Trajectory of Indecision in College:
An Illustration of Mixed Methods Research
La trajectoire de l'indécision au CÉGEP : une illustration
de l'application de la recherche aux méthodes mixtes

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ABSTRACT

This article focuses on the explanatory variables impacting the effectiveness of a transition program designed to reduce indecision among first-year college students in Québec. Mixed methods research was crucial in measuring exploratory variables such as the influence of student psychosocial characteristics and the college learning environment on the trajectory of indecision during the first semester. A repeated measures study involving 973 students was used. College professionals provided data into the learning environment and career guidance. The study presents new empirical evidence on the links between the career guidance and learning environment provided by colleges and the short-term trajectory of change in indecision.

RÉSUMÉ

Cet article traite des variables explicatives susceptibles d'influer sur l'efficacité d'un programme de transition destiné à réduire l'indécision chez les étudiants de première année de collège au Québec. La recherche aux méthodes mixtes s'avère critique pour mesurer des variables exploratoires comme l'influence des caractéristiques psychosociales des étudiants ainsi que l'environnement d'apprentissage au collège sur la trajectoire d'indécision pendant le premier semestre. Une étude à mesures répétées a été menée auprès de 973 étudiants. Des professionnels au collège ont fourni des données sur l'environnement d'apprentissage et les interventions en orientation. L'étude présente des données empiriques probantes sur les liens entre l'orientation et l'environnement d'apprentissage offerts par les collèges et la trajectoire de changement à court terme du niveau d'indécision chez les étudiants.

Indecision is prevalent among college students (Germeijs & Verschueren, 2006; Morgan & Ness, 2003). In the Québec education system, approximately 30% of first-year college students have stated they have no specific ideas about their academic path or profession (Picard, Boutin, & Skakni, 2010). To address this issue and support students along their transition to college, Québec created the *Session d'accueil et d'intégration* (SAI) college transition program. SAI is a single-semester program designed to assist new college students overcome certain challenges, be they academic (e.g., weak high school grade point averages, missing mathematics or science courses) or vocational (e.g., academic and career indecision). SAIs allow students to delay deciding on their academic major, and encompass a range of indecision interventions (e.g., counselling, career information, credit career courses), prerequisite high

school courses, and general education courses (e.g., French or English, Humanities) that are compulsory in preuniversity and technical (career) programs. The expected outcomes of this program are successful integration into college, persistence over the first semester, and deciding on a major. In 2010, approximately 9% of the Québec college population was enrolled in an SAI (Ministry of Education, Recreation and Sports; Ministry of Higher Education, Research, Science and Technology, 2013). In the 20 years since its introduction, no major study has ever been done on the effectiveness of this program.

The majority of studies on first-year seminars have largely been conducted from the perspective of student success and retention (Baron, 1997; Chapman & Reed, 1987; Daniels, Stewart, Stupnisky, Perry, & LoVerso, 2011; Davis, 1992; Fidler, 1991; Noble, Flynn, Lee, & Hilton, 2007; Robinson, 1989; Schnell & Doetkott, 2003). A meta-analysis conducted by Folsom and Reardon (2003) reveals that college career courses can reduce lack of readiness and improve indecision, vocational identity, and locus of control. Whiston, Sexton, and Lasoff (1998) also show the benefit of these courses, as they enhance the decision-making process (Hardesty, 1991; Osborn, Howard, & Leierer, 2007; Peng, 2001), reduce lack of readiness (Hardesty, 1991), and improve dysfunctional beliefs (Scott & Ciani, 2008).

The aim of our comprehensive study was to illuminate the explanatory variables likely to influence the effectiveness of SAIs in lessening *academic and career indecision* over the first semester. Our investigation was centred on the following questions: (a) Do the learning environment and the career guidance practices in SAIs make a difference in how well first-year students can successfully overcome indecision? (b) How do student-related variables influence the trajectory of indecision by the end of the first semester?

The nature of our research questions required a powerful mixed methods (MM) design to integrate both quantitative and qualitative data. There are several definitions of MM research (Creswell & Plano Clark, 2011; Greene, Caracelli, & Graham, 1989; Tashakkori & Teddlie, 2010). We refer to Creswell and Plano Clark's (2011) viewpoint that emphasizes the core characteristics of MM research: (a) the research questions are based on a need to collect and analyze both quantitative and qualitative data; (b) both sources of data are integrated by merging them, building them sequentially one on the other, or by embedding one within the other; (c) the priority is given to one or both sources of data; (d) MM research is used in a single study or a multiphase study; (e) MM research has its specific theoretical framework; and (f) the procedure corresponds to a specific well-known MM design (e.g., sequential, embedded, multiphase, exploratory).

CONCEPTUAL FRAMEWORK

Many theories first advanced in the 1990s continue to guide research on the impact of the college environment on student development (Pascarella & Terenzini, 2005). Because Arthur Chickering and Linda Reisser's psychosocial theory on college student identity development remains a cornerstone of much

administrative effort in this area, the conceptual framework for our study is based upon this theory. Chickering and Reisser (1993) created a systematic framework integrating the links between seven vectors of a student's psychosocial development when entering adult life or higher education and seven influential conditions in the college learning environment that can foster this development. We structured our research questions around the vector of *developing purpose*. It refers to the passage from either academic or career indecision (marked by varied, disorganized, and unfocused interests) or lack of commitment, to a defined choice of career and engagement in specific, sustained, and gratifying activities, as well as engagement with other members of one's social network.

