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Psychometric Study of Two Decision-Making Measures: The Melbourne Decision-Making Questionnaire Versus the General Decision-Making Style

Anton Aluja [1,2,*], Ferran Balada [1,3], Oscar García [1,4] and Luis F. García [1,5]

[1] Lleida Institute for Biomedical Research, Dr. Pifarré Foundation (IRBLleida), Catalonia (Spain); ferran.balada@uab.cat (F.B.); oscar.garcia@universidadeuropea.es (O.G.); luis.garcia@uam.es (L.G.)
[2] University of Lleida, Catalonia (Spain)
[3] Autonomous University of Barcelona (Spain)
[4] European University of Madrid
[5] Autonomous University of Madrid (Spain);
* Correspondence: anton.aluja@udl.cat

Abstract: This study compares the Melbourne Decision-Making Questionnaire (MDMQ) and the General Decision-Making Style (GDMS), two of the most widely used decision-making questionnaires in the literature, in a large age- and sex-weighted general population sample of 714 men (45.7%) and 848 women (54.3%) between 18 and 90 years old. The objective was to evaluate the convergent and construct validity between several aspects of decision-making styles questionnaires. The results indicate that the two questionnaires replicate the factorial structure of four and five factors reported in the original studies respectively, through exploratory and confirmatory procedures in our cross-cultural context. The domains of both questionnaires that represent a strong or large correlation are Vigilance with Rational (.50), Hypervigilance, Buck-passing, and Procrastination with Avoidant (.45, .52 and .60). A Structural Equations Model (SEM) between both questionnaires indicates that both latent factors formed by the domains of the MDMQ and the GDMS obtain a correlation of .96. It is concluded that the two questionnaires measure similar aspects of the decision-making construct.

Keywords: Decision making; convergence validity; MDMQ; GDMS

1. Introduction

Decision-making activity is universal. People face recurring problems and opportunities that require meaningful and competitive choices [1]. Research about how people make their decisions informs us about individual patterns and styles and lays the foundation for the development of strategies that can improve the quality of decisions. At the end of the 70s, a psychological theory that sought to address social conflict through decision making was put forward. Janis and Mann [2] proposed that decision making is sustained by the presence or absence of conditions from which a coping pattern emerges: a) awareness of serious risks, b) hope of finding the best alternative and c) belief that one can deliberate in time before adopting a decision. Other researchers have continued this search for answers to the individual decision-making process by generating models and attending to related individual variables such as age [3,4], gender [5,6], culture [1] and other psychological variables such as life satisfaction, self-esteem (Filipe et al., 2020), personality [7,10], etc. The research data have been obtained basically through questionnaires that measure different modalities of the general construct of decision making.

The decision-making construct has generated several self-reported questionnaires. Some examples are the Decision Making Style Inventory (DMI) [11] , the Decision Outcome Inventory (DOI) [12], the Decision Styles Questionnaire (DSQ) [13], the Decision Styles Scale (DSS) [14], the

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Desire for Self-Control Scale (DSCS) [15], the Rational and Intuitive Decision Style Scale (RI-DSS. [14] and the Proactive Decision-Making Questionnaire (PDMS9 [16]. The PDMS incorporates six domains, including four proactive cognitive skills, systematic identification of goals, systematic search for information, systematic identification of alternatives and use of a decision radar, and two proactive personality traits, showing initiative and striving to improve.

However, the most used in the literature are the Melbourne Decision Making Questionnaire (MDMQ. [2] and the General Decision-Making Style (GDMS) [17,18]. Both questionnaires have short versions of 22 items each and measure several aspects of the decision-making construct. The MDMQ is a version of the Flinders Decision Making Questionnaire [19]. The MDMQ assesses four decision-making domains: Vigilance and three non-vigilant styles: Hypervigilance, Buck-passing, and Procrastination. Vigilance would be the style in which people search for objectives to decision-making based on rational, relevant solutions and considering different alternatives. Hypervigilance style involves making quick decisions to avoid anxiety. Buck-passing includes attribution of responsibility for one's own decisions. Procrastination corresponds to the style or pattern of behavior related to postpone decisions until later [2]. The GDMS consists of five decision-making domains: Rational, Intuitive, Dependent, Avoidant, and Spontaneous. The Rational style involves the use of a logical, reasoned, and structured approach. The Intuitive style involves trust in hunches, intuitions, or subjective impressions. The Dependent style involves seeking help and advice before a decision. The Avoidant style involves postponing decision making. The Spontaneous style assumes a need for immediacy and the desire to overcome the challenge of a decision as soon as possible [17].

