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Career Adaptability and Career Construction as Mediating Variables Between Hardiness and Vocational Identity

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Abstract

Background: The Career Construction Theory (CCT) focuses on the active role people can play when they create and design their singular paths for career success. Unlike other career guidance theories that focus their attention on identifying vocational interests or on the fit between the person and the work settings, CCT raises the possibility that people can go beyond the determinants of their life. This study tested the adaptation model proposed by Career Construction Theory. Consolidation of vocational identity is particularly important at the university stage, in which people decide their first steps about their professional future.

Method: Participants were 1023 students from Spain and Brazil. The Spanish subsample was composed of 602 participants, 34% were men (N = 207), and 66% were women (N = 395). The average age was 21.69. The Brazilian subsample was composed by 421 participants, 39% were men (N = 165), and 61% were women (N = 256), with an average age of 24.84. The four dimensions in the model were each operationally defined by a single indicator. The Hardiness Scale represented adaptive readiness. The Career Adapt-Abilities Scale represented adaptability resources. The Student Career Construction Inventory represented adapting responses. And finally, The Vocational Identity Status Assessment represented the adaptation result.

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Results: Bivariate correlations obtained between the measures were as expected by the theoretical model. All variables were significantly related to each other, and the values of the correlations were positive and quite high in both the Spanish and Brazilian subsamples. Structural Equation Modeling analysis of data indicated that the relationship between hardiness and vocational identity was mediated by both career adaptability and career construction. The overall fit indices for confirmatory factor analysis (CFAs) and structural equation models (SEMs) showed that the multiple factor structure models did not fit the data as well as the second-order structure model for hardiness, career adaptability and career construction. The multiple factor solutions only provided a better adjustment compared to the second-order solution for vocational identity.

Conclusions: The analysis supported empirically the four-dimension model proposed by the Career Construction Theory. This major finding suggests new pathways to improve individual decision-making about work and career.

Keywords: Hardiness, Career Adaptabilities, Career Construction, Vocational Identity, Vocational Education and Training, VET

1 Introduction

Nowadays, people need to be resistant to the fluctuations of the labor market, flexible to adapt to the changes, and, at the same time, they need a clear vocational identity to knock on the right door when the possibility arises. The present study aims to provide empirical evidence for the usefulness of career adaptability as a mediator in the process of forging an appropriate vocational identity. Previous research has consistently shown the mediating role played by career adaptability; however, there are few empirical studies showing the four-step model at the core of the theory. For this reason, the main objective of this study is to test a theoretical model of the relations between the following variables: hardiness, career adaptability, career construction, and vocational identity. The procedure we used is outlined below in the theoretical proposal section.

1.1 Theoretical Model From Career Construction Theory

Currently, among the new theories of career development, one of the most promising and influential is, without a doubt, the Career Construction Theory (CCT; Savickas, 2013). This theory focuses on the active role people can play when they create and design their singular paths for career success. Unlike other career guidance theories that focus their attention on identifying vocational interests or on the fit between the person and the work settings, CCT

raises the possibility that people can go beyond the determinants of their life, among which we can find aspects of genetics, early experiences, and destiny. They can get rid of fate and the environmental conditioning that they have undergone and determine their behavior in the way predicted by early behaviorism theories.

Ultimately, this theory supports the idea that the best way to predict the future is to create it. This attitude may not work in all areas of life, especially in those where things do not depend utterly on us, such as relationships or family scenarios, but of course, in the professional field, this is more likely to be true because much of our success depends on ourselves.

A core argument of this theory puts forward four steps in the active process of career construction and adaptation process: Adaptive readiness, adaptability resources, adapting responses, and adaptation results. The first concept, *adaptive readiness*, is related to a sense of personal predisposition to face challenges and has a certain level of stability. The second concept, known as *adaptability resources*, is more specific than the previous one. It is related to the precise competencies people display to figure out new solutions and to get a specific level of performance. It is probably the core moment of the process, and it is branded by career adaptability. The next step is *career construction*, which is the following natural link in the chain of the career adaptation process emanating from career adaptability. It is related to specific adapting responses and can be defined as the 'performance of actual behaviors that address changing career conditions and making occupational choices' (Savickas et al., 2018, p. 139).

Finally, and because of the previous process, people can achieve the desired *results*, particularly in a career task, such as job performance, vocational identity, or engagement in different types of contexts.

Although this theory is well extended, has generated empirical research on career development, and is well adapted to changing environments, a critical point to this theory is that it misses the influence of socioeconomic factors and the proposals from the Theory of Work Adjustment (Dawis & Lofquist, 1984; Lofquist & Dawis, 1969), such as the congruence person-environment for example.

Within this four-step model, career adaptability is a central concept within CCT. Initially, it was defined by Savickas (1997) 'as the readiness to cope with the predictable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions' (p. 254). This definition stresses the proactive behavior that can allow people to prepare for and overcome the changes they can find along with their careers. Career adaptability has begotten a great number of studies, particularly concerning its assessment through the Career Adapt-Abilities Scale (CAAS; Savickas & Porfeli, 2012), which will be detailed below in the instruments section. Later on, a new definition was provided keeping and insisting on its dynamic and active character 'a psychosocial construct that denotes an individual's resources for coping with current and anticipated tasks, transitions, traumas in their occupational roles' (Savickas & Porfeli, 2012, p. 662).

In a meta-analysis which included 90 studies (Rudolph et al., 2017), career adaptability is related to different and relevant variables such as career exploration, career decision-making, well-being, and even job income. In this meta-analysis among the variables considered as adaptivity (adaptive readiness), we can find, among others, the following: Cognitive ability, Big Five Traits, and proactive personality. So, it seems appropriate to consider hardiness as a variable of this kind too. Hardiness has been chosen as the beginning of the process for this study and, as we will describe bellow, this ability allows people to face and tackle situations with a positive attitude. Besides, hardiness is also related to a proactive behavior, enhancing tolerance to change, and considering hurdles as an opportunity to display the appropriate skills and, eventually, grow as a person.

