Motivations Underlying Career Decision-Making Activities: The Career Decision-Making Autonomy Scale (CDMAS)

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Abstract

The purpose of the present research was to develop and validate a measure of motivation toward career decision-making activities, the Career Decision-Making Autonomy Scale (CDMAS). The CDMAS is designed to assess the constructs of intrinsic motivation, identified regulation, introjected regulation, and external regulation. A longitudinal study was used to develop and validate the CDMAS. Overall, results show that the CDMAS is composed of four internally consistent factors. The construct validity of the scale is also supported by (a) a quasi-simplex pattern of correlations, (b) correlations with personality variables and vocational constructs, and (c) convergent and divergent correlations. In sum, the CDMAS represents a valid self-report measure of intrinsic motivation, identified regulation, introjected regulation, and external regulation toward career decision-making activities.

Career exploration has been the focus of much research during the past few decades, and it is recognized as an important factor influencing individuals' career decision making (Blustein, 1992). According to Blustein, Prezioso, and Schultheiss (1995), career exploration is defined as a process wherein individuals seek out information not only about themselves but also about educational and career options in order to progress in career decision making. Although various individual factors such as self-efficacy, ego identity, and neuroticism have been linked to the career decision-making process, less attention has been devoted to the motivations underlying career decision making.[1] Yet numerous studies have shown that many behaviors including persistence, concentration, creativity, and performance can be predicted and explained by underlying motivations (Vallerand, 1997). Thus it becomes crucial to study these motivations to better understand the career decision-making process. Indeed, it is possible that children's progress in career decision making would be facilitated by internal sources of motivation. For example, students who are seeking information on professions out of choice and pleasure may progress more effectively through the career decision-making and commitment processes.

[1] One may argue that self-motivation (autonomy) and the decision-making process is one of the most frequently studied correlations in vocational research if one includes locus of control and independence as indicators of autonomy. However, the type of self-motivation studied here is quite different from these two constructs. First, autonomy as conceptualized in this study should not be equated with an internal locus of control. That is, as pointed out by Deci and Ryan (1985), it may be possible for an individual to experience a contingency between his or her actions and outcomes without feeling autonomous. For example, students may know that studying hard for an exam will lead to good grades (internal locus of control), but they may perform this activity for nonautonomous reasons (obtaining a reward or reducing anxiety and guilt). Second, according to Self-Determination Theory, independence should not be equated with autonomy. Independence as defined as lack of reliance on others is different from the sense of volition defined by autonomy. That is, a person can be dependent in a relationship yet not necessarily experience lack of autonomy. For example, adolescents who are still dependent on their parents may want to experience a sense of volition or autonomy by choosing their career options themselves rather than having the feeling of being controlled by their parents.

A potentially useful theoretical framework for understanding these motivations is Self-Determination Theory (SDT; Deci & Ryan, 1985). Specifically, this theory focuses not only on the intensity of the motivational process but also on the quality of such a process. As we shall see later, this distinction may be quite useful in predicting outcomes related to career decision making such as career indecision. The purpose of this article is to present the development and validation of a measure of motivations underlying career decision-making activities, namely the Career Decision-Making Autonomy Scale (CDMAS).

SDT is an approach to human motivation that highlights the importance of three fundamental psychological needs, namely autonomy, competence, and relatedness, to understanding optimal functioning. These three basic needs must be satisfied in order to experience a sense of well-being. The need for relatedness implies that individuals seek positive and significant relationships with others. That is, students who feel connected to others when carrying out activities related to their career decision are fulfilling their need for relatedness. The need for competence implies that individuals seek to be effective in their interactions with the environment. Specifically, individuals need to experience perceptions of competence when performing an activity. For example, students who feel competent when they perform activities related to their career decision are fulfilling their need for competence. The need for autonomy implies that individuals strive to experience choice in the initiation, maintenance, and regulation of human behavior. For example, students who are carrying out career decision-making activities out of choice and pleasure are satisfying their need for autonomy. Most studies using this theoretical framework have measured the satisfaction of these psychological needs by the degree to which individuals perceived themselves as competent, related, and autonomous. Consequently, for the remainder of the text, I use the terms *perceived competence*, *perceived relatedness*, and *perceived autonomy* to refer to the fulfillment of these psychological needs.

In the present study, the development and validation of the CDMAS is based only on perceived autonomy. Indeed, there is no need to develop scales on perceived competence and relatedness, because well-established validated scales exist. For instance, perceived competence can be assessed via the Career Decision-Making Self-Efficacy Scale (Taylor & Betz, 1983) and perceived relatedness via the Perceived Relatedness Scale (Richer & Vallerand, 1995).

Perceived autonomy has been typically operationalized via motivational processes (Ryan & Connell, 1989). Deci and Ryan (1985) thus proposed that there are different types of motivation that are situated along a self-determination continuum. *Intrinsic motivation* reflects the highest degree of self-determination or autonomy. It refers to engaging in an activity for its own sake and to experience the pleasure and satisfaction derived from participation. *Extrinsic motivation* refers to engaging in an activity as a means to an end rather than for its intrinsic qualities. However, in contrast to some theoretical perspectives, SDT posits that extrinsic motivation can vary greatly in terms of self-determination. Indeed, this theory proposes that different types of extrinsic motivation exist, some of which may represent relatively high levels of self-determination.