Both questionnaires have been adapted and validated to different cultures and languages, including our socio-cultural context, with excellent psychometric properties [7,20]. Although both instruments are based on the general decision-making construct, the MDMQ was designed to assess conflict theory and stress coping patterns and is related to personality and emotions [10,19] .On the other hand, the GDMS is based more on behavioral styles, reactions and habits in specific contexts and depends less on personality, focusing more on adaptive, rational, or intuitive aspects [17].

As mentioned, both questionnaires have been related to different psychological variables independently, so we will appraise the similarities and differences. As far as we know, there are no studies that relate both questionnaires with the same sample. Vigilance in the MDMQ has been related to positive affect, life satisfaction, and self-esteem [18]. Procrastination (non-vigilant style) negatively correlates with self-esteem [1,21]. Within the framework of the five-factor model of personality (FFM), Extraversion, Conscientiousness, Agreeableness, and Openness to Experience negatively correlated with Vigilance using the MDMQ. On the contrary, the relationship was positive with Neuroticism and negative with the other three non-vigilant domains [8,22].

A recent MDMQ study in our socio-cultural field has related the domains of this questionnaire with personality evaluated using the Zuckerman alternative five factor personality model (AFFM). Neuroticism and low Extraversion were significantly related to non-vigilant styles. Women obtained significantly lower scores in Vigilance and higher scores in Hypervigilance, Buck-passing, and Procrastination than men. The most predictive personality domains with respect to the MDMQ scales were Aggressiveness (negatively) and Activity for Vigilance, and Neuroticism for Hypervigilance, Buck-passing, and Procrastination [9].

In reference to the GDMS, Scott and Bruce [17] described decision styles as learned habits where the key factor is the number of alternatives identified and the information collected during decision making [23]. However, the GDMS has also been related to the FFM personality model. Conscientiousness and Agreeableness have been positively related to Rationale, Extraversion to Intuitive style. Conscientiousness to Avoidant, and Agreeableness to Spontaneous styles (both in negative) [7]. Taking the AFFM as a reference, Avoidance was positively correlated with Aggressiveness and Neuroticism, and negatively with Activity and Extraversion. The Dependent style was positively correlated with Neuroticism. The Intuitive style was positively correlated with Extraversion and Sensation Seeking [9]).

Individual differences play a role in decision making. The most stable characteristics would be related to personality, while superficial characteristics, albeit displaying some stability, are more

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malleable and adaptable to situations [24] .Therefore, depending on the content of the domains of both questionnaires, differences and similarities are expected around a more general construct of decision making.

The main purposes of this study were to a) examine the psychometric properties of MDMQ and the GDMS, particularly their exploratory and confirmatory factor structure and scale reliability, (b) explore the relationships between the different domains of both questionnaires to identify similarities and differences, and c) jointly analyze the domains of both questionnaires using a structural equation model generating two correlated latent variables.

2. Method

2.1. Participants and Procedure

The sample comprised a total of 1,562 anonymous Caucasian adults from the general population, divided into a group of 714 men (45.7%) and 848 women (54.3%). All participants were healthy. Males reported a slightly higher average age than females (41.16 vs 39.06; *t*-test: 2.43; $p < .025$). The sample range was between 18 and 90 years old. Participants responded to a self-reported questionnaire with paper and pencil and were recruited by university students performing a data analysis practice. Students were instructed to invite men and women in the age ranges 18–30, 31-40, 41-50, 51-60 and over 61 to respond anonymously, to obtain the most representative sample possible of the community population. All participants authorized in writing the use of their anonymous data for data analysis practice and for subsequent research. The students also signed a document transferring the uses of data for research in the framework of a broader investigation authorized by the university's ethics committee (File number CEIC-2160).