On the other side, in this same study, among the adaptation results, we can find the following variables: Career identity, calling, work performance, or engagement. Therefore, it seems reasonable to include vocational identity as a variable of the same style.

Career adaptability and career construction are well known variables within the CCT; their presence is justified enough in this study because of their mediating role in the adaptation process proposed by the theoretical model. Recent research has shown the mediating role of career adaptability between self-regulation and academic engagement (Merino-Tejedor et al., 2016), and the mediating role of career construction between trait emotional intelligence and vocational identity (Merino-Tejedor et al., 2024).

1.2 Hardiness as a Dispositional Variable

The concept of hardiness was initially created by Kobasa (1979), and later on developed by ongoing studies (Maddi, 2002; Maddi & Kobasa, 1984). Following these authors, this concept consists of three components: Control, commitment, and challenge. When people face tasks of every kind from this perspective, instead of considering the environment as a continuous threat, they believe that everything changes, and more positive results can be achieved, including, for example, better performance when practicing leadership (Bartone et al., 2009). Currently, within vocational development, this active disposition seems an appropriate point of view too. The three dimensions of hardiness seem to fit in the conception of the active involvement of individuals in their career development and so, it may be expected a positive relation to career adaptability and career construction.

Hardiness has been studied mainly as a dispositional variable in its relationship to stress and health variables, particularly in preserving and enhancing performance and health despite tough stressful circumstances (Maddi et al., 2006). However, there are fewer studies oriented towards studying hardiness in relation to positive variables such as personal growth or career development. Although the relation between personality and vocational identity has already been addressed (Hirschi, 2012), there are few studies focused on the relationship

between hardiness and vocational identity. Some recent research on this topic has tried to fill this gap (Ferreira et al., 2013; Ndlovu & Ferreira, 2019). Since 'hardiness is conceptualized to encourage imaginativeness and flexible reflection upon alternatives so that potentially disruptive changes can be turned to advantage instead' (Maddi et al., 2006, p. 589), we can assume a perfect fit between this concept and the process implied in vocational development from CCT propositions.

From a theoretical point of view, hardiness seems to fit rightly within the CCT. According to Maddi et al. (2006), the three components of hardiness lead people to actively commit themselves within the environments in which they operate. They believe that if they try hard enough, the objectives they set will end being fulfilled, and they see change not as a curse but as something natural in the arrangement of events. They do not stubbornly cling to situations but rather see change as an opportunity to grow on both a personal and a professional level.

1.3 Vocational Identity as an Outcome of the Process of Career Adaptation

There are many models to approach vocational identity, most of them considering a developmental approach of vocational identity in adolescents, particularly relating career adaptability and vocational identity. For example, carried out a study relating these two variables (Negru-Subtirica et al., 2015). In this study, the authors mention a model proposed by Porfeli et al. (2011) which consists of the following three dimensions: Commitment, exploration, and reconsideration of commitment. Each of these dimensions is defined by two different processes. The first of these dimensions, *commitment*, includes the processes of making a commitment and identifying with commitment. The second dimension, *exploration*, includes the processes of in-breadth and in-depth exploration. Finally, the third dimension, *reconsideration of commitment*, includes the processes of self-doubt and commitment flexibility. Among the various findings we can highlight the following: Career adaptability and vocational identity together facilitate vocational decision making; they maintain reciprocal associations over time; and career adaptability predicts different vocational identity dimensions, such as in-breath vocational exploration and career commitment. In this study, the authors recognize the need to study this relationship between these two variables in more depth and they call for further research.

Vocational identity is a concept that is very close to career identity, a variable that develops throughout life and is linked to general well-being and progress in life (Praskova et al., 2015). The difference between the two concepts is basically due to timing. Vocational identity has more to do with aspects before and during the vocational choice, while career identity has more to do with the development of the profession. Of course, these limits in time are very permeable. Moreover, vocational identity has broader coverage and is more closely linked to the development of a person's self-concept.

All career counseling theories are aware of the importance of vocational identity as a goal itself in the guidance and counseling process. Achieving a well-defined vocational identity makes it possible to face vocational challenges with greater success, as well as thrive within the professional career more quickly and directly, understanding the ups and downs of the journey from a more distant focus and as something transient, as something that does not disturb the core objectives people are trying to attain. To sum up, a defined vocational identity is like a sailboat keel, guiding us to the desired goals, regardless of the obstacles we may find on the way. In addition, current research has found a positive relationship between vocational identity and an important vocational variable, such as career decision self-efficacy (Jo et al., 2016; Turda, 2024).

1.4 Theoretical Proposal

First, we would like to point out that the four variables considered here: Hardiness, career adaptability, career construction, and vocational identity are important variables in the field of vocational development as it has been explained above. Hardiness is considered here as a dispositional variable with its three components: Control, commitment, and challenge; it can be set at the beginning of the career adaptation process influencing the adaptability resources and adapting responses; locating eventually the vocational identity as the result of this adaptation process. These four variables share the same nature and the sense of control, considering the active and constructive character of people when designing their careers.

