping. An additional analysis with the group of students who took all exams but failed as reference group revealed no significant effect of commitment on the odds of succeeding as compared to failing (odds ratio = 1.20, $p = .59$).

Concerning the effect of *academic adjustment* during the first trimester in higher education on academic achievement, the multinomial regression model was significant (Model Likelihood Ratio $\chi^2(6) = 26.68$, $p < .01$). As can be seen in Table 4 (Model 3), the effect of academic adjustment was significant. The odds ratios revealed that higher levels of academic adjustment during the first trimester of the first year in higher education increased the odds of succeeding as opposed to stopping. Subsequent multinomial regression analysis with the group of students who failed as reference group, showed that the odds of succeeding in the first year as compared with failing were significantly increased for students with higher levels of academic adjustment (odds ratio = 2.60, $p < .05$).

It was also investigated whether academic achievement could be directly predicted from students’ coping with the career decisional tasks at the end of Grade 12. Both in the sample of 377 students and in the sample of 202 students, multinomial regression analyses with academic achievement as dependent variables and gender, cognitive ability and the six career decisional tasks as predictors were performed. Both analyses revealed that the model predicting academic achievement was not significant (Model Likelihood Ratio $\chi^2(16) = 17.33$, $p = .37$ in the sample of 202 students and Model Likelihood Ratio $\chi^2(16) = 25.65$, $p = .06$ in the sample of 377 students).

4. Discussion

Combined, the results of the current study provide support for the hypothesis formulated by several authors (e.g., Gati & Asher, 2001; Harren, 1979) that individuals’ career

decision-making process may have important consequences for subsequent choice implementation (i.e., choice actualization, commitment to the chosen option, and adjustment).

4.1. Choice actualization

With regard to choice actualization, the results revealed that high school students' coping with some decisional tasks are predictive of whether or not they enter the study they intended to choose. Specifically, higher levels of decisional status and commitment at the end of Grade 12 increased the likelihood of actualizing the choice intention. In other words, students who had a first choice but still considered several alternatives (i.e., score 3 on decisional status) and students who were less confident in and attached to their choice at the end of Grade 12 (i.e., May) were more inclined to still change their mind before the start of the next academic year in September. As shown by the subsequent analysis, entering another study than was intended at the end of Grade 12, turned out to be a risk factor for stopping with the study before participating in any or all exams during the first year in higher education.

The associations we found between decisional status and the degree of commitment to the study choice on the one hand and subsequent choice actualization on the other hand, are in line with hypotheses from [Lent et al. \(1994\)](#). These authors expected that firmly held career goals, characterized by choice certainty, decidedness, and commitment, may promote the likelihood of choice entry behavior. The results of the current study also reflect previous research findings from [Pieters and Verplanken \(1995\)](#) about the association between confidence in an intention and actualization of this intention. However, the study of [Pieters and Verplanken \(1995\)](#) did not focus on career decisions, but on voting behavior for a particular party. The findings from the current study indicate that the relationship also applies to decisions in the career domain.

In contrast to decisional status and commitment, no significant effect of orientation and the three exploration tasks (i.e., self-exploration, broad environmental exploration, and in-depth environmental exploration) on choice actualization was found. The absence of a significant relationship between exploration and choice actualization may seem to be inconsistent with findings from researchers outside the career domain ([Davidson, Yantis, Norwood, & Montano, 1985](#)). One possible explanation for these differences may be the conceptualization and measurement of exploration. For example, in contrast to the current study, in which exploration was conceptualized as the frequency of exploratory activity in the past as reported by the students, [Davidson et al. \(1985\)](#) have used measurements of the amount of information about the choice alternatives as rated by the researcher (i.e., participants had to list the information they had about the alternatives, which was evaluated by the researchers). Whether the difference in findings are due to a differential effect of exploratory behavior versus amount of information and/or to differences between self-reports versus objective ratings, remains a topic for further investigation.

4.2. Commitment to the chosen study

The second aspect of early choice implementation investigated in the current study, was commitment to the chosen study in higher education. Whereas coping with all decisional tasks (except self-exploration) was related to commitment to the chosen study, only students' coping with the decisional tasks of in-depth environmental exploration and of

commitment to the choice at the end of Grade 12 were found to be uniquely predictive of this aspect. Put differently, students who show less in-depth exploratory behavior regarding a reduced set of career alternatives during their decision-making process and students who are less confident in their choice before choice implementation, are at risk for being less committed to their study during higher education. Furthermore, analyses revealed that being less committed to the chosen study in higher education is less adaptive, because being less committed is in turn associated with a higher risk for stopping with the study during the first year in higher education (i.e., without participating in any or all exams).