Learning Environment

Chickering & Reisser (1993) defined seven key conditions in the college learning environment likely to foster student psychosocial development:

- *Clear and consistent objectives*: "Impact increases as institutional objectives are clear and taken seriously and as the diverse elements of the institution and its program are internally consistent in the service of the objectives." (Chickering & Reisser, 1993, p. 266)
- *Institutional size*: "As redundancy increases, development of competence, mature interpersonal relationships, identity, and integrity decreases." (p. 268)
- *Student-faculty relationships*: "When student-faculty interaction is frequent and friendly and when it occurs in diverse situations calling for varied roles and relationships, development of intellectual competence, sense of competence, autonomy and interdependence, purpose, and integrity are encouraged." (p. 269)
- *Curriculum*: "An educationally powerful curriculum encourages the development of intellectual and interpersonal competence, sense of competence, identity, purpose, and integrity." (p. 270)
- *Teaching*: "When teaching calls for active learning, encourages student-faculty contact and cooperation among students, gives prompt feedback, emphasizes time on task and high expectations, and respects diverse talents and ways of knowing, the following qualities are fostered: intellectual and interpersonal competence, sense of competence, mature interpersonal relationships, autonomy, identity, and purpose." (p. 272)
- *Friendship and student communities*: "When students are encouraged to form friendships and to participate in communities that become meaningful subcultures, and when diversity of backgrounds and attitudes as well as significant interchanges and shared interest exist, development along all seven vectors is fostered." (p. 275)
- *Student development programs and services*: "When student development professionals define themselves as educators working collaboratively with faculty to apply student development theory, they increase the direct and

indirect impact of programs and services on students' movement along all vectors." (p. 277)

With the exception of institutional size, all of these conditions encourage developing purpose. Although no current data clearly demonstrate the impact of institutional size on purpose, in a previous qualitative study we posited that large college populations (more than 2,000) tend to limit the interactions between counsellors, teaching staff, and students (Picard, Soucy, & Demers, 2013). Along with individual student characteristics influencing indecision, the student experience in the college learning environment—a perspective recently used in a MM study on first-year college students measuring the outcomes of liberal arts programs (Seifert, Goodman, King, & Baxter Magolda, 2010)—provided the foundation of our conceptual framework.

Indecision

The literature in the field investigated several individual factors of indecision: the career decision-making style (Harren, 1979), the career decision-making self-efficacy (Guay, Ratelle, Senécal, Larose, & Deschênes, 2006), the personality traits such as chronic indecision or indecisiveness (Di Fabio, Palazzeschi, Asulin-Peretz, & Gati, 2013; Saka, Gati, & Kelly, 2008), the career decision-making profiles (Gati, Landman, Davidovitch, Asulin-Peretz, & Gadassi, 2010), the normal stages of development in the career decision-making process or decisional tasks (Gati & Asher, 2001; Germeijs & Verschueren, 2006, 2007; Morgan & Ness, 2003), and the sources of difficulties underlying decision-making (Gati, Krausz, & Osipow, 1996). In line with Gati et al.'s (1996) taxonomy of difficulties in decision-making, Forner (2007) maintains that assessing the sources of indecision is one means of evaluating student needs and identifying effective guidance strategies. Forner (2001) categorizes six sources of indecision:

- *Lack of self-knowledge*: uncertainty about self-representation that may lead to anxiety at the time of making a decision;
- *Lack of readiness*: inadequate commitment to the decision-making process, manifested in a delay in making academic and career choices;
- *Lack of method in decision-making*: difficulty in deciding on different but equally attractive goals;
- *Lack of information:* insufficient knowledge on the choice of trades, careers, and academic programs, which can slow down the decision-making process;
- *External barriers*: real and tangible events that can hinder the fulfillment of one's plan;
- *Dysfunctional beliefs*: negative expectations leading to the perception that one's education and career goals are unattainable.

Forner (2001) observed a more pronounced level of indecision among high school students with a higher socioeconomic status, as they tended to show a more pronounced lack of readiness and lack of method in decision-making. Students

with a lower socioeconomic status appear to have more external barriers, dysfunctional beliefs, and lack of engagement in school. Indeed, research has shown a strong correlation between the level of parental education and access to higher education for their children (Finnie & Mueller, 2008; Kamanzi et al., 2010). Guay, Senécal, Gauthier, and Fernet (2003) reported differences along gender lines among college students, with men showing more indecision than women. Forner (2001) also found Grade 11 girls tended to exhibit more dysfunctional beliefs, boys more lack of engagement in school. Germeijs and Verschueren (2006) found evidence for developmental progress in coping with some decision-making tasks during the last year of high school (Grade 12). They took into account five career *decisional tasks*: orientation to choice (awareness of the need to make a decision), self-exploratory behaviour (talking to relevant sources of information, such as parents and friends, about one's interests, abilities, etc.), broad and in-depth exploration of the environment, decisional status (list of study programs), and the commitment to a choice.