From low to high levels of autonomy, the different types of extrinsic motivation are external regulation, introjected regulation, and identified regulation. *External regulation* refers to behaviors that are regulated through external means such as rewards and constraints. *Introjected regulation* refers to behaviors that are in part internalized by the person. However, this form of internalization is still not self-determined because it is limited to the internalization of external control sources.

For example, individuals can act in order to rid themselves of their guilt, to lessen their anxiety, or else to maintain a positive image of themselves. *Identified regulation* refers to behaviors that are performed by choice because the individual judges them to be important. For example, a student who does not like college may have decided to go to college because he or she feels that a college diploma is important to enter the job market in a field that he or she likes. According to SDT, individuals who are acting for intrinsic motivation and identified regulation are satisfying their need for autonomy. In contrast, individuals who are performing activities for introjected or external regulations are not satisfying their need for autonomy.

These various types of motivation are quite important to understanding the quality of the motivational process and the consequences related to such a process. For example, two students may spend the same amount of time and energy regarding their career decision-making process and thus may both appear to be highly motivated. However, the first one is motivated by introjected reasons (avoiding anxiety and guilt) whereas the second one is motivated by identified reasons (a conscious valuing of the activity). According to SDT, the first student is more prone to experience difficulties in the career decision-making process, whereas the second one would experience greater enjoyment and satisfaction.

Much research during the past 25 years has revealed that these various forms of motivation can explain and predict human behaviors including school achievement, persistence, and creativity (see Vallerand, 1997, for a literature review). For instance, some studies have shown that the more students act for self-determined motivations (intrinsic and identified), the higher are their school grades (Guay & Vallerand, 1997) and the more persistent they are (Vallerand, Fortier, & Guay, 1997).

The present study had three goals. The first goal was to develop items assessing intrinsic motivation, identified regulation, introjected regulation, and external regulation. The second goal was to verify the four-factor structure of the CDMAS, using confirmatory factor analysis, as well as to assess the invariance of the scale across gender. In addition, the reliability of the subscales is evaluated. The third goal consisted of examining the construct validity of the CDMAS. To this end I performed three types of analyses.

First, evidence of the construct validity will be presented using a quasi-simplex pattern of correlations among the four subscales. This pattern is based on the self-determination continuum described previously. More precisely, the interrelations among subscales were expected to form an ordered pattern in which the adjacent subscales along the self-determination continuum would correlate more positively than those that are more distant from each other. For example, I expected that identified regulation and intrinsic motivation would be positively correlated, whereas intrinsic motivation and external regulation would be negatively correlated.

econd, the construct validity of the scale was assessed through correlations between the CDMAS subscales and career indecision and various constructs related to career indecision such as neuroticism, self-esteem, career decision-making self-efficacy, and the quality of relationships with friends and parents. Career indecision has been one of the major concerns of vocational research during the past decades, and some studies have shown that neuroticism (Chartrand, Rose, Elliott, Marmarosh, & Caldwell, 1993) is positively related to career indecision, whereas self-efficacy beliefs (Betz & Luzzo, 1996), the quality of relationships with parents and friends

(Blustein et al., 1995; Felsman & Blustein, 1999), and self-esteem (Santos, 2001) are negatively related to career indecision. Thus, we should observe some relations between these predictors of career indecision and the subscales of the CDMAS as well as between the CDMAS and career indecision. In addition, because self-determination is associated with enhanced psychological functioning, I expected that intrinsic motivation and identified regulation would be negatively correlated with neuroticism and career indecision but positively correlated with self-esteem, career decision-making self-efficacy, and the quality of relationships with friends and parents. On the other hand, I posited that introjected and external regulation would be positively correlated with neuroticism and career indecision but negatively correlated with self-esteem, career decision-making self-efficacy, and the quality of relationships with friends and parents.

Third, I assessed the convergent-divergent validity of the scale based on the approaches used by Campbell and Fiske (1959) and Marsh and Grayson (1995). Campbell and Fiske (1959) proposed a multitrait-multimethod (MTMM) design in which two or more traits are each measured using two or more methods. In the present study, the multiple traits are the four subscales of the CDMAS, and the multiple methods are three measurement times with a 1-year interval between each time. Although the use of multiple occasions as multiple methods is less usual in studies using the MTMM matrix than multiple sources of evaluation, Campbell and Fiske allude to this possibility in their work. Indeed, the term multiple methods was used very broadly by these authors and includes not only different sources of information but also multiple occasions. Even Campbell himself (Campbell & O'Connell, 1967; 1982) considered multiple occasions as multiple methods in later publications. In addition, the work of Marsh and his colleagues has shown that multiple occasions could be used as multiple methods (Marsh & Butler, 1984; Marsh & Hocevar, 1988). However, it is rather clear that the interpretation of the MTMM matrix depends on the method used. Thus convergence validities based on multiple occasions represent test-retest reliabilities clearly. Nonetheless, the MTMM approach used here provides a much richer framework for evaluating test-retest reliabilities than the simple presentation of test-retest correlations.

Campbell and Fiske (1959) proposed four guidelines to assess construct validity with the MTMM matrix. First, convergent validity occurs when the correlation between two different methods assessing the same trait is high and significant. Second, divergent validity occurs when correlations between two traits assessed by a different method are lower than convergent correlations. Third, a method effect exists when correlations between traits of the same method are higher than convergent correlations. Fourth, the pattern of correlations among different traits should be similar for different methods. In sum, construct validity is supported when (a) convergent correlations are high, (b) divergent correlations are lower than convergent correlations, (c) the method effect is low, and (d) the pattern of correlations among different traits is similar for different methods.