The significant association between in-depth environmental exploration during the decision-making process and commitment during the implementation of the career choice, is in line with the hypothesis of [Stumpf et al. \(1983\)](#) about the outcomes of career exploration when choosing a job. These authors suggested that information gathering prior to selecting a job, may result in higher levels of commitment to the occupation and organization. However, in the current study, of the three exploration tasks (i.e., broad environmental exploration, in-depth environmental exploration, and self-exploration) only a significant effect of in-depth environmental exploration was revealed, when controlling for the other career decisional tasks. Although broad environmental exploration was positively correlated with commitment to the study in higher education, this significant association disappeared when controlling for the other decisional tasks. This finding suggests that the shared variance of broad environmental exploration with the other decisional tasks and not the unique variance of broad environmental exploration, explains the relationship with future commitment to the career choice. With regard to self-exploration, even the bivariate correlation with commitment in higher education (i.e., without controlling for the other decisional tasks), failed to reach significance. Previous findings ([Germeijs & Verschueren, 2006b](#)) already indicated that self-exploratory behavior is not associated with commitment to the choice prior to implementation. The results of the current study suggest that this also applies to the relationship with commitment to the choice during the implementation of the career choice.

In addition to in-depth environmental exploration, commitment to the choice prior to implementation significantly predicted commitment to the chosen option during implementation. The association between both variables ($r = .48, p < .01$, without controlling for gender and cognitive ability) points to a moderate stability in commitment before and during the implementation of the choice, despite important changes in the educational environment. This may be important information for career counseling, because it indicates the risk for stability of feelings of uncertainty about a study choice. Of course, this may also be due to the use of overlapping items to tap commitment at both occasions. However, this measurement issue can not entirely explain the association between commitment before and during implementation because the association remained comparable when leaving out the overlapping items in the commitment scale used during choice implementation ($r = .43, p < .01$, without controlling for gender and cognitive ability).

4.3. *Academic adjustment*

With regard to the third aspect of early choice implementation, academic adjustment, the results showed that orientation, self-exploration, environmental exploration (i.e., broad, in-depth), decisional status and commitment at the end of Grade 12 were all significantly associated with future academic adjustment in higher education. However, when

controlling for the other career decisional tasks, only self-exploration and commitment significantly contributed to academic adjustment. These results suggest that students with lower levels of self-exploration and commitment at the end of high school are at risk for showing less motivation and effort in academic work in the future. The findings provide further evidence of the view that individuals who show higher levels of coping with the career decisional tasks will be more prepared and motivated to (overcome obstacles to) achieve their goals (e.g., Blustein, Ellis, & Devenis, 1989; Taborsky, 1994). Subsequent analyses demonstrated the importance of being motivated and showing effort to meet academic demands. Indeed, for students who showed lower levels of academic adjustment, the risk for either stopping or failing (vs. succeeding) in the first year of higher education was substantially increased.

It may be speculated that the relationship between self-exploratory behavior and academic adjustment, can be due to the domains of self-exploration investigated. One of these domains referred to study strategies and methods (see Method), because of their importance for successful learning (Weinstein, Goetz, & Alexander, 1988). Based on Weinstein et al. (1988) the domain of study strategies was explained in the questionnaire as behaviors or attitudes including motivation for school work, time scheduling, and using aids to help learning (e.g., making summaries). These topics, namely motivation and effort, are also included in the measurement of academic adjustment in higher education. It is possible that the relationship between self-exploratory behavior and academic adjustment is due to the fact that reflecting on your study strategies in high school goes hand in hand with better (future) study strategies. However, this possible explanation needs to be investigated in future research.

When combining the results with regard to the three aspects of early choice implementation, it seems that one career decisional task is especially important for career choice implementation, namely commitment. The results showed positive effects of commitment on choice implementation regardless of the levels of the other decisional tasks. In general, the career decisional task commitment is expected to be prominent towards the end of the career decision-making process (e.g., Harren, 1979). Because we only used students' coping with the decisional tasks at the end of Grade 12 as predictors, it may be that at that particular moment students' differences in the degree of commitment are especially relevant for grasping individual differences in the career decision-making process. To evaluate the importance of the career decisional tasks for choice implementation more thoroughly, the present analyses can be complemented with analyses examining the relationships between choice implementation and the career decisional tasks, assessed at other moments during the career decision-making process.