2.2. Measures

2.2.1. Melbourne Decision-Making Questionnaire (MDMQ)

The MDMQ is a self-report inventory designed to measure the four main coping patterns identified in the Conflict-Theory model of decision-making [19] (Mann et al., 1997). Different factor analyses carried out in different cross-cultural contexts report a four-factor structure by Confirmatory Factor Analysis (CFA): Vigilance, Hypervigilance, Buck-passing, and Procrastination [1,5,25,29]. The current version of the MDMQ is a 22-item questionnaire with a Likert response format of 3 points. Each item consists of three answers that are scored as follows: true, sometimes true and not true. The Spanish version used in this research was validated by De Heredia et al. [20] and the psychometric properties were replicated by Urieta et al.[10]. For the present sample, the reliability coefficients were .74 (Vigilance), .71 (Hypervigilance), .79 (Buck-passing) and .78 (Procrastination) (Table 1).

Table 1. Descriptive, distribution frequency values, internal consistency, and correlations.

(n = 1,562)	M	*SD*	S	K	α	9	8	7	6	5	4	3	2	1
MDMQ														
1. Vigilance	9.28	2.20	-.94	.99	.74	-.31	-.17	.00	-.01	.50	-.17	-.15	.07	1
2. Hypervigilance	4.74	2.34	.17	-.38	.71	.04	.45	.29	-.11	-.01	.47	.41	1	
3. Buck-passing	5.05	2.67	.37	-.10	.79	.06	.52	.32	-.17	-.12	.46	1		
4. Procrastination	3.21	2.34	.64	.01	.78	.14	.60	.24	-.06	-.14	1			
GDMS														
5. Rational	3.99	.65	-.63	.80	.84	-.44	-.19	.11	.06	1				
6. Intuitive	3.68	.87	-.51	.13	.89	.20	-.07	.04	1					
7. Dependent	3.47	.82	-.42	.00	.83	-.01	.32	1						
8. Avoidant	2.37	.97	.53	-.38	.92	.23	1							
9. Spontaneous	2.31	.89	.61	.02	.87	1								

Note: M: Mean; SD: Standard deviation, S: Skewness; K: Kurtosis; α: Cronback's alpha. Cohen's standard medium effect size corresponds to r $\pm$ .37, but a correlation coefficient of .50 or larger is thought to represent a strong or large correlation.

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2.2.2. General Decision-Making Style (GDMS)

The GDMS was developed by Scott and Bruce [17] to evaluate decision-making styles. The GDMS has been adapted in multiple cross-cultural contexts with similar psychometric properties [31,35]. Alacreu-Crespo et al. [7] adapted the GDMS in Spain and the psychometric properties were replicated recently by Urieta et al. [10]. This version contains 22 items, including a Likert-type response of 5 points. (1: Strongly disagree to 5: Strongly agree). Spanish researchers removed three items from the test based on the internal structure results in previous studies and their own analysis (e.g., [32]). The factor structure offers five domains representing five decision-making styles: Rational, Intuitive, Dependent, Avoidant, and Spontaneous. The confirmatory factor analysis supported the five-factor structure of the GDMS, finding acceptable internal consistency and temporal stability [7]. Alpha internal consistency values in the current study ranged from .83 to .92. (Table 1).

3. Results

3.1. Descriptive, Distribution Frequencies Values, Internal Consistency, and Inter-Correlations

Table 1 shows the descriptive domains of the MDMQ and the GDMS for a population of men and women of similar ages to the general Spanish population. The internal consistency alpha is satisfactory for all domains of both questionnaires and is similar to the original studies. The distribution values are normal since the skewness and kurtosis remain at values close to zero and do not exceed $\pm$ 1 ([36,38]. Considering the large number of participants, the correlations must be corrected for effect size [39]. Correlations with values of .37 or more obtain a medium effect, and those greater than .50 a strong effect. Vigilance from the MDMQ correlates with Rational from the GDMS (.50), Hypervigilance with Avoidant (.45), Procrastination (.47) and Buck-passing (.41). Rational correlates negatively with Spontaneous (-.44). Avoidant correlates with Buck-passing (.52) and Procrastination (.60). Buck-passing correlates with Procrastination (.46).

3.2. Exploratory Matrix Structure of the MDMQ and the GDMS

The optimal implementation of Parallel Analysis (PA) advised four and five factors for MDMQ and GDMS [40,41]. The method to obtain random correlation matrices was Permutation of the raw data [42]. The number of random correlation matrices was 500 (Table 2).