Marsh and Grayson (1995) suggested that the Campbell and Fiske (1959) approach could be complemented by testing the MTMM matrix with confirmatory factor analysis (CFA). Indeed, the MTMM matrix could be factor-analyzed easily to make inferences about convergent validity, divergent validity, and method effect. Marsh and Grayson (1995) highlighted some methodological guidelines to efficiently test the MTMM matrix with CFA. They recommended a minimum of four traits and three methods and more than 250 participants. In the present study, I use four traits and three methods with approximately 220 participants, which is not too far from the optimal number of participants (N = 250). In addition, I test two CFA models. The first model

(CT) posits correlations among traits but no method effects, whereas the second model (CTCU) proposes correlations among traits and methods (see Figure 1). The correlations among methods in the CTCU are estimated via correlated errors or uniquenesses. In the present study, I expected that traits would be correlated (see above) and consequently I posited that the CTCU model would offer the best representation of the MTMM matrix. In addition, I expected that (a) trait factor loadings would be large, (b) the trait factor correlations would be small to moderate, and (c) method effects as evidenced by correlated uniquenesses would be small to moderate.

METHOD

Scale Development

The scale was developed by a committee of experts (i.e., graduate students and professors).[2] First, they were asked to generate activities in line with career decision making. The committee selected 8 activities out of 14 related to career decision making. Six activities were deleted not only because they were less relevant to the career decision-making process but also to reduce the scale length. The 8 activities were (a) seeking information on careers, (b) seeking information on school programs, (c) identifying options for a school program or a career, (d) working hard to attain a career goal, (e) identifying career options in line with a career goal, (f) identifying steps to follow to complete a school program, (g) identifying what one values the most in a career option, and (h) identifying a career option that is congruent with one's interest and personality. Second, they were asked to generate items in line with the conceptual definition of intrinsic motivation, identified regulation, introjected regulation, and external regulation and to word them so as to indicate the underlying reasons for participating in each of the career decision-making activities. This formulation is in line with the conceptual definition of motivation (Deci & Ryan, 1985), which focuses on the "why of behavior." Thus, with respect to the CDMAS, respondents are instructed as follows: "Here is a list of activities one can carry out with respect to an eventual career choice. Indicate the extent to which you are carrying out, or would carry out, these activities for each of the reasons listed below." The committee decided to not generate new items but rather to adapt the following four items from Sheldon and Elliot (1998) to career decision-making activities: (a) for the pleasure of doing it (intrinsic motivation), (b) because I believe that this activity is important (identified regulation), (c) because I would feel guilty and anxious if I did not perform this activity (introjected regulation), and (d) because somebody else wants me to do it or because I would get something from somebody if I did it—rewards, praise, approval from it (external regulation). Finally, to be consistent with previous motivational scale studies (Vallerand, Blais, Briere, & Pelletier, 1989), the committee decided to use a 7-point Likert-type scale (1 = *does not correspond at all* to 7 = *corresponds completely*).

Procedure and Participants

In September 2000 (Time 1), 2,300 participants were contacted in their college classroom and asked to complete a questionnaire at home. It was not possible to administer the questionnaire during school time because the questionnaire takes approximately 60 min to complete. A research assistant explained that the purpose of the study was to gain knowledge about college students'

[2] Graduate students were considered as experts because they have more than 3 years of experience in self-determination research.

experiences. The questionnaire was distributed along with a stamped envelope addressed to the university. In addition, participants completed a form on which they indicated their name and telephone number. They then returned this form to the research assistant. This form was used to call participants who had not returned their questionnaire and ask them to do so. A total of 834 participants returned their questionnaire, giving a response rate of 36%. This response rate was similar to those of previous studies (e.g., Guay, Vallerand, & Blanchard, 2000). The 834 participants included 236 men, 581 women, and 17 without gender identification. Participants' mean age was 18 years, and 97% of them were born in the province of Quebec, Canada. A total of 29% of the participants' parents were divorced. The mean family income was between C$30,000 and C$40,000. In September 2001 (Time 2), a questionnaire was sent to these 834 participants. A total of 380 participants returned their questionnaire, giving a response rate of 46%. In September 2003 (Time 3), the same questionnaire was sent to the 834 participants. A total of 325 participants returned their questionnaire, giving a response rate of 39%.

Measures

The Career Decision Scale (CDS). The CDS (Osipow, 1987) has been translated into French by Martin, Sabourin, Laplante, and Coallier (1991) and assesses the extent and nature of career indecision. This scale contains 18 items that assess certainty (Items 1 and 2) and indecision (Items 3-18). Responses are made on a 4-point continuum ranging from *like me* (1) to *not like me* (4). Higher scores on the first 2 items indicate career certainty, whereas higher scores on the remaining 16 items indicate degrees of career indecision. In the present study, I used the Indecision scale. The Cronbach's alpha values for this scale ranged from .90 to .92 for the three measurement times.