In our study, we conceptualized indecision as the product of the interaction between student characteristics and the learning environment, an interchange shaped by many factors, some student-related (e.g., self-efficacy, anxiety, gender, socioeconomic status, and grade point average), others pertaining to career guidance practices and the institutional context of the college itself (Chickering & Reisser, 1993; Guichard, 2008, 2012). Within our conceptual framework, we thus formulated three hypotheses:

Hypothesis 1: In the learning environment of SAIs, four key conditions—clarity of objectives, student-faculty relationships, friendship and student community, and student development programs and services—lessen academic and career indecision and its sources; however, a fifth—institutional size—has an opposite effect as the student population increases.

Hypothesis 2: Targeted career guidance practices integrated in SAIs lessen academic and career indecision and its sources.

Hypothesis 3: Individual student characteristics (gender, parental education level, educational pathways, and decision-making tasks) have an impact on academic and career indecision and its sources.

<center>RESEARCH DESIGN</center>

Overview

Our MM research design prioritized the quantitative method, converting the qualitative data into numerical codes for statistical analysis. This procedure is, in essence, an embedded design. According to Caracelli and Green (as cited in Creswell & Plano Clark, 2011, p. 90), the embedded design is "a mixed methods approach where the researcher combines the collection and analysis of both quantitative and qualitative data within a traditional quantitative research design or qualitative research design." We needed a high-quality psychometric instrument (Forner, 2010; Gati et al., 1996; Osipow, 1987) to measure indecision and other student-related variables (QUAN), and the input of college professionals to provide data

on career guidance practices and the learning environment in colleges (QUAL)—each of which has its own distinctive characteristics that can impact student indecision.

The MM technique using an embedded design was divided into three stages and implemented sequentially (Fig. 1). In the first stage, 21 CÉGEPs (colleges) in Quebec were invited to participate in our study. College professionals from these institutions were then asked to recruit two groups of first-year students. Quantitative data were collected from these groups in a repeated measures study (QUANT). In the second stage, 21 college professionals took part in focus groups, providing qualitative data on SAI career guidance practices and learning environments (QUAL). In the final stage, the qualitative data from the focus groups were integrated into the quantitative outcomes of the repeated measures study to perform a quantitative analysis (MM embedded design).
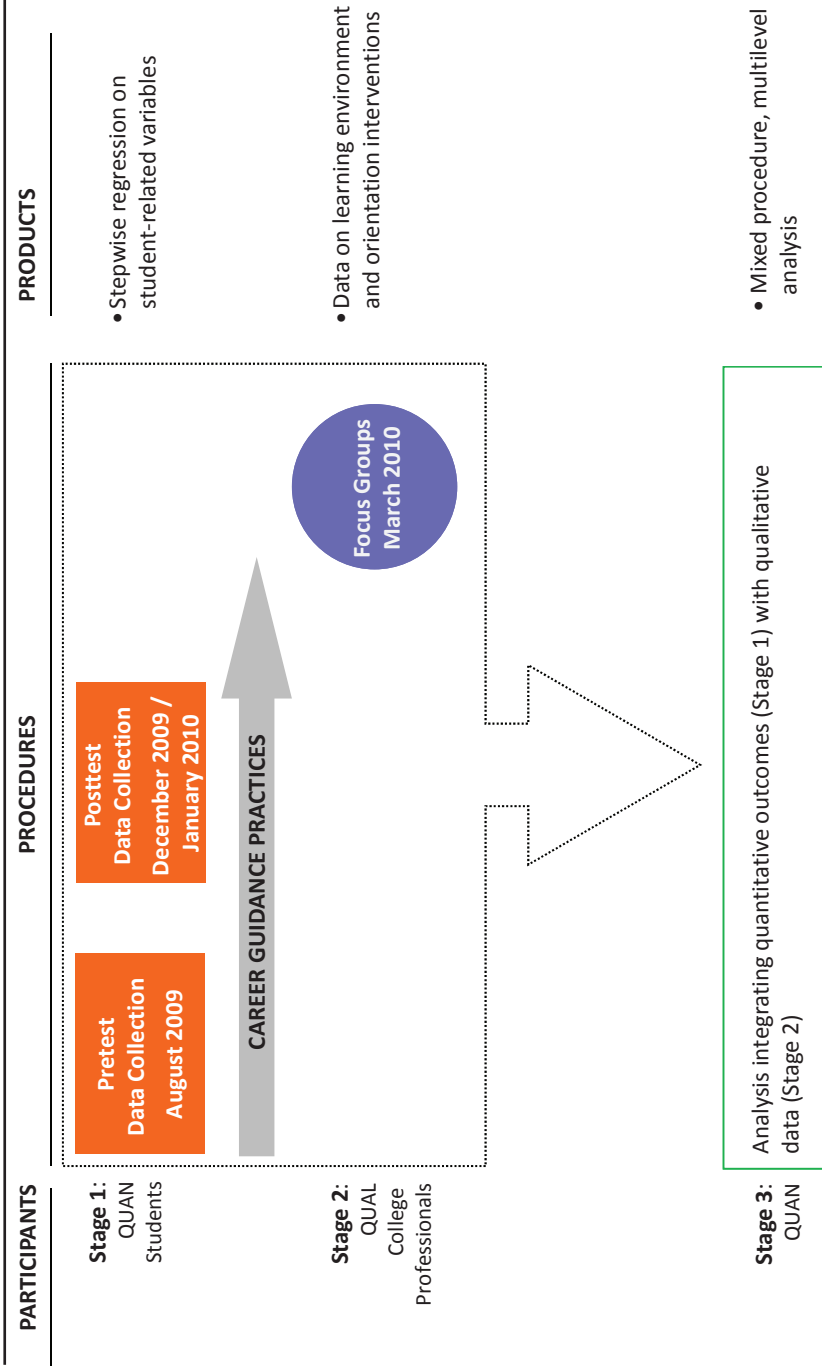
Stage 1 (Quantitative): Participants