So, the focus of the research of the present study tries to test the four-step theoretical key model proposed by CCT (Savickas, 2013) in the adaptation process to peoples' career development. The model presented here considers hardiness as a measure of adaptivity (which indicates readiness) predicting adaptability, assessed through the CAAS (Savickas & Porfeli, 2012), which points to adaptability resources. This action is followed by adapting responses or behaviors, specified by the Student Career Construction Inventory (SCCI) (Savickas et al., 2018), and finally, the adaptation result or outcome confirmed the vocational identity. As far as we know, this is one of the few studies to be designed prospectively to test the complete four steps at the same time with a positive mediating result so far, a major contribution to the field of career development, and particularly to the support of the CCT. Figure 1 shows a graphical representation of the model.

To sum up, *adaptivity*, considered as adaptive readiness, is the first step of the model, assessed here by hardiness; the second step is *adaptability resources*, measured through career adaptability; the adapting responses are the third step, assessed through career construction; and finally, in fourth and last place it can be found the *adaptation results*, in this case measured by vocational identity.

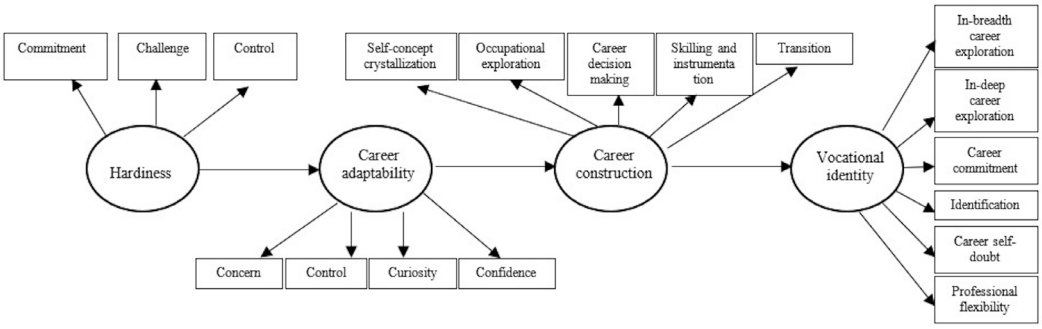


Figure 1: Theoretical Model

1.5 Aims of the Present Study

Recent research has highlighted the importance of joining initial vocational education and vocational training in higher education (Mason, 2020). The goal of the present study is to provide empirical evidence for a theoretical framework linking key dimensions of vocational development such as career construction and vocational identity. Besides, this study tries to offer suggestions for practitioners to integrate key qualities of career development within the basics of vocational training programs.

The overall aim of this study is to explicitly design and conduct proactive research into the adaptation model of Career Construction Theory (CCT). The study design tested the four-step model proposed by CCT in career design and development among undergraduate students. The specific objectives of the study aimed to test the relations between: (a) Hardiness and career adaptability, assessed through the CAAS as well as its four dimensions; (b) hardiness and career construction, assessed by the SCCI as well as its five dimensions; (c) hardiness and vocational identity; (d) the convergent and criterion-related validity of the CAAS to results and those obtained with other instruments of vocational development (i.e., SCCI, the Student Career Construction Inventory), and vocational identity (i.e., VISA, Vocational Identity Status Assessment).

To sum up, the main objective of this research was to test the theoretical model of mediation proposed and described in Section 1.4, a theoretical model proposed by the CCT, which is a major empirical contribution to CCT and the field of career development. Specifically, the four-step model proposes de following sequence: Adaptive readiness (hardiness), adaptability resources (career adaptability), adapting responses (career construction), and adaptation results (vocational identity). As far as we know, there is a shortage of publication showing the empirical evidence for this theoretical model.

We present the following hypotheses derived from these objectives:

- *Hypothesis 1*: Hardiness is positively related to career adaptability (H1a), career construction (H1b), and vocational identity (H1c).

- *Hypothesis 2*: Career adaptability mediates the relationship between hardiness and career construction.

- *Hypothesis 3*: Career construction mediates the relationship between career adaptability and vocational identity.

- *Hypothesis 4*: Career adaptability and career construction mediates the relationship between hardiness and vocational identity.

2 Method

This section describes the following aspects: the characteristics of the participants in this research, the measurement and data collection tools, and the analyses carried out.

2.1 Participants

Savickas (2013) focuses on the active role that people can play when creating and designing their paths to career success. In the professional field, much of our success depends on ourselves, which is why we have chosen as the object of study a sample of students who are at the beginning of their professional career. The total sample consisted of 1023 participants from two different countries: Spain and Brazil. The Brazilian subsample was composed by 421 participants. A total 39% of this subsample were men (N = 165), and 61% were women (N = 256), with an average age of 24.84 (SD = 7.92). All Brazilian participants were studying a university degree, but at different levels: 23% were in the first course (N = 27), 42% were in the second course (N = 177), 20% were in the third course (N = 83), 11% were in the fourth course (N = 47) and 4% were in the fifth course (N = 17). The participants were studying different knowledge areas: Nature sciences (2.9%; N = 12), health sciences (38%; N = 160), social sciences (32.3%; N = 136), and engineering and architecture (26.8%; N = 113).

The Spanish subsample was composed of 602 participants. A total 34% were men (N = 207), and 66% were women (N = 395). The average age was 21.69 (SD = 6.22). A total of 98% of the Spanish participants were studying a university degree (N = 593) and 2% were doing postgraduate studies (master's degree or doctorate) (N = 9). Students studying a university

degree were also at different levels: 48% were in the first course (N = 286), 8% were in the second course (N = 51), 26% were at the third course (N = 172), 12% were in the fourth course (N = 74) and 2% were in the fifth course (N = 10). Finally, they were studying different knowledge areas: Nature sciences (6%; N = 36), Health sciences (65.3%; N = 393), Social sciences (14%; N = 84), engineering and architecture (9.5%; N = 57), and art and humanities (5.3%; N = 32).