The Career Decision-Making Self-Efficacy Scale (CDMSE). This scale was developed by Taylor and Betz (1983). I used the short form of this scale (Betz, Klein, & Taylor, 1996), which was translated into French for the purpose of the present study. The short form consists of 25 items that measure an individual's degree of belief that he or she can successfully complete the tasks necessary to make career decisions. These 25 items assessed the five career choice competencies postulated by Crites (1978), namely (a) accurate self-appraisal, (b) gathering occupational information, (c) goal selection, (d) making plans for the future, and (e) problem solving. Items were rated on a five-level confidence continuum, ranging from 1 (*no confidence at all*) to 5 (*complete confidence*). The Cronbach's alpha values for this scale ranged from .92 to .94 for the three measurement times.

Neuroticism. This construct was measured via a scale that assesses four indicators of mental health, namely depression, anxiety, irritability, and paranoid ideations. In a recent study conducted by Guay, Larose, Boivin, and Sabourin (2001), a correlation of .71 was found between this mental health measure and the Neuroticism subscale of the Revised NEO Personality Inventory (Costa & McCrea, 1992), thereby indicating that this measure of mental health assesses conceptual properties of the neuroticism construct. Each item assesses the frequency of a psychological symptom on a 4-point Likert-type scale ranging from *not at all* (1) to *often* (4). The Depression, Anxiety, and Irritability subscales are abridged versions of the Psychiatric Symptoms Index subscales (Ilfeld, 1976). These subscales were adapted and validated in French by Villeneuve, Valois, Frenette, and Sévigny (1996). The first subscale assesses anxiety (6 items), whereas the second subscale assesses irritability (4 items). The third subscale assesses depression (10 items). The fourth subscale is an abridged version of the Paranoid Ideations subscale from the Symptoms

Checklist 90 (6 items) (Derogatis & Melisaratos, 1983). The Cronbach's alpha values for these subscales ranged from .66 to .82 for the three measurement times. Correlations among subscales ranged from .47 to .74 across the three measurement times. The four subscales were added together to form a global score of neuroticism.

Trait self-esteem. The Rosenberg Self-Esteem Scale was used to assess the trait of self-esteem (Rosenberg, 1965) and was translated into French by Vallières and Vallerand (1990). This scale is made up of 10 items and assesses participants' feelings of global personal value. The following is an example of the items contained in the scale: "I would like to have more respect for myself"—reverse scoring. Items were rated on a 4-point Likert-type scale. The Cronbach's alpha values for this scale ranged from .88 to .89 for the three measurement times.

Relatedness with parents and friends. These two constructs were assessed via the French version of the Perceived Relatedness Scale (Richer & Vallerand, 1995). This scale is made up of 10 items that are rated on a 7-point Likert-type scale. Each of these 10 items was answered in reference to relationships with friends and parents (e.g., "I feel accepted by my parents-friends"). The Cronbach's alpha value for these two scales was .96 for the three measurement times.

Statistical Analyses

To test the CFA models, I used structural equation modeling analyses (see Byrne, 1995, for more details on this statistical technique). I used a CFA instead of exploratory factor analysis (EFA) because I wished to test particular linkages between the observed variables and their underlying latent factors. Indeed, based on SDT and research by Sheldon and Elliot (1998) I had a fairly clear idea about which items would load on the four underlying factors. Thus, the factor analysis used here is employed to confirm an expected factor structure rather than to determine an unknown factor structure. In addition, Byrne (1995) argued that the use of CFA is clearly suitable in a context where the researcher has a priori knowledge from a theory. In contrast, EFA is designed for situations where the researchers do not know (a) a number of factors of a given set of variables and (b) which variables are good indicators of various factors (Bentler & Wu, 1995), which is not the case in the present study.

Goodness-of-fit. The adequacy of the models tested in the present study was assessed by structural equation modeling (SEM) with the EQS program (version 5.1) (Bentler, 1993). Models were all tested with standardized coefficients obtained from the maximum likelihood method of estimation. To ascertain the model fit, I emphasized the comparative fit index (CFI), the non-normed fit index (NNFI) (also known as the Tucker-Lewis Index), the root mean square error of approximation (RMSEA), and the chi-square test statistic. A nonsignificant chi-square indicates that the model is an adequate representation of the sample data. However, because the chi-square test may not be good enough to reflect model adequacy (see Hu & Bentler, 1995, for more details), I also used the CFI, the NNFI, and the RMSEA. The NNFI and CFI usually vary along a 0 to 1 continuum (although the NNFI could be greater than 1 because of sampling, this is rarely the case in practice) in which values greater than .90 and .95 are typically taken to reflect acceptable and excellent fits to the data (Schumacker & Lomax, 1996). Browne and Cudeck (1993; also see Jöreskog & Sörbom, 1993) suggested that RMSEAs less than 0.05 are indicative of a "close fit" and that values up to 0.08 represent reasonable errors of approximation. The CFI contains no penalty for a lack of parsimony so that the addition of new parameters leads to an improved fit that

may reflect capitalization on chance, whereas the NNFI and RMSEA contain a penalty for a lack of parsimony.

Tests of invariance across gender. To evaluate gender differences in the CFA solution, I computed separate covariance matrixes for men and women. When there are parallel data from more than one group, it is possible to test the invariance of the solution by requiring any one, any set, or all parameter estimates to be the same in the two groups. The minimal condition of factorial invariance is the invariance of the factor loadings. Thus separate tests were conducted to test the invariance of the factor loadings, factor variances, and factor correlations. However, uniquenesses were not constrained to equality because this test is considered to be excessively stringent (Byrne, 1995). Model comparison was facilitated by positing a nested ordering of models in which the parameter estimates for a more restrictive model are a proper subset of those in a more general model (Bentler, 1990).