For the repeated measures study, the two groups of first-year students were recruited based on gender and academic pathway. The first group comprised SAI students who might benefit from targeted career guidance practices; students in the comparison group were enrolled in either a technical (career) or preuniversity program. In total, 973 students from the 21 colleges participated. At the pretest, the SAI group comprised 506 (276 women, 229 men, 1 unspecified); the comparison group 467 (272 women, 192 men, 3 unspecified). The mean age of participants was 17.70 (SD = 2.12; range 16–42). A total of 857 students were enrolled in French-speaking colleges, and 116 were in English-speaking colleges. In the SAI group, 1.2% had a high school grade point average (GPA) of 85% and above (compared to 11.6% in the comparison group), 41.7% had a GPA between 73% and 84% (50.1% in the comparison group), while 42.7% had a GPA lower than 72% (22.7% in the comparison group). The remaining 14.4% did not specify a GPA (15.6% in the comparison group). Fifteen of the colleges had student populations greater than 2,000. The overall response rate was 82%.

At the posttest, the sample dropped to 730, with 351 remaining in the SAI group (208 women, 142 men, 1 unspecified) and 379 in the comparison group (225 women, 152 men, 2 unspecified). As the number of participants abandoning the study was higher in the SAI group, we tested whether sample attrition during posttest had introduced any bias. Overall, with the exception of the GPA, we found no statistically significant differences in student-related independent variables between those who withdrew and those who remained. Participants who withdrew had a GPA of M = 71.9%, compared to M = 75.3% for those who remained, t = -7.24; $p < .001$. Those who withdrew had also shown a greater degree of academic indecision compared to those who remained, χ^2 (3) = 8.29; $p < .05$.

Stage 1 (Quantitative): Instruments

To measure the dependent variables (indecision and its sources), we adapted the student form of the Épreuve de décision vocationnelle, forme scolaire voca-

Figure 1
Trajectory of Indecision in SAIs: Mixed Methods Research Using an Embedded Design

PARTICIPANTS

PROCEDURES

PRODUCTS

Stage 1:
QUAN
Students

Pretest
Data Collection
August 2009

Posttest
Data Collection
December 2009 /
January 2010

CAREER GUIDANCE PRACTICES

- Stepwise regression on student-related variables

Stage 2:
QUAL
College
Professionals

Focus Groups
March 2010

- Data on learning environment and orientation interventions

Stage 3:
QUAN

Analysis integrating quantitative outcomes (Stage 1) with qualitative data (Stage 2)

- Mixed procedure, multilevel analysis

tional assessment test (EDV-9s; Forner, 2010) into a questionnaire. For English-speaking students, the French questionnaire was translated, revised, and then validated by two bilingual experts in the field to achieve semantic equivalence. The EDV-9s is a high-quality psychometric instrument that incorporates scales of academic and career indecision, including the following ordinal data: (1) "I've decided on one single path/trade or profession"; (2) "I'm considering a path/trade or profession, but I haven't decided yet"; (3) "I'm considering various paths/trades or professions"; and (4) "I don't have any specific ideas." Six sub-scales measure sources of indecision: lack of self-knowledge ("I'd like to know more about what interests or appeals to me"); lack of readiness ("I'll worry about choosing a trade in a few years"); lack of method in decision-making ("There are several training paths that look equally interesting to me"); lack of information ("I don't have the information on academic requirements for those professions that interest me"); external barriers ("I had to abandon my plans because of the type of studies I had to do"); and dysfunctional beliefs ("I'm afraid I won't succeed in the studies I would like to pursue"). Each subscale including ordinal data contains eight items rated on a 4-point Likert-type scale (1 = *does not apply* to 4 = *definitely applies*).

Forner (2010) tested the validity of the EDV-9s using a group of high school seniors in France (n = 1152; M age = 15.6 years; girls = 60.5%). Six factors emerged from an exploratory factor analysis (EFA), supporting the factorial validity of the test. Internal consistency values of the EDV-9s, ranging from .66 to .87, were considered acceptable to satisfactory (Forner, 2010). Although the test appears to have adequate reliability and factorial validity, no confirmatory factor analysis (CFA) was performed. To address this lacuna, at the preliminary stage of our study we tested the EDV-9s using a French-Canadian student population. Internal consistency values for the six subscales ranged from .81 to .91 and were considered satisfactory (Field, 2005). Results of our CFA also showed Bentler & Bonett's NNFI (.98), the CFI (.98), and the RMSEA (.045; [.043–.047]) to be excellent (Picard, Frenette, Guay, & Labrosse, 2015).