2.2 Procedure

Non-probability sampling, also known as random accidental sampling, was used for this research. University students participated anonymously and voluntarily; their personal identification was not recorded. The study's aims were clearly explained to them. Data were collected from classroom groups. The professor who taught the subject also gave his or her consent. A psychologist was responsible for collecting the data in each company and for ensuring that no data was lost. The response rate was 80%. The study was conducted in accordance with the Declaration of Helsinki, and the protocol followed the guidelines of the Ethics Committees of the participating universities, which gave their approval.

2.3 Measures

The instruments utilized in the study are outlined below. The predictor variables encompass the scales and subscales presented subsequently.

2.3.1 The Hardiness Scale (Moreno-Jiménez et al., 2000)

The Hardiness Scale is a tool used to assess the variable *hardiness* was assessed using the scale developed by Moreno-Jiménez et al., (2000). The scale consists of 21-item that are divided into three factors with seven items each one: Commitment (α=.76, e.g., 'I am seriously involved in what I do, as it is the best way to achieve my own goals'), Challenge (α=.82, e.g., 'Even when it takes more effort, I choose jobs that represent a new experience for me'), and Control (α=.73, e.g., 'I do everything I can to ensure that I control the results of my work'). The response range was from 1 (*completely disagree*) to 4 (*completely agree*). In the Spanish subsample, the Cronbach's alpha for the total scale was .87. The back translation method was used to adapt the scale to the Brazilian subsample, the Cronbach's alpha for the total scale was .86, and for the dimensions of the scale it was .66 (Commitment), .79 (Challenge), and .72 (Control). The alpha of the commitment scale was .66, near but not over the recommended value.

2.3.2 Career Adapt-Abilities Scale (CAAS, Savickas & Porfeli, 2012)

For the present study we used the 24-item form adapted into Spanish (Merino-Tejedor et al., 2016). This scale asks participants to indicate how strongly they have developed each of the career adaptabilities. It is scored for four career adaptability dimensions (concern, control, curiosity, and confidence) as well as total adaptability. Each factor is composed by six items: Concern (α=.83, e.g., 'Becoming aware of the educational and career choices that I must make'), control (α=.81., e.g., 'Taking responsibility for my actions'), curiosity (α=.82, e.g., ´Becoming curious about new opportunities'), and confidence (α=.81, e.g., 'Overcoming obstacles'). In the Spanish subsample, the Cronbach's alpha for the total scale was .92. In the Brazilian subsample, we used the 24-item form adapted into Brazilian (Pereira et al., 2012) the Cronbach's alpha for the total scale was .90, and for the scale's dimensions it was .79 (concern), .74 (control), .79 (curiosity), and .82 (confidence). The response range was from 1 (*low intensity*) to 4 (*maximum intensity*).

2.3.3 The Career Construction Inventory – Investigation Form (Savickas et al., 2018; Savickas & Porfeli, 2012)

This instrument was used as a measure of career construction behaviors. The total score represents overall engagement in career construction. The SCCI is a Likert-type instrument consisting of 25 items and five factors that represent specific career behaviors: Self-concept crystallization (7 items, α=.76, e.g., 'To recognize my talents and skills'), Occupational exploration (7 items, α=.80, e.g., 'To interview people who do a job I like'), Career decision making (5 items α=.83, e.g., 'To select a job that satisfies me'), Skilling and instrumentation (4 items, α=.80, e.g., 'To develop special knowledge or skills that will help me get the job I want'), and transition from school to work (2 items, α=.71, e.g., 'To make plans for my job search'). In the Spanish subsample, was used the Spanish adaptation Cronbach's alpha for the total scale was .91. The response ranged from 1 (*I have not thought about this yet*) to 5 (*I have already done this*). The back translation method was used to adapt the scale to the Brazilian subsample, Cronbach's alpha for the total scale was .91, and for the scale's dimensions it was .79 (self-concept crystallization), .77 (occupational exploration), .84 (career decision making), .86 (skilling and instrumentation), and .74 (transition from school to work).

2.3.4 The Vocational Identity Status Assessment (VISA; Porfeli et al., 2011)

The Vocational Identity Status Assessment was used to examine vocational identity. Recent research has proved the Vocational Identity Status Assessment (VISA) to be an appropriate instrument for assessing vocational identity development in adolescents and emerging

adults (Weigold et al., 2021). The back-translation method was used to adapt the scale in both languages. This scale consists of six factors with five items for each dimension: In the Spanish subsample, Cronbach's alpha for the total scale was .79, and for the scale's dimensions it was: In-breadth career exploration (α=.82, e.g. ,'Keep learning about professional careers that I don't know to find some more to explore'), In-depth career exploration (α=.80, e.g., 'Learning as much as I can about the particular educational requirements of the career that interests me the most'), Career commitment (α=.77, e.g., 'I have known for a long time what career is best for me'), Identification with career commitment (α=.77, e.g., 'Becoming a worker in my chosen career will allow me to become the person I dream to be'), Career self-doubt (α=.80, e.g., 'Thinking about choosing a career makes me feel uneasy'), and Professional flexibility (α=.79, e.g., 'I need to learn a lot more before I can make a career choice'). In the Brazilian subsample, Cronbach's alpha for the total scale was .81, and for the scale's dimensions it was .85 (In-breadth career exploration), .81 (In-depth career exploration), .82 (Career commitment), .78 (Identification with career commitment), .80 (Career self-doubt), and .81 (Professional flexibility). The scale uses a five-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

2.4 Data Analysis

First, a preliminary analysis was conducted to obtain means, standard deviations, and bivariate correlations among the variables. Secondly, various confirmatory factor analyses were conducted to verify the factor structure of the study variables. The variables were examined from a global perspective, conceptualizing them as second-order hierarchical factors. This approach is feasible because career adaptability and career construction encompass different dimensions while also allowing for overall scores. In other words, their factor structure may reflect both a first-order and a second-order hierarchical factor solution. Regarding the global scores of hardiness and vocational identity, their dimensions are highly interrelated. Thus, they can also be explored as a second-order hierarchical factor structure to obtain an overall hardiness and vocational identity score.