RESULTS

Confirmatory Factor Analysis

A confirmatory factor analysis was performed on the CDMAS using Time 1 data because the sample size was sufficiently large at Time 1 to justify the use of this statistical technique. The means and standard deviation of each item are presented in Appendix 1. Results of the confirmatory factor analysis showed that the χ^2 was significant, χ^2 (458, n = 772) = 3,323.70, $p <$ .01, and the NNFI (.84) and the CFI (.86) were lower than the .90 cutoff value. In addition, the RMSEA (.09) was unsatisfactory. Inspection of the Lagrange multiplier test indicates that the estimation of three correlated uniquenesses would substantially improve fit indexes. These three correlated uniquenesses involved some items of intrinsic motivation, identified regulation, and external regulation subscales. Although in most applications of CFA analyses, a priori models assume that uniqueness associated with each measured variable is independent of uniqueness associated with other measured variables, I decided to freely estimate these correlated uniquenesses. I have done this because the CDMAS implies that the same items measuring intrinsic motivation, identified regulation, introjected regulation, and external regulation are completed for the eight activities. Thus, it is likely that the uniquenesses associated with the matching measured variables are correlated (a method halo effect). If there were substantial correlated uniquenesses that are not included in the model, then the model fit indexes would be attenuated. Results of a second model where these correlated uniquenesses were relaxed indicate fairly good fit indexes in that the CFI (.90), NNFI (.89), and RMSEA (.08) were relatively satisfactory. Appendix 1 presents the standardized solutions for the factor loadings and uniquenesses. All hypothesized factor loadings were substantial and significant (z values > 1.96).[3]

[3] To verify whether the solution found with a CFA is replicable while using a procedure where the analysis has not been instructed to look for a specific pattern, I have conducted an EFA. Results indicated four factors with eigenvalues greater than 1.5 and the total variance accounted for was 67%. In addition, each item loaded on its respective factor (factor loadings between .72 and .85) with no cross-loading more than .40.

Test of Invariance Across Gender

Based on samples of 213 men and 548 women (Time 1 data), the purpose of these analyses was to test for the equivalence of factor loadings, covariances, and variances across gender. In the least restrictive model (Model 1), no parameters were constrained to be equal across gender, and this model provided a relatively good fit to the data, $\chi^2(908, n = 761) = 3{,}346.40$, $p < .05$, CFI = .89, NNFI = .87, and RMSEA = .06. In Model 2, the factor loadings were constrained to be invariant across gender, and the fit, $\chi^2(936, n = 761) = 3{,}392.32$, $p < .05$, CFI = .88, NNFI = .87, RMSEA = .06, of this model did not differ significantly from that of Model 1 (i.e., the χ^2 difference test was nonsignificant). Hence, the factor loadings did not differ between genders. In Model 3, factor loadings, variances, and covariances were constrained to be equal. The fit of this model, χ^2 (946, $n = 761) = 3{,}431.19$, $p < .05$, CFI = .87, NNFI = .87, RMSEA = .06, did not significantly differ from that of Model 2, thereby indicating that variances and covariances were invariant across gender. Uniquenesses were not constrained to be invariant in those models because this test is considered to be excessively stringent (Byrne, 1995). In sum, these three CFA analyses revealed that the factor structure of the CDMAS is invariant across gender.

Internal Consistency of the Four Subscales

Internal consistency values were evaluated for the three measurement times. Internal consistency values ranged from .91 to .95 for the four subscales. Nunnally (1978) suggested that self-report scales with internal consistencies more than .70 are acceptable for research purposes. The CDMAS subscales meet this criterion.

Construct Validity

As mentioned above, the construct validity of the scale was assessed via three types of analyses. The first analysis revealed that most correlations among the four subscales for each measurement time represented a quasi-simplex pattern of relations (see correlations in bold in Table 1). That is, the overall pattern of interrelations among the subscales is made up of an ordered pattern in which the adjacent subscales along the self-determination continuum were more positively correlated than those that were more distant from each other. For example, at T1, intrinsic motivation correlated positively with identified regulation (r =.50) but negatively with external regulation (r = –.22). A similar pattern was found for each measurement time, thereby providing reasonable support for the replication of these findings over time. Yet one pattern of relations across the three measurement times does not support the quasi-simplex structure. Specifically, I expected that the negative correlation between intrinsic motivation and external regulation would be higher than the one between identified regulation and external regulation.

The second correlational analysis was performed between the CDMAS subscales and the following variables: neuroticism, self-esteem, career indecision, career decision-making self-efficacy, and relatedness with parents and peers. Correlations are presented in Table 2 for each measurement time. The magnitude of these correlations is low to moderate. For instance, at T1, it appears that individuals with high levels of intrinsic motivation and identified regulation have higher levels of career decision-making self-efficacy. In contrast, individuals with high levels of external regulation and introjected regulation have, for example, higher levels of career indecision. Thus, most correlations were in line with SDT predictions and the vocational literature. A similar

pattern was found for each measurement time, thereby providing reasonable support for the replication of these findings over time.