Three categories of student-related independent variables were also embedded in our questionnaire (Table 1): sociodemographic characteristics (pretest), decision-making tasks performed in high school (pretest) and college (posttest), and events along educational pathways prior to (pretest) and during (posttest) the first college semester. The educational pathways variables are usually taken into account into longitudinal studies, such as the Youth in Transition Survey in Canada (Kamanzi et al., 2010).

Stage 1 (Quantitative): Procedure

During class time, students were informed of the study's purpose and received either a French or English version of the questionnaire and instructions. Those who agreed to participate were asked to fill out a consent form and the questionnaire; those who declined were free to leave. No compensation was offered for participation. Pretest data collection took place in August 2009, posttest data collection

Table 1.
Independent Variables

Explanatory Factor	Category	Variable
Student-related	Sociodemographic	Gender[a]
		Age[b]
		Parental education level: 1 = elementary; 2 = secondary; 3 = college; 4 = university; 5 = I don't know
	High school (HS) and college path	Interruption of studies[a]
		Repeating or dropping courses[a]
		Number of courses dropped: 1, 2, 3, 4 courses dropped; all of them
		Delays in obtaining a diploma: 1 = less than 1 year; 2 = 1 year ago; 3 = more than 1 year, less than 2; 4 = 2 to 5 years; 5 = more than 5 years; 6 = no HS diploma
		Type of study program in HS[a]: regular, specialized, vocational, individualized education path, adult education)
		Working while studying[a]
		Number of paid work hours during the college semester during the week/the week-end: 1 = less than 10 hours; 2 = 10–20 hours; no work during college semester
	Decision-making tasks taken in HS and college	Advice from a counselor[a]
		Advice from a teacher[a]
		Advice from a parent[a]
		Advice from a friend[a]
		Career information[a]
		Interest or capacity inventory[a]
		Employment internships[a]
		Number of decision-making tasks[b]
Learning environment	Clarity of objectives	Objectives: 1 = explicit; 2 = implicit; 3 = no mention
	Institutional size	Institutional size[b]
	Student-Faculty relationships	Intensity of relationship: 1 = strong; 2 = medium; 3 = low
		Follow-up sessions and/or evaluations during the semester[a]
	Friendship and student communities	"Mattering": 1 = strong; 2 = medium; 3 = low
		Homogeneous classroom groups[a]
		Full-time studies[a]
		Tutoring[a]
		Other[a]
	Student development programs and services	Collaboration between professionals and faculty: 1 = strong; 2 = medium; 3 = low

		SAI program coordinating committees[a]
		Professional support[a]
		Team-teaching[a]
		Educational counselors in the classroom[a]
		Guidance services tailored for SAI students[a]
Career guidance practices	Interventions	36 out of 41 qualitative variables listed in Appendix 1

[a]Dummy variable. [b]Continuous variable.

in December 2009. A follow-up of students absent at posttest was carried out in January 2010 using an online survey.

Stage 2 (Qualitative): Participants, Instruments, and Procedure

In the summer of 2009, 18 career counsellors, two professors, and one academic advisor from 21 Québec CÉGEPs were selected based on the geographical location (urban/rural), size, and language of instruction of their institution. In March 2010, these professionals took part in focus group sessions. The research director and the research assistant conducted the focus group sessions in four different regions of Québec. Following Leclerc, Bourassa, Picard, and Courcy's (2011) focus group method, the same three main questions were discussed in each group (Picard et al., 2013). They provided insight into the learning environment and career guidance practices, used in their respective institutions during the Fall 2009 semester, that they deemed relevant to the decision-making process of SAI students. The verbatim transcriptions of the focus group audio recordings provided the source of our qualitative data, which were then sorted by college. Qualitative data pertaining to learning environment were integrated into a matrix of classification, including the four qualitative key conditions of learning environment and their level of intensity (Miles & Huberman, 1994). Statements were derived from this matrix (e.g., low relationships between students and college staff). The career guidance practices were built according to the method of the *répertoire de pratiques professionnelles* developed by Paillé (2007). The *répertoire* is a list of professional practices, including their definition. The list of career guidance practices available to SAI students (Appendix A) and statements about the learning environment (Table 1) were independently reviewed by two experts.

Stage 3 (Integration of Qualitative and Quantitative Data): Analysis

Using our embedded design, we reformulated the qualitative data into quantitative data and integrated them into a quantitative database (Creswell & Plano Clark, 2011). The career guidance practices were converted into dummy variables (1 = *presence*; 0 = *absence*). Five practices (visits to resource centres, *Ateliers Cur-*

sus, individual or group guidance consultations, and exploration project courses) were excluded from the analysis, as no variation among colleges between two variables was found and a perfect multicollinearity was found between some of them. Statements about the learning environment were converted into dummy, categorical, or continuous variables (Table 1). Institutional size was sourced from government statistics.

To test our first and second hypotheses and measure the impact of the learning environment and targeted career guidance practices in SAIs on indecision, we performed a stepwise regression, effective in an exploratory approach when measuring a large number of independent variables (Darlington, 1990; Draper & Smith, 1981). As our conceptual framework defined indecision as the product of the interaction between student characteristics and the college environment that might impact SAI student scores on the EDV-9s test, it also required multilevel modelling, as it otherwise would have violated the fundamental assumption of the independence of observations (Hox, 2010). We therefore conceived our data hierarchically, with the improvement or deterioration in indecision scores over time (Level 1) nested within the college characteristics related to the learning environment and career guidance in SAIs (Level 2).