Note that two additional confirmatory factor analyses were conducted for hardiness. Therefore, we could examine the validity of the hardiness scale with all items compared to the proposed reduced version due to low reliability indices in the commitment dimension. Third, two structural equation models were computed to test our hypotheses. The first model represented a full mediation (M1), while the second model (M2) depicted a partial mediation model, which included direct effects among variables through additional paths from hardiness to career construction and vocational identity. Multiple fit indices were computed to assess overall model fit (Marsh et al., 1996): Chi-squared index ($\chi 2$), the comparative fit index (CFI), the incremental fit index (IFI), and the root mean square error of approximation

(RMSEA). The cutoff values applied for the IFI and CFI were >0.90 (Hu & Bentler, 1998; Jöreskog & Sörbom, 1993) and <0.08 for the RMSEA to indicate an acceptable model fit (Browne & Cudeck, 1993; Jöreskog & Sörbom, 1993). In addition, we computed a measure of parsimony, Akaike Information Criteria (AIC), that assesses the efficiency of the models' fit to a particular sample, and is appropriate for model comparison (Hao et al., 2004). Moreover, following the recommendations of Preacher and Hayes (2008) for mediation models, we tested the significance of indirect effects. All these analyses were carried out independently for the Spanish and Brazilian subsamples. The data analyses were carried out using the statistical package SPSS 25.0 and AMOS 24.

3 Results

Descriptive statistics and correlations among the variables are presented in Table 1. All variables were significantly related to each other, and the values of the correlations were positive and quite high in both the Spanish and Brazilian subsamples. In fact, they ranged from .35 to .64 in the Spanish subsample and from .30 to .57 in the Brazilian subsample.

Table 1: Descriptive Statistics (Means and Standard Deviations) and Correlations (Observed Variables)

	Mean	SD	1	2	3	4
	Spanish Subsample					
1. Hardiness	3.11	.41	-			
2. Career Adaptability	3.83	.58	.640**	-		
3. Career Construction	3.38	.68	.500**	.597**	-	
4. Vocational Identity	3.41	.39	.509**	.430**	.349**	-
	Brazilian Subsample					
1. Hardiness	3.13	.40	-			
2. Career Adaptability	3.91	.54	.573**	-		
3. Career Construction	3.47	.71	.458**	.522**	-	
4. Vocational Identity	3.31	.42	.386**	.337**	.301**	-

** $p < .01$, Two-tailed.

Measurement Model: Confirmatory Factor Analysis (CFA)

Table 2 presents the overall fit indices for confirmatory factor analysis (CFAs) and structural equation models (SEMs). The results showed that the multiple factor structure models did not fit the data as well as the second-order structure model for hardiness, career adaptability and career construction. The multiple factor solutions only presented a better adjustment compared to second-order solution for vocational identity.

Table 2: Indices of Overall Fit for CFAs and SEMs

Model	*χ2*	*df*	*p*	IFI	CFI	RMSEA	AIC
	Spanish Subsample						
CFA: Hardiness (3-factors)	618.498	186	.000	.876	.875	.062	750.498
CFA: Hardiness (second-order factor)	560.991	184	.000	.892	.891	.058	696.991
CFA: Hardinessb (3-factors)	257.634	101	.000	.938	.938	.051	359.634
CFA: Hardinessb (second-order factor)	219.026	99	.000	.953	.952	.045	325.026
CFA: Career adaptability (4-factors)	902.465	246	.000	.888	.887	.067	1058.465
CFA: Career adaptability (second-order factor)	734.408	246	.000	.917	.916	.057	890.408
CFA: Career construction (5-factors)	1039.321	264	.000	.866	.865	.070	1211.321
CFA: Career construction (second-order factor)	616.404	256	.000	.938	.937	.048	804.404
CFA: Vocational identity (6-factors)	948.842	390	.000	.917	.916	.049	1158.842
CFA: Vocational identity (second-order factor)	1024.460	394	.000	.906	.905	.052	1226.46
SEM: Serial full mediation model (M1)	561.636	115	.000	.909	.909	.080	709.636
SEM: Serial partial mediation model (M2)	466,406	113	.000	.928	.928	.072	618.406
	Brazilian Subsample						
CFA: Hardiness personality (3-factors)	591.550	186	.000	.813	.811	.072	723.550
CFA: Hardiness personality (second-order factor)	542.508	184	.000	.835	.833	.068	678.508
CFA: Hardiness personality[b] (3-factors)	282.080	101	.000	.891	.889	.065	384.080
CFA: Hardiness personality[b] (second-order factor)	252.708	99	.000	.907	.906	.061	358.708
CFA: Career adaptability (4-factors)	622.120	246	.000	.886	.885	.060	778.120
CFA: Career adaptability (second-order factor)	570.980	246	.000	.901	.901	.056	726.98
CFA: Career construction (5-factors)	841.003	264	.000	.871	.870	.072	1013.003
CFA: Career construction (second-order factor)	518.281	256	.000	.942	.941	.049	706.281
CFA: Vocational identity (6-factors)	794.080	390	.000	.920	.919	.050	1004.080
CFA: Vocational identity (second-order factor)	898.422	398	.000	.901	.900	.055	1092.42
SEM: Serial full mediation model (M1)	342.418	115	.000	.925	.924	.069	490.418
SEM: Serial partial mediation model (M2)	296.680	113	.000	.939	.939	.062	448.680

Note. b These models reflect the reduced version of hardiness scale

If we review the results more in detail, for career adaptability and career construction, the multiple factor structure models did not show an appropriate fit in both subsamples. IFI and TLI were lower than .90 and they did not surpass this cutoff value (Hu & Bentler, 1998; Jöreskog & Sörbom, 1993). In contrast, the second-order hierarchical structure, career adaptability and career construction presented excellent fits in both subsamples. Their results surpassed the cutoff value of .90 for IFI and TLI and were lower than .08 for RMSEA.