Table 2. Parallel Analysis (PA) for MDMQ and GDMS.

	MDMQ[1]				**GDMS[2]**		
Component	**Real data**	**Mean RAND**	**95 PCT RAND**	**Component**	**Real data**	**Mean RAND**	**95 PCT RAND**
	Eigenvalues				**Eigenvalues**		
1	5.27422*	1.21685	1.24935	1	5.29357*	1.21785	1.25389
2	2.77683*	1.18202	1.20613	2	3.98406*	1.18216	1.20514
3	1.63456*	1.15615	1.17912	3	1.88839*	1.15578	1.17578
4	1.28210*	1.13212	1.15250	4	1.88839*	1.13285	1.15060
5	0.95638	1.11097	1.12864	5	1.41550*	1.11058	1.12707
…	…	…	…	6	0.68454	1.09074	1.10641
…	…	…	…	…	…	…	…
22	0.35966	0.80128	0.82461	22	0.14727	0.80160	0.82372
Advised number of factors: 4				Advised number of factors: 5			

Note: MDMQ[1]: Melbourne Decision-Making Questionnaire; GDMS[2]: General Decision-Making Style; RAND: Random; PCT: Percentile.

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Table 3 shows a comparative principal components analysis (PCA) of the MDMQ and the GDMS (both with 22 items) and the communalities of the two matrices. After analyzing several factor extraction and rotation methods, we chose PCA with LOSEFER empirical correction [43] and oblique Promax rotation using Factor Analysis software [44]. The PCA allows the content of broad information to be summarized, making it possible to analyze and visualize it more easily. We used oblique Promax rotation because it allows factors to be correlated. This rotation can be computed more quickly than a direct oblimin rotation, making it useful for large data sets.

Table 3. Principal component analysis with oblique Promax rotation structure matrices of the MDMQ and the GDMS items.

	MDMQ[1]					GDMS[2]					
Item	**I**	**II**	**III**	**IV**	**H²**	**I**	**II**	**III**	**IV**	**V**	**H²**
1	**.71**	-.02	-.07	.02	.51	**.73**	.01	.10	-.10	-.17	.58
2	**.64**	.10	.00	.03	.42	**.78**	.03	.02	-.09	-.12	.63
3	**.72**	-.10	-.03	-.07	.53	**.75**	.03	-.01	-.11	-.14	.60
4	**.68**	.07	-.07	-.07	.48	**.80**	-.02	.07	.03	-.23	.69
5	**.55**	-.10	-.13	-.22	.38	**.75**	.08	.06	-.10	-.12	.60
6	**.62**	.24	.05	-.08	.45	.07	**.92**	-.03	-.05	.09	.85
7	-.05	**.67**	.15	.15	.49	.03	**.93**	.00	-.04	.09	.88
8	.01	**.68**	.14	.18	.51	.03	**.83**	.11	-.03	.12	.72
9	.15	**.68**	.07	.07	.49	-.02	.01	**.73**	.23	-.02	.59
10	.00	**.53**	.31	.04	.38	.03	-.03	**.74**	.12	-.13	.58
11	.07	**.63**	.07	.16	.43	.07	.06	**.76**	.07	.03	.59
12	-.09	.12	**.64**	.39	.58	.09	-.01	**.79**	.07	.01	.64
13	-.10	.15	**.62**	.30	.50	.06	.06	**.78**	.16	.06	.64
14	-.10	.08	**.77**	.17	.64	-.10	-.08	.19	**.82**	.04	.73
15	-.09	.26	**.66**	.19	.55	-.05	-.04	.15	**.89**	.04	.82
16	-.06	.06	**.74**	.10	.56	-.07	-.04	.16	**.90**	.05	.85
17	.10	.13	**.51**	-.12	.30	-.12	.02	.05	**.81**	.19	.70
18	.00	.37	.04	**.41**	.39	-.08	-.02	.17	**.84**	.10	.76
19	-.10	.32	.07	**.63**	.52	-.21	.05	-.03	.18	**.79**	.70
20	-.04	.16	.14	**.75**	.60	-.24	.13	.06	.19	**.82**	.79
21	-.15	.14	.15	**.74**	.62	-.14	.11	-.08	-.07	**.80**	.68
22	-.06	.08	.26	**.75**	.64	-.23	.09	.03	.14	**.83**	.77

Note: Melbourne Decision-Making Questionnaire (MDMQ[1]) = (F-I: Vigilance; F-II: Hypervigilance; F-III: Buck-passing; F-IV: Procrastination). General Decision-Making Style (GDMS[2]) = (F-I: Rational; F-II: Intuitive; F-III: Dependent; F-IV: Avoidant; F-V: Spontaneous. H²: Communality.