The third correlational analysis was performed to test the convergent and discriminant validity of the CDMAS using the MTMM matrix. In the present study, the multitraits were the four subscales of the CDMAS, whereas the multimethods were the three measurement times. The MTMM matrix is presented in Table 1. This matrix is divided into three components: (a) Correlations in bold represent relations among different traits assessed with the same method (heterotraits-monomethods, or HTMM), (b) correlations in italics represent relations among different traits evaluated with different methods (heterotrait-heteromethods, or HTHM), and (c) correlations in blocks represent the convergent validities (monotrait-heteromethods, or MTHM). To analyze this matrix, I applied the four guidelines proposed by Campbell and Fiske (1959) that were outlined in the introduction.

First, convergent validities were relatively high. The 12 correlations were significant and ranged from .36 to .55 (mean r = .43) thereby providing good support for this guideline. Second, convergent correlations were mostly higher than HTHM correlations in that the mean correlation for convergent correlations was .43, whereas for the HTHM correlations the mean was .17, thereby providing good support for the second criterion. Third, convergent correlations (mean r = .43) were mostly higher than HTMM correlations (mean = .29), thereby providing good support for the third guideline. Finally, the pattern of correlations among different traits was similar across the three methods. For example, the correlation between external regulation and introjected regulation was .49 in Method 1, .46 in Method 2, and .47 in Method 3.

As mentioned in the introduction, I performed CFA analyses to test the MTMM matrix more rigorously. I thus tested the CT model (see Figure 1). The fit of this model was quite poor, χ^2 (48, n = 217) = 289.725, p < .05, CFI = .73, NNFI = .63, RMSEA = .15. In contrast, the fit of the CTCU was excellent, χ^2 (30, n = 217 = 44.24, p < .05, CFI = .98, NNFI = .97, RMSEA = .05, and significantly higher than the CT model. One may argue that the high increase in fit indexes when correlated uniquenesses are taken into account is indicative of a serious method effect. I believe that it is not necessarily the case because, according to the self-determination continuum, it is expected that these four traits would be correlated. Results of the CFA-CTCU are presented in Tables 3 and 4. Results indicate that the factor loadings are substantial and that the trait factor correlations and correlated uniquenesses are small to moderate. Overall, results from the CFA-CTCU provide reasonable support for the construct validity of the CDMAS.

DISCUSSION

The purpose of the present longitudinal study was to develop and validate a measure of motivations underlying career decision activities, namely the Career Decision-Making Autonomy Scale (CDMAS). The present results provided very good support for the psychometric properties of the CDMAS. First, results from confirmatory factor analyses revealed that the CDMAS has a four-factor structure that reflects the theorized constructs of intrinsic motivation, identified regulation, introjected regulation, and external regulation. Second, the factor structure of the scale has been found to be invariant across gender. Third, as expected, internal consistency values for each subscale computed within the confines of three measurement times were satisfactory. Third,

the construct validity of the CDMAS was supported through the results of multiple analyses. More precisely, correlational analyses revealed a simplex-like pattern of relations among the CDMAS subscales as well as relations in line with the self-determination continuum between the CDMAS subscales and variables assessing neuroticism, career decision-making self-efficacy, self-esteem, career indecision, and relatedness with parents and peers. Construct validity of the CDMAS was also supported by an MTMM matrix. Specifically, correlations and CFA analyses indicate that (a) convergent correlations are relatively high, (b) convergent correlations are mostly higher than HTHM correlations, (c) convergent correlations are mostly higher than HTMM correlations, and (d) the pattern of correlations among different traits is similar across the three methods. The present findings lead to a number of implications for career counseling and development as well as directions for future research. These are detailed below. Finally, I also underscore some of the limitations of the present study.

The CDMAS could be used to better understand the career decision-making process including the nature of career indecision. For example, Guay, Senécal, Gauthier, and Fernet (2003) recently proposed and tested a motivational model of career indecision. Based on SDT, the model postulates that people would experience a high degree of indecision about their career options when they perceived themselves to be less self-efficacious and autonomous as regards career decision-making activities. Conversely, people would be likely to have a lower degree of career indecision when they perceived themselves to be self-efficacious and autonomous as regards career decision-making activities. The model also posits that parental and peer autonomy support promotes career decision-making self-efficacy and autonomy. That is, students' self-efficacy and autonomy perceptions would be supported by a positive interpersonal climate where parents and peers provide choices, feedback, and involvement. In contrast, self-efficacy and autonomy perceptions would be hampered by a climate where punitive techniques and negative feedback are used. Using the CDMAS to assess the autonomy construct, Guay et al. (2003) provided reasonable support for this model. Thus, the CDMAS could be used to answer various research questions from the stance of SDT to better understand the career exploration and career decision-making processes.

The CDMAS could be used in career counseling to verify the motivation of the client toward the career-counseling process. For instance, if the client has low levels of intrinsic motivation and identified regulation toward career decision-making activities, the school counsellor may try to foster self-determined motivations by acting in an autonomy-supportive way. This may be achieved by giving choices, acknowledging negative feelings, and providing feedback and involvement. Indeed, much research in the field of intrinsic motivation has provided reasonable support for the fact that a teacher or supervisor autonomy-supportive style is related to subordinate autonomous forms of motivation (intrinsic motivation and identified regulation). For instance, an experimental study conducted by Pelletier and Vallerand (1996) showed that an autonomy-supportive style of the supervisor was associated with the subordinate's level of intrinsic motivation. Regarding career counselling, it may be quite valuable to foster autonomous forms of motivation toward career decision-making activities because such types of motivation may produce a better career exploration and less career indecision (Guay et al., 2003).