Regarding hardiness, the three-factor and second-order models did not show an appropriate fit. More specifically, in Spain, the results for the three-factor model were: $\chi2(186)= 618.49$ ($p<.00$), IFI=.88, CFI=.87, RMSEA=.06 and AIC=750.49; and for the second-order

model, they were $\chi2(184)= 560.99$ ($p<.00$), IFI=.89 CFI=.89, RMSEA=.06 and AIC=696.99. In Brazil, the results were $\chi2(186)= 591.55$ ($p<.00$), IFI=.81, CFI=.81, RMSEA=.07 and AIC=723.55 for the three-factor model, and they were $\chi2(184)= 542.50$ ($p<.00$), IFI=.83, CFI=.83, RMSEA=.07 and AIC=678.50 for the second-order model. In an attempt to improve the validity of this scale, we reviewed its items and loadings. Two items of the commitment dimension (H16, 'The best way I can achieve my goals is by getting deeply involved'; H19, 'My dreams are what make me continue carrying out my activity') and three items of the control dimension (H3, 'I do everything I can to ensure control of the results of my work'; H6, 'Things are only achieved through personal effort'; H15, 'If I set out to do so, I can overcome and control my dislikes') showed low loadings. In the second-order model, their loadings were .61 and .47 for H16, .53 and .31 for H19, .56 and .47 for H6, .52 and .45 for H3 and .35 and .39 for H15 in Spanish and Brazilian subsamples, respectively. In the three-factor model, their loadings were .59 and .46 for H16, .53 and .28 for H19, .56 and .47 for H6, .51 and .44 for H3 and .35 and .39 for H15 in Spanish and Brazilian subsamples, respectively. All these items did not surpass the cutoff value of .50 (Beauducel & Herzberg, 2006) in the Brazilian subsample, and only the H15 in the Spanish subsample. Therefore, they were removed to assess hardiness with the same measure in both subsamples. Once they were removed, confirmatory factor analyses were carried out again. These results showed a better fit of the model to the data for second-order solutions compared to third-order solutions. In fact, the three-factor model did not surpass the cutoff criteria in both subsamples. More specifically, in Spain, the three-factor model indexes were: $\chi2(101)= 257.63$ ($p<.00$), IFI=.94, CFI=.94, RMSEA=.05 and AIC=359.63; and for the second-order model, they were $\chi2(99)= 219.02$ ($p<.00$), IFI=.95 CFI=.95, RMSEA=.04 and AIC=325.02. In Brazil, the values were $\chi2(101)= 282.08$ ($p<.00$), IFI=.89, CFI=.89, RMSEA=.06 and AIC=384.08 for the three-factor model, and they were $\chi2(99)= 252.70$ ($p<.00$), IFI=.90, CFI=.90, RMSEA=.06 and AIC=358.70 for the second-order model. Thus, the adjust of the second-order solution was more satisfactory than three-factor solution in both subsamples. The factor loadings of each item to its latent variable is presented in Table 3. The loadings of all items were higher that cutoff of .50 (Beauducel & Herzberg, 2006), except for the item H4 of commitment dimension, that was around .50. It was .49 in the Brazilian subsample and .57 in the Spanish subsample. Finally, the reliability of this reduced version of the hardiness scale was also acceptable (.84 in the Spanish subsample, and .85 in the Brazilian sample). Thus, the reduced version of hardiness showed better reliability and validity than the original scale in both subsamples. This reduced version was used to carry out our analysis and test our hypotheses.

The results on vocational identity showed that the multiple factor structure model fits the data, as well as the second-order structure model. In fact, AIC values were lower for the multiple-factor solution, indicating a slightly better fit for the six-factor model (Hao et al.,

2004). Nevertheless, given that the two solutions showed an appropriate fit for vocational identity, we adopted the second-order structure model according to the solutions of the other variables.

Table 3: Reduced Hardiness Scale: Factors and Loadings

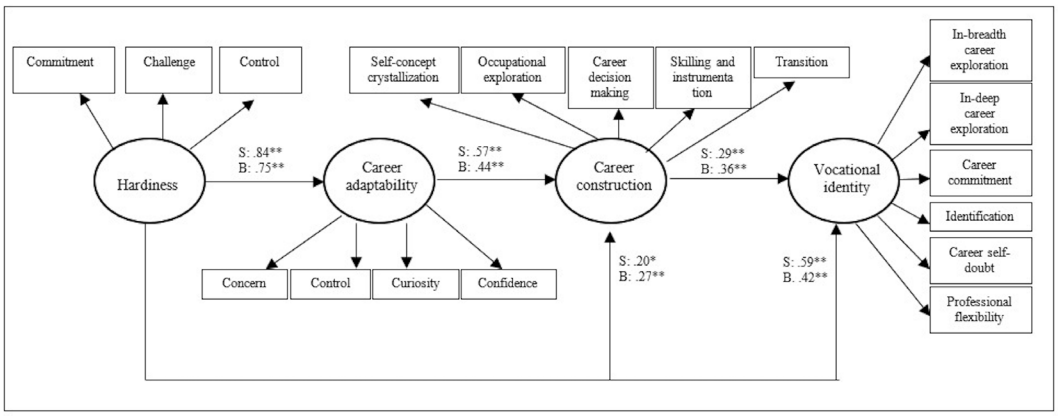
	Loadings in Spanish subsample	Loadings in Brazilian subsample
Commitment		
H1	.66	.50
H7	.54	.58
H10	.54	.57
H13	.54	.50
H4	.57	.49
Challenge		
H2	.67	.59
H5	.58	.60
H8	.64	.59
H11	.65	.60
H14	.65	.59
H17	.64	.55
H20	.58	.56
Control		
H9	.53	.56
H12	.69	.59
H18	.72	.72
H21	.51	.56