Our multilevel analysis integrated these levels of hierarchical data in the stepwise regression (Goldstein, 1986; Hox, 2010; Maas & Hox, 2005; Mason, Wong, & Entwistle, 1983; Nezlek, 2008). This was performed using the SAS MIXED procedure (Littell, Milliken, Stroup, & Wolfinger, 1996; Nezlek, 2008; Singer, 1998). At Level 1, we integrated the EDV-9s scores into the model, and adjusted for the difference between scores of every scale and subscale between posttest and pretest. These continuous scores ranged from -3 (deterioration, i.e., increasing indecision) to +3 (improvement, i.e., lessening indecision). Due to posttest attrition, only observations for respondents who participated at both pretest and posttest were used. In all, 351 observations collected from the SAI group were input into the model. At Level 2, stepwise regression models were used to test which conditions in the learning environment were likely to explain the variance in the trajectory of indecision over the first semester. The same procedure was applied to the career guidance practices.

For our third hypothesis, we used stepwise regression to measure the effect of student-related variables on the deterioration or improvement in EDV-9s test scores, inputting the independent variables into the model (Table 1). Analyses were performed for the SAI and comparison groups, as the student questionnaires had provided data for both. EDV-9s scores were adjusted using the same procedures as in Hypotheses 1 and 2.

For each hypothesis, parameters were set for the independent variables contributing to a statistically significant deterioration or improvement in the EDV-9s scores, and analyses were limited to those dependent variables measured by the EDV-9s determined to be statistically significant in a previous study (Picard, 2012). As a result, the subscale *lack of readiness* was excluded from the analyses. A level of statistical significance of .05 was applied throughout.

<div align="center">RESULTS</div>

From our analyses, it appears that by the end of the first semester, some of the conditions in the learning environment of SAIs are likely to make a difference in how well first-year college students overcome indecision and its sources (Table 2). Follow-up sessions and/or evaluations during the semester—a good indicator of student-faculty relationships—proved statistically significant in lessening academic indecision; conversely, a strong relationship between students and college staff appears to produce a deterioration in scores for this variable by the end of the first semester. Institutional size led to a significant deterioration in lack of self-knowledge, lack of method in decision-making, and external barriers (e.g., β indicating that increasing the student population by one could lead to a deterioration of .000049—over 10,000 students, this deterioration is estimated at 0.5).

Table 2
Stepwise Regression Multi-level Model, Impact of the Learning Environment on Indecision and Its Sources (EDV-9s), SAI Group

Variable	df	Global effect F	η^2	Regression parameters ß	SE	t
Academic Indecision						
Intercept				0.33	0.15	2.20*
1. Relationships between students and college staff (ref. = low)	2	7.37**	.04			
Strong				-0.60	0.18	-3.43**
2. Follow-up sessions and/ or evaluations during the semester (ref. = no)	1	4.91*	.01			
Yes				0.28	0.13	2.21*
Error	17					
Lack of Self-knowledge						
Intercept				0.35	0.09	3.93***
1. College size	1	5.69*	.02	-.000049	0.00	-2.39*
Error	19					
Lack of Method in Decision-making						
Intercept				0.22	0.09	2.45*
1. College size	1	4.68*	.01	-.000045	0.00	-2.16*
Error	19					
External Barriers						
Intercept				0.12	0.06	2.13*
1. College size	1	10.05**	.03	-.000044	0.00	-3.17**
Error	19					

*p < .05; **p < .01; ***p < .001

We also found that some career guidance practices in SAIs can also influence how well first-year college students overcome indecision and its sources (Table 3). Career courses and pre-enrollment activities and assessments of student needs appear to significantly lessen career indecision. However, support networks assisting students with their education or career plans and other interventions, such as career guidance week and open house, led to a significant deterioration in scores for academic and career indecision. Moreover, "other interventions" was associated with an increase in external barriers.

Table 3

Stepwise Regression Multi-level Model, Impact of Career Guidance Practices on Indecision and Its Sources (EDV-9s), SAI Group

Variable		Global effect		Regression parameters		
	df	*F*	η^2	ß	*SE*	*t*
Academic Indecision						
Intercept				0.39	0.08	4.70***
1. Support network (ref. = no)	1	6.72*	.02			
Yes				-0.30	0.12	-2.59*
2. Other interventions (ref. = no)	1	5.98*	.01			
Yes				-0.29	0.12	-2.45*
Error	18					
Career Indecision						
Intercept				0.19	0.09	2.18*
1. Support network (ref. = no)	1	20.49***	.05			
Yes				-0.57	0.13	-4.53***
2. Career courses (ref. = no)	1	12.02**	.03			
Yes				0.50	0.14	3.47**
3. Other interventions (ref. = no)	1	8.64**	.02			
Yes				-0.39	0.14	-2.94**
4. Pre-enrollment activities and assessment of decision-making needs (ref. = no)	1	6.29*	.01			
Yes				0.41	0.16	2.51*
Error	16					
External Barriers						
Intercept				0.00	0.03	0.11*
1. Other interventions (ref. = no)	1	4.39*	.01			
Yes				-0.12	0.06	-2.09*
Error	19					

*p < .05; **p < .01; ***p < .001

For their part, the student-related independent variables were found to influence the trajectory of indecision by the end of the first semester in many ways (Appendix B).