Although the present results provide support for the psychometric properties of the CDMAS, at least seven limitations should be taken into consideration when interpreting these findings. First, some of the correlations with personality and vocational variables are quite low, such as the

relations between CDMAS subscales and neuroticism and self-esteem. Consequently, correlations below .20 may have limited practical implications. Although I expected higher correlations, these results are in line with the self-determination continuum and were replicated across three measurement times. Second, only a limited number of variables were used to assess the construct validity of the CDMAS. Thus, additional research on the construct validity of the CDMAS is needed. Third, the CDMAS does not assess the amotivation (lack of contingency between behavior and outcome) dimension posited by SDT. Future studies should verify if the inclusion of this subscale is necessary to further our understanding of career decision-making activities. Fourth, this study involved only college students. It could be quite useful to validate the scale with older and younger populations. Fifth, the response rate at each measurement time was relatively low, and thus one should be careful about the possibility that the results obtained on this restricted sample are not generalizable to the initial larger sample (n = 834). Sixth, one may argue that the test-retest reliabilities from the MTMM matrix are less than optimal. Although these reliabilities are not very high, one should keep in mind that these reliabilities stem from a 1-year interval or in some cases a 2-year interval. Seventh, it would be important to replicate results of the factor structure because I relaxed three correlated uniquenesses in the SEM analysis.

In sum, although additional research needs to be conducted on the CDMAS, the present research reveals that the scale has adequate psychometric properties and can prove quite useful in studying motivation toward career decision-making activities in a multidimensional fashion. I began by arguing that the critical question in motivational research is whether the quality of motivation is important to understand motivations underlying career decision-making activities. The answer to this question seems to be yes. More specifically, students who are acting out of choice and pleasure in their career decision-making activities seem to have a more positive experience than those who are acting out of guilt and for rewards.

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Figure 1. Confirmatory factor analysis of the multitrait-multimethod matrix with four traits and three methods with correlated traits (CT model) and correlated traits and correlated methods (CTCU model).

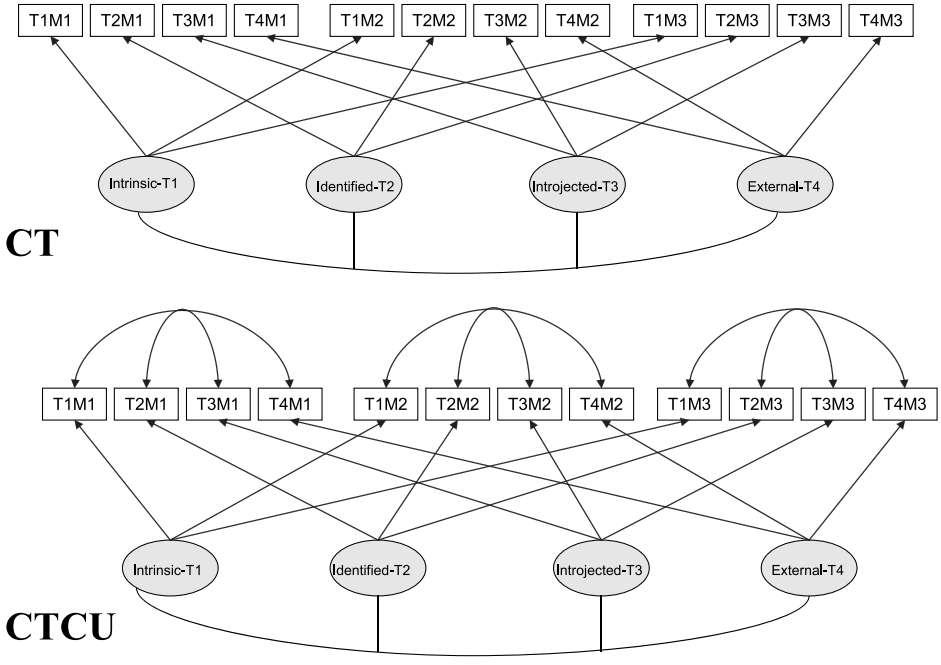

Table 1
The Multitraits-Multimethods Matrix (MTMM)

Measure	1	2	3	4	5	6	7	8	9	10	11	12
Time 1 (n = 843)												
1. External	—											
2. Introjected	**.49****	—										
3. Identified	**–.39****	**–.08***	—									
4. Intrinsic	**–.22****	**–.14****	**.50****	—								
Time 2 (n = 380)												
5. External	.38**	*.11**	*–.20***	*–.11**	—							
6. Introjected	*.20***	.38**	*.04*	*–.14***	**.46****	—						
7. Identified	*–.30***	*–.04*	.50**	*.32***	**–.31****	**–.05**	—					
8. Intrinsic	*–.14***	*–.11**	*.32***	.49**	**–.17****	**–.16****	**.52****	—				
Time 3 (n = 325)												
9. External	.36**	*.20***	*–.27***	*–.15***	.37**	*.23***	*–.26***	*–.20***	—			
10. Introjected	*.17***	.40**	*–.17***	*–.19***	*.17***	.49**	*–.11*	*–.33***	**.47****	—		
11. Identified	*–.16***	*.00*	.40**	*.30***	*–.11*	*–.02*	.40**	*.27***	**–.27****	**–.04**	—	
12. Intrinsic	*–.12**	*–.09*	*.27***	.44**	*–.07*	*–.09*	*.20***	.55**	**–.17****	**–.25****	**.58****	—

Note. Correlations in bold represent relations among different traits assessed with the same method (heterotraits-monomethods); correlations in italics represent relations among different traits evaluated with different methods (heterotrait-heteromethods); correlations in blocks represent the convergent validities (monotrait-heteromethods).
*$p < .05$. **$p < .01$.