Testing Hypothesis: Structural Equation Model (SEM)

In order to test the hypotheses, we conducted structural equation analyses of the serial relationship between hardiness and vocational identity through career adaptability and career construction in the Spanish and Brazilian samples. We tested two models. The first model reflected a full mediation, and the second model showed a partial mediation. Results of the two models showed an appropriate fit to data. However, the partial mediation model had a lower AIC value than the full mediation model and the IFI, CFI and RMSEA were slightly better. More specifically, in Spain the partial mediation model presented the following values: $\chi2(113)= 466.40$ ($p<.00$), IFI=.93, CFI=.93, RMSEA=.07 and AIC=618.40; whereas the full mediation model showed $\chi2(115)= 561.63$ ($p<.00$), IFI=.91, CFI=.91, RMSEA=.08 and AIC=709.64. In Brazilian, the results for the partial mediation model were $\chi2(113)= 296.68$ ($p<.00$), IFI=.94, CFI=.94, RMSEA=.07 and AIC=448.68; whereas the full mediation model showed $\chi2(115)= 342.41$ ($p<.00$), IFI=.92, CFI=.92, RMSEA=.07 and AIC=490.41.

Thus, we concluded that even though the two models showed an appropriate fit, the solution of the partial mediation model was better (see Table 2).

Figure 2 presents the results of the path estimates. The results showed a significant and positive relationship between hardiness and career adaptability (Spain: β = .84, p=.00; Brazil: β =.75, p=.00), career construction (Spain: β = .57, p=.00; Brazil: β =.44, p=.00) and vocational identity (Spain: β = .29, p=.01; Brazil: β =.42, p=.00), supporting the Hypothesis 1 in both the Spanish and Brazilian samples. A higher score in hardiness was associated with higher levels of career adaptability, career construction and vocational identity.



Note: *p < .05 **p < .01; S refers to the Spanish subsample and B to the Brazilian subsample.

Figure 2: Hypothesized Serial Mediation Model

Hypotheses 2 and 3, which stated that there would be a mediation effect, were also confirmed. The results showed a significant indirect effect of personality hardiness on career construction via career adaptability (Spanish sample: Indirect effect = .746, p = .001, 95% CI [.489, 1.1179]; Brazilian sample: Indirect effect = .550, p = .001, 95% CI [.335, .860]), supporting the hypothesis 2. The results also evidenced a significant indirect effect of career adaptability on vocational identity through career construction in both samples, as hypothesis 3 stated (Spanish sample: Indirect effect = .076, p = .000, 95% CI [.040, 0.137]; Brazilian sample: Indirect effect = .064, p = .000, 95% CI [.030, .146]). Finally, hypothesis 4 was also supported. Personality hardiness was significantly related to vocational identity through career adaptability and career construction in both samples (Spanish sample: Indirect effect = .087, p = .000, 95% CI [.047, 0.170]; Brazilian sample: Indirect effect = .052, p = .000, 95% CI [.022, .123]).

4 Discussion

The main aim of the present study was to test the four-dimension adaptation model of the CCT, a core proposal of the theory. The results obtained in this study support the findings of recent research examining this model with senior high school students (Leung et al., 2022).

This discussion explains in detail the extent to which the objectives and hypotheses outlined in the introduction have been attained. To determine the convergent and criterion-related validity of the CAAS, the scores were compared to other instruments of vocational development such as the SCCI and the VISA. As predicted by the theoretical model of the CCT, these three variables are aligned in predicting vocational development. Usually, people who score high in one of these three variables, do so, to a similar extent in the other two.

The data obtained on the relationship between hardiness and career adaptability were favorable for the relationship with the overall score and the four dimensions: Concern, control, curiosity, and confidence. These results are in line with those obtained in other studies (Ndlovu & Ferreira, 2019). Both variables play a positive, similar, and shared role in career development, for example, concerning organizational commitment (Ferreira et al., 2013). In particular, *Hypothesis 1* proposed that hardiness would relate positively to career adaptability, career construction, and vocational identity. This hypothesis was supported by the data. Hardiness was positively related to career adaptability (H1a), career construction (H1b), and vocational identity (H1c). Moreover, each of the four CAAS variables included in this hypothesis showed positive and significant correlations among them.

In terms of the relation between hardiness and career construction (i.e., adapting responses) the data also confirmed the relationship with the overall score of the scale as well as its five dimensions: Self-concept crystallization, occupational exploration, career decision making, skilling and instrumentation, and transition from school to work. This finding has not been documented in previous research, and therefore is an innovative and valuable contribution of this study. Furthermore, the relationship between hardiness and career construction was partially mediated by career adaptability, giving support to *Hypothesis 2* about the mediating role of career adaptability.

Hardiness also showed a positive relation to vocational identity and its six dimensions: In-breadth career exploration, in-depth career exploration, career commitment, identification with career commitment, career self-doubt, and professional flexibility. Although expected, this finding is also original in the field of vocational development. Concerning *Hypothesis 3*, considering the influence of career adaptability on vocational identity, this relation is fully mediated by career construction, something expected based on the theoretical model. This is an important result since there has been less research on career construction than on career adaptability. This study helps to extend the role that this variable can play within the vocational development field.