ACADEMIC INDECISION

Having discussed academic plans with parents during high school or dropping three courses in college significantly lessened academic indecision in the SAI group; however, dropping four courses in college led to a deterioration in scores, with 5% variance observed. For the comparison group, dropping courses during college and being male produced a statistically significant improvement in scores (3% variance).

CAREER INDECISION

In the SAI group, reading information about careers in college and having repeated a course in high school significantly lessened career indecision, while consulting an educational counsellor in college or having enrolled in a regular high school program produced a significant deterioration in indecision scores (6% variance). In the comparison group, men fared better in their scores (LSM_1 = -0.24) than women (LSM_2 = -0.46) [$\beta = LSM_1 - LSM_2$]. Although working during the semester showed a significant improvement in scores over time, working between 11–20 hours on weekends produced a significant deterioration. Having consulted a career advisor in high school also led to a deterioration in indecision scores (LSM_1 = -0.24), albeit to a lesser degree than not having done so (LSM_2 = -0.45); these differences are statistically significant (6% variance).

LACK OF SELF-KNOWLEDGE

Gender as well as educational pathways and decision-making tasks might account for the 11% variance observed in the SAI group for this variable. Having taken an interest or aptitude test in high school, having enrolled in a specialized (e.g., International Baccalaureate, Sports-Study program) or vocational program in high school, and having obtained a high school diploma 1–2 years prior to entering college were all predictors of significant improvement. Women scored higher (LSM_2 = 0.80) than men (LSM_1 = 0.60), a statistically significant difference. For the comparison group, having met a representative from a chosen field of work while in high school led to a significant improvement (1% variance).

LACK OF METHOD IN DECISION-MAKING

For the SAI group, having added decision-making tasks during high school or having obtained a high school diploma 1–2 years prior to entering college significantly improved scores in this variable. Conversely, consulting an educational counsellor in college resulted in a significant deterioration (7% variance). For the comparison group, working during the semester as well as not working on weekends led to an improvement. A number of independent variables produced a statistically significant deterioration in scores over time for this group, albeit to a

lesser degree than the reference value: dropping courses in college (LSM_1 = -0.29; compared to LSM_2 = -0.53 if no course was dropped), having obtained a high school diploma more than two years and less than five prior to entering college (LSM_1 = -0.15; compared to LSM_2 = -0.56 if obtained less than one year prior), and having consulted a career advisor in high school (LSM_1 = -0.33; compared to LSM_2 = -0.50 if not having done so). Students whose mothers had a high school education also had a more pronounced deterioration in scores than those whose mothers had a university degree. These variables might explain the 14% variance observed for the comparison group.

LACK OF INFORMATION

Consulting a career advisor or reading career information in college significantly improved scores in the SAI group (4% variance). For the comparison group, having discussed career plans with parents (LSM_1 = -0.15) produced a deterioration in scores, although to a lesser degree than those who had not (LSM_2 = -0.35), a statistically significant difference. Having discussed career plans with a teacher in high school led to a statistically significant deterioration as well (4% variance).

EXTERNAL BARRIERS

Having enrolled in adult education in high school produced a statistically significant deterioration for the SAI group, yet interrupting studies significantly improved scores for this variable (3% variance). For the comparison group, having obtained a high school diploma one year prior to entering college significantly improved scores; however, having repeated courses during high school, participating in an organized tour of a workplace, or consulting a career advisor while in college led to a significant deterioration over time (8% variance).

DYSFUNCTIONAL BELIEFS

Among SAI students, having attended a career presentation prior to college, meeting with a representative from a chosen field of work while in college, or having interrupted studies in high school significantly mitigated dysfunctional beliefs (5% variance). In the comparison group, having added decision-making tasks while in high school significantly improved scores in this variable, and could possibly explain the 2% variance observed.

DISCUSSION

Using an embedded design to integrate qualitative and quantitative data provided us with a complementary methodology to draw meaningful conclusions on the impact and limitations of independent variables on the trajectory of indecision among first-year college students, and illustrates an application of MM in the field of career development in the bargain.

The multilevel regression analysis revealed that two of five key conditions found in the learning environment of SAIs yielded significant statistical trends, and par-

tially validated our first hypothesis: Follow-up meetings and/or evaluations during the semester were found to lessen academic indecision among SAI students. Also, the larger the college population, the more likely these students are to manifest a proportional deterioration in the lack of self-knowledge subscale, in the lack of method in the decision-making subscale, and in external barriers. This might be explained by shrinking opportunities in larger environments for students to explore curricular and extracurricular activities, thus multiplying these sources of indecision (Chickering & Reisser, 1993; Pascarella & Terenzini, 2005). These findings highlight the challenges college staff face in larger institutions.