Table 2
Correlations Among Career Decision-Making Autonomy Scale Subscales and Vocational Variables

Measures	External	Introjected	Identified	Intrinsic
Time 1 (n = 843)				
1. Neuroticism	.17**	.17**	–.13**	–.07*
2. Self-Esteem	–.19**	–.11**	.25**	.16**
3. Career Indecision	.28**	.28**	–.20**	–.17**
4. Career Decision-Making SE	–.28**	–.15**	.44**	.39**
5. Quality of relationships with P	–.15**	–.09*	.27**	.21**
6. Quality of relationships with F	–.15**	–.03	.30**	.19**
Time 2 (n = 380)				
1. Neuroticism	.14**	.23**	–.12*	–.19**
2. Self-Esteem	–.14**	–.22**	.27**	.30**
3. Career Indecision	.29**	.29**	–.26**	–.31**
4. Career Decision-Making SE	–.25**	–.20**	.45**	.43**
5. Quality of relationships with P	–.09	–.11*	.20**	.25**
6. Quality of relationships with F	–.14**	–.16**	.25**	.31**
Time 3 (n = 325)				
1. Neuroticism	.17**	.24**	–.07	–.09
2. Self-Esteem	–.28**	–.26**	.14*	.15*
3. Career Indecision	.30**	.32**	–.19**	–.21**
4. Career Decision-Making SE	–.20**	–.20**	.21**	.25**
5. Quality of relationships with P	–.16**	–.12*	.25**	.25**
6. Quality of relationships with F	–.13*	–.16**	.22**	.33**

Note. SE = self-efficacy; P = parents; F = friends. *p < .05. **p < .01.

Table 3
Results of the Confirmatory Factor Analysis-CTCU Model

Measure	Factor Loading	Uniqueness
Intrinsic motivation		
T1	.61	.80
T2	.86	.50
T3	.64	.77
Identified regulation		
T1	.68	.74
T2	.82	.58
T3	.56	.83
Introjected regulation		
T1	.55	.84
T2	.64	.77
T3	.76	.65
External regulation		
T1	.63	.78
T2	.59	.80
T3	.59	.81

Note. CTCU = correlated traits and correlated methods; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Table 4
Correlated Uniquenesses for the Confirmatory Factor Analysis-CTCU Model

Measure		1	2	3	4
Method 1 (T1)					
1.	Intrinsic motivation				
2.	Identified regulation	.45			
3	Introjected regulation	–.14	–.12		
4.	External regulation	–.16	–.35	.50	
Method 2 (T2)					
1.	Intrinsic motivation				
2.	Identified regulation	.23			
3	Introjected regulation	.06	.06		
4.	External regulation	–.07	–.08	.41	
Method 3 (T3)					
1.	Intrinsic motivation				
2.	Identified regulation	.59			
3	Introjected regulation	–.23	.08		
4.	External regulation	–.07	–.10	.45	

Note. CTCU = correlated traits and correlated methods; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Appendix 1

Means, Standard Deviations, Factor Loadings, and Uniquenesses for Each Item of the Career Decision-Making Autonomy Scale

Measure	*M*	*SD*	Loadings	Uniquenesses
Intrinsic motivation (Im)				
Im1	4.70	1.66	.73	.67
Im2	4.44	1.71	.79	.62
Im3	4.04	1.83	.77	.64
Im4	5.01	1.58	.75	.66
Im5	4.38	1.78	.84	.54
Im6	4.37	1.74	.87	.50
Im7	4.73	1.73	.85	.56
Im8	5.17	1.66	.78	.63
Identified regulation (Iden)				
Iden1	5.62	1.29	.73	.69
Iden2	5.63	1.33	.74	.67
Iden3	5.53	1.44	.74	.67
Iden4	6.12	1.16	.73	.68
Iden5	5.50	1.43	.78	.63
Iden6	5.64	1.40	.81	.59
Iden7	5.60	1.40	.78	.62
Iden8	6.12	1.18	.75	.66
Introjected regulation (Int)				
Int1	2.53	1.42	.72	.69
Int2	2.53	1.49	.73	.68
Int3	2.87	1.66	.75	.67
Int4	3.15	1.86	.78	.62
Int5	2.72	1.61	.83	.55
Int6	2.89	1.71	.88	.48
Int7	2.54	1.61	.85	.54
Int8	2.91	1.87	.81	.59
External regulation (Ext)				
Ext1	2.17	1.37	.74	.67
Ext2	2.08	1.31	.73	.68
Ext3	2.09	1.35	.79	.62
Ext4	2.05	1.47	.79	.62
Ext5	2.15	1.40	.84	.60
Ext6	2.10	1.42	.89	.46
Ext7	1.88	1.31	.88	.47
Ext8	1.89	1.38	.78	.60