Finally, *Hypothesis 4* stated that the relationship between hardiness and vocational identity would be mediated by both career adaptability and career construction (i.e., adapting responses). This hypothesis, related to the main objective of this study, was also confirmed since we have found that this relationship is partially mediated. The confirmation of this statement is the most striking finding of the study because the results empirically support the four-step model proposed by the CCT. This is a major finding in vocational development proposed by the CCT until now.

The confirmation of the hypotheses of this study serves to strengthen the theoretical model proposed by the CCT in the adaptation process. The model presented here considers hardiness as a measure of adaptivity, indicating readiness (step 1), predicting adaptability (step 2), and consisting of adaptability resources. This action is followed by adapting responses or behaviors (step 2), and finally, the adaptation result or outcome confirms the vocational identity (step 4).

One the other hand, one of the goals of this study is to offer suggestions for practitioners to integrate key qualities of career development within the foundations of vocational training programs. Besides, it is important to provide answers to the requirement of creating bridges between initial vocational education and vocational training in higher education, as suggested by current researchers (Catterall et al., 2014; Mason, 2020). The development of essential career skills can help students paving the way for the development of transition experiences form university to wok and in the future, and eventually allowing the students to face the demands and challenges with enthusiasm, confidence, and resilience.

In terms of counseling practitioners applying these findings, new possibilities have been opened for future interventions in the field of vocational development, suggesting new pathways for improving individual decision-making about work and personal careers. Counselors in practice should consider actions that improve both career adaptability and career construction, two compelling variables for vocational development. These variables mediate the existing path between more stable aspects, hardiness for example, and the desired results, such as a defined vocational identity, which is one of the desired outcomes in most career interventions.

Furthermore, counselors should take into account the four-step sequential model that we empirically demonstrate in this study, designing activities that promote the dimensions of career adaptability. For example, they should promote activities that favor the subjects developing capacities related to the feeling of control and confidence in their own decisions, such as self-analysis oriented to goal setting. Counselors should also suggest activities linked to career construction responses, designing activities that are related to the appropriate search for relevant occupational information, providing techniques for effective decision-making, combining rational and emotional aspects, and, depending on the stage the subjects are in, facilitating strategies for job seeking behavior, paving the way to work transition and success.

Here we can highlight the following main practical implications of this study:

1. Design and development of career intervention programmes at the university context. Such interventions could be promoted either as explicit vocational guidance interventions in the university itself or integrated into broader generic soft-skills training activities.

2. Improving activities for career decision-making, considering career choices, as well as personal strengths and limitations, improving self-knowledge, through self-awareness and self-control of their careers through the appropriate adapting responses as career planning and tackling changing conditions.

3. Dedicating time to imagine and design their professional future. Getting information through career exploration with curiosity and creativity.

4. Linking vocational identity through positive and personal responsibility and not waiting to appear it from outside. Believing that we can link our personality dispositions to results desired with the appropriate career beliefs, abilities, and responses.

Future research could verify the scope and projection of vocational identity. Is it really important to have a defined vocational identity? Current research seems to indicate that the answer is yes. For example, vocational identity can act as a mediator between core self-evaluations such as perceived competence and capabilities and life and job satisfaction (Hirschi, 2011).

Consolidation of vocational identity is particularly important at the university stage, in which people decide their first steps about their professional future. During the time spent at university it is very important for undergraduates to choose specializations and specific career paths. For many undergraduates, choosing a specialization or career path can be a challenging task (Fouad et al., 2016). A defined vocational identity could help undergraduates tackle this task, decrease dropout, and achieve a greater commitment to their studies and academic training.

Besides, it appears that longitudinal studies on career adaptability will be required with the purpose to enhance the understanding of the vocational progression of university students, from their early enrolment at college or university to finishing their studies and entering and thriving within the labor market.

Another line of research would be to determine whether the CCT adaptation model can be applied to other areas beyond the vocational area, such as wellbeing, general life satisfaction, or happiness. Prior research has linked, for example, a higher level of vocational identity with larger increases in wellbeing in an adolescent sample (Hirschi, 2012). In our society, at a stage where many people sell quick fake recipes for personal and professional develop-

ment, this study scientifically proves how things can work to set and obtain valuable personal achievements.

In terms of possible future lines of research, the role of emotional intelligence in vocational development should be explored in more detail (Di Fabio & Saklofske, 2014; Puffer, 2011). In particular, its role within CCT should be considered. It would be interesting to determine whether emotional intelligence plays a similar role to hardiness, particularly as an adaptivity (readiness) variable.

This study has several limitations. Firstly, we can point out that the cross-sectional nature of this research does not guarantee temporal precedence and may be an impediment to drawing conclusions about causality between variables. On the other hand, there are limitations when using a convenience sampling or a non-probabilistic sample, although the sample size is acceptable, there may be imbalance in its composition. However, the strength within this limitation is that the sample belongs to two different countries, languages, and cultures. Finally, the use of self-reporting involves well-known problems related to social desirability, that people do not say what they really think, and that questionnaires may not assess peoples' inner states accurately, so we must be cautious about the validity and generalizability of the findings. Although these limitations must be considered, we can state that this study makes an important hallmark in the field of vocational development particularly within the Career Construction Theory and its application to career development programs. The empirical support to the model found in this research encourage to go on with the practical suggestions.

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Ethics Statement

This study was conducted adhering to the ethical principles outlined by the International Journal for Research in Vocational Education and Training (IJRVET). Informed consent was obtained from all participants included in the study.

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