Only two career guidance practices captured at the qualitative stage were found to have a positive effect on career indecision: career courses and pre-enrollment activities and assessment of student needs. These findings are consistent with extant literature confirming the benefit of career courses in lessening indecision in higher education (Folsom & Reardon, 2003; Whiston et al., 1998). Although providing little support for our second hypothesis, the quantitative data collected clearly demonstrate both the effectiveness and the limitations of targeted career guidance practices. In the SAI group, for example, consulting a career advisor in college is associated with improving lack of information. Although guidance consultations were excluded from our multilevel stepwise regression (as all the colleges offered individual or group guidance to SAI students), we relied on decision-making tasks reported by students in the repeated measures study. These quantitative data complemented the multilevel analysis, which was derived mostly from qualitative data on characteristics of the college environment.

We also sought to measure the effect of two categories of student-related independent variables on indecision and its sources: sociodemographic characteristics and educational pathways prior to and during the first college semester. The outcomes indeed support our third hypothesis: Our data revealed that both gender and socioeconomic status play a particular role in indecision. While very few studies on indecision have found statistically significant differences based on gender (Forner, 2001; Guay et al., 2003), our study demonstrated that women in the SAI group showed an improvement in lack of self-knowledge, men in the comparison group an improvement in academic indecision. Also in the comparison group, students whose mothers had a high school education had a deterioration in lack of method in decision-making, a finding that corroborates literature on the strong link between lower parental education levels and limited access to higher education (Finnie & Mueller, 2008; Kamanzi et al., 2010). These results provide evidence for the importance of including sociodemographic characteristics in career counselling.

In the SAI group, the type of high school program was clearly influential, as adult education (typically associated with academic failure and/or dropping out) increased external barriers, while specialized or vocational programs (which offer students more opportunity to explore self-representation and identity) lessened lack of self-knowledge. These findings support the argument that a varied curriculum is pivotal to developing purpose, and effectively broadened the scope of

our first hypothesis to include a sixth key condition. Overall these results provide an invaluable tool kit for college professionals to tailor guidance strategies to support at-risk first-year college students.

Although required by our conceptual framework, the use of multilevel modelling led to limiting the results. Nezlek (2008) recommends tightly building a multilevel model and selecting variables that have explanatory power rather than using a larger model with many variables. Sample size is also an issue in multilevel modelling, particularly at the highest level of the model (Maas & Hox, 2005); in our study we sampled 21 of the 48 CÉGEPs in the Québec college network. This is a small sample and population for a multilevel model that may have affected the estimation of the standard error. On the qualitative side, the data collection was limited to the SAI group, as these professionals could not provide comparable data on technical [career] or preuniversity programs. Nevertheless, our findings on the significant variables can be used as a launching pad for further research.

CONCLUSION

The relevance of the article is twofold, as it (a) illustrates the meaningful use of MM research in the career development field, and (b) contributes to the extant literature on MM research in the field. The career development field is largely based on a traditional psychometric approach that "emphasizes quantitatively measuring attitudinal constructs in career development" (Perry, 2009, p. 116). While MM can be a useful technique for the field of career development, the "prevalence rate" of MM research in extant literature in this field is low. The prevalence rate is an indicator of the "degree of awareness that researchers in different disciplines have of the utility of MM research and how it can be used to uniquely answer certain types of questions in their areas of study" (Alise & Teddlie, 2010, p. 104). Indeed, Cameron (2010) noted that MM is represented in only 6% of published empirical studies on career development.

Our study fills this gap and illustrates why, how, and when an embedded design can be a useful research method in the field of career development. From the outset, we chose a conceptual framework that would enable us to consider the institutional context (Bryman, 2006; Greene et al., 1989), a set of variables often overlooked in this area of research. This conceptual framework—which embedded qualitative data on characteristics of the learning environment in a college transition program into a quantitative repeated measures study on student indecision or *purpose*—demanded an MM approach, and offered us the opportunity to place our study within a comprehensive conceptual framework, thus bolstering the credibility of the data and expanding the body of research on indecision. We formulated the goal, objectives, research questions, and hypotheses for our study with an MM design in mind. Data collection in Stages 1 and 2 adhered to quantitative (high-quality psychometric instrument) and qualitative (focus group) guidelines, and multilevel modelling in Stage 3 permitted integrating the qualitative and quantitative data. The resulting empirical evidence, despite some limitations,

provides a relevant example of how MM research can expand the production of knowledge in the field alongside other scientific works using MM (e.g., Perdrix, Stauffer, Masdonati, Massoudi, & Rossier, 2012; Perry, 2009).

Despite being secondary in terms of methodological priority, qualitative data was intentionally designed to be an integral component of our multilevel model, and was crucial in testing Chickering & Reisser's (1993) systematic framework. In fact, with the exception of institutional size, the college characteristics input into the second level of our model were all based on qualitative data. Without the integration of these data, the multilevel model would likely have introduced serious flaws in testing our hypotheses. Ultimately, in our analyses, qualitative and quantitative data reciprocally complemented each other, and led us to new empirical evidence on factors that might explain the short-term effectiveness of the SAI program.

Our study also enriches our current knowledge of multilevel modelling. Researchers conducting studies in educational institutions often struggle with the interdependence of data sourced from students in a given institution, classroom, student group, and so on (Hox, 2010), as such scenarios violate the fundamental assumption of the independence of observations in quantitative analysis. By showing how an embedded design can meaningfully integrate quantitative data collected by psychometric tests and qualitative data describing characteristics at the educational level (the highest level of hierarchical data), our study demonstrates how MM design can help methodologists avoid this conundrum and enhance multilevel modelling in the process.

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