With regard to academic adjustment and commitment to the chosen study in higher education, the results of the current investigation suggest that although both aspects of early choice implementation are highly interrelated, they may have different consequences. Lower levels of commitment increased the risk of stopping (versus passing and versus failing). Lower levels of academic adjustment (i.e., motivation and effort) also increased the risk of stopping (versus passing), but in addition increased the risk of failing (versus passing). In sum, commitment to the chosen study seems to be especially predictive for whether or not students drop out before participating in all exams, whereas academic adjustment seems to be especially important to predict whether or not students successfully complete their first year in higher education.

In the current study, commitment was investigated with regard to what students intend to do at the end of Grade 12 as well as with regard to the chosen study at the beginning of the first year in higher education. Commitment at the end of Grade 12 turned out to be an important predictor of the quality of early choice implementation, whereas commitment at the beginning of higher education significantly predicted academic achievement in the future. Combined, these results point to the importance of students' emotional investment in and feelings about what they want to do and what they are doing.

4.4. *Limitations and suggestions for future research*

Although the present study revealed a number of interesting findings, some limitations and suggestions for future research need to be mentioned. A first point deserving attention is the association between the career decisional tasks and academic achievement. Although the decisional tasks such as commitment contributed to the three aspects of early choice implementation and these three aspects in turn predicted academic achievement, no significant direct effect of the decisional tasks on academic achievement was revealed. One possible explanation for these findings may be that together with the positive effect of the decisional tasks on early choice implementation, which in turn has a positive effect on academic achievement, other mechanisms occur through which the decisional tasks have a negative effect on academic achievement. These may cancel out the positive effect of the decisional tasks on academic achievement and result in a total effect equal to zero (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Janis and Mann (1977) for example, hypothesize that the greater the commitment to a decision, the greater the anticipated losses and disapproval from failing to continue that course of action, and hence the greater the degree of stress. Higher levels of stress may have in turn a negative effect on academic achievement. Clearly, additional research is needed to better understand the link between the decisional tasks and academic achievement.

Second, we controlled in all analyses for cognitive ability. However, cognitive ability did not have any relationship with the outcome variables, even not with academic achievement. Some authors have suggested that the relationship between intelligence and academic performance may be weaker than expected, because of the restrictive range of intelligence in the students under investigation (e.g., Furnham et al., 2003). It may be that the short form of the Raven Advanced Progressive Matrices Test (APM-SF) was too easy for grasping inter-individual differences in cognitive ability in the current sample. The mean score on the APM-SF was indeed high in the present study ($M = 8.81$ for a test on which the minimum score is 0 and the maximum score is 12) and the frequency distribution of the scores revealed that the scores were not symmetric distributed but negatively skewed (skewness = $-.46$, Z score = -4.66 , $p < .01$), indicating that most of the students had scores above the mean.

Third, all data used in the current study resulted from self-report questionnaires. By using other sources of information like parents, peers, and the educational staff who evaluate students' choice implementation in higher education, additional information may be provided.

Fourth, in the current study implications of adolescents' coping with decisional tasks were investigated within the context of one specific career decision-making process. Otherwise stated, and following Super (1980), this study focused on one mini-cycle (i.e., decision-making process) within the broader maxi-cycle of career development. Although these

mini-cycles shape a person's career, and are thus assumed to be related to the maxi-cycle of career development, the present study did not investigate directly the relationship between the mastery of career developmental tasks in general and career choice implementation. Thus, for a more comprehensive understanding of how this specific career decision-making process is embedded in individuals' career development, researchers may need to combine instruments like the SCTI with other instruments focusing on other career decisions and on developmental task mastery in general (e.g., the Career Maturity Inventory, Crites, 1973; the Adult Career Concerns Inventory, Super, Thompson, & Lindeman, 1988).

Fifth, the sample of this study only consisted of students who followed general education in high school. Future studies could give an indication about the generalizability of these findings to other career decisions in other populations.

Finally, in the present study only consequences of adolescents' career decision-making process for early choice implementation (i.e., first trimester in higher education) and for achievement during the first year in higher education were investigated. Future studies could investigate longer-term outcomes such as choice stability, commitment, and achievement after 2 or more years. In addition, it may be interesting to examine consequences for other aspects of choice implementation, which are hypothesized to relate to the career decision-making process, such as the degree of congruence between the individual and the chosen career option (e.g., Stumpf et al., 1983).

Despite these limitations, this study provides valuable information about the consequences of the career decision-making process for subsequent choice implementation. Although many theoreticians have assumed that the quality of the career decision-making process is linked to the quality of choice implementation (e.g., Harren, 1979; Stumpf et al., 1983), empirical research on this topic has been scarce. With our study we hope to make a significant contribution to this issue and to stimulate other researchers to investigate the prediction of additional aspects of choice implementation.

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