For the MDMQ, we obtained a Bartlett's statistic of 9219.7 (df: 231; $p < .000010$) and a Kaiser-Meyer-Olkin (KMO) test of .89. Robust goodness of fit statistics after LOSEFER correction was the Root Mean Square Error of Approximation (RMSEA): .033; Bootstrap 95% confidence interval (.033-.034). Close-fit test and power analysis results after LOSEFER correction: alpha: .050 [43]. The 22 items loaded adequately on their factor with weights between .41 and .75. There were no secondary factor loadings greater than .37.

Bartlett's statistic for the GDMS was 17877.7. Degrees of Freedom (df: 231; $p < = .000010$) and Kaiser-Meyer-Olkin (KMO) test of 0.87. Robust goodness of fit statistics after LOSEFER correction was Root Mean Square Error of Approximation (RMSEA): .030; Bootstrap 95% confidence interval (.030-.031). Close-fit test and power analysis results after LOSEFER correction: alpha: .050 (Lorenzo-Seva & Ferrando, 2022). The 22 items loaded adequately on their factor with weights between .73 and .93. There were no secondary factor loadings greater than .24. ….

A PCA with the same procedure was performed with the nine domains of the two questionnaires using the previous extraction and rotation methods. Parallel Analysis indicated that three factors

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should be retained. The factors were formed by Avoidant (GDMS), Procrastination (MDMQ), Hypervigilance (MDMQ), Buck-passing (MDMQ) and Dependent (GDMS) (I); Rational (GDMS), Vigilance (MDMQ) and Spontaneous (negative) (GDMS) (II) and Intuitive and Spontaneous (GDMS) (III). Notice that Spontaneous loaded in a different sign in factor II and factor III (Table 4).

Table 4. Principal component analysis matrices with Promax rotation of the MDMQ and the GDMS domains.

	I	II	III
Avoidant	**.79**	-.24	.00
Procrastination	**.76**	-.19	-.02
Hypervigilance	**.74**	.10	-.06
Buck-passing	**.74**	-.12	-.20
Dependent	**.59**	.20	.26
Rational	-.03	**.84**	.12
Vigilance	-.05	**.77**	.03
Spontaneous	.10	**-.67**	**.40**
Intuitive	-.09	-.01	**.92**

Note: Loadings equal to or higher than .40 in boldface.

3.3. Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted with the MDMQ and GDMS using the Maximum Likelihood (ML) estimation method, which seems warranted given the size of the sample and the apparent normality of the variables. This analysis employed the AMOS 26 statistical package [45].

For MDMQ, the simple model obtained a Chi-Square (χ^2): 985.73; Degrees of freedom (df): 202; $\chi 2$ /df: 4.88. Fit indicator values were Goodness of Fit Index: (GFI): 0.94; Tucker-Lewis Index: (TLI): 0.90; Comparative Fit Index: (CFI): 0.91 and Root Mean Square Error of Approximation (RMSEA): .050. Elevated Modification Index (MI) analysis informed that items 14-16 were highly correlated. Correlated error terms of the items were introduced in the analysis. The correlations between the latent variables (domains) and the standardized regression weights of the items are shown in Figure 1.

Standardized Regression Weights			
Item			
M1	←	VIG_1	.61
M2	←	VIG_1	.53
M3	←	VIG_1	.62
M4	←	VIG_1	.62
M5	←	VIG_1	.49
M6	←	VIG_1	.54
M7	←	HIPER_2	.60
M8	←	HIPER_2	.66
M9	←	HIPER_2	.55
M10	←	HIPER_2	.51
M11	←	HIPER_2	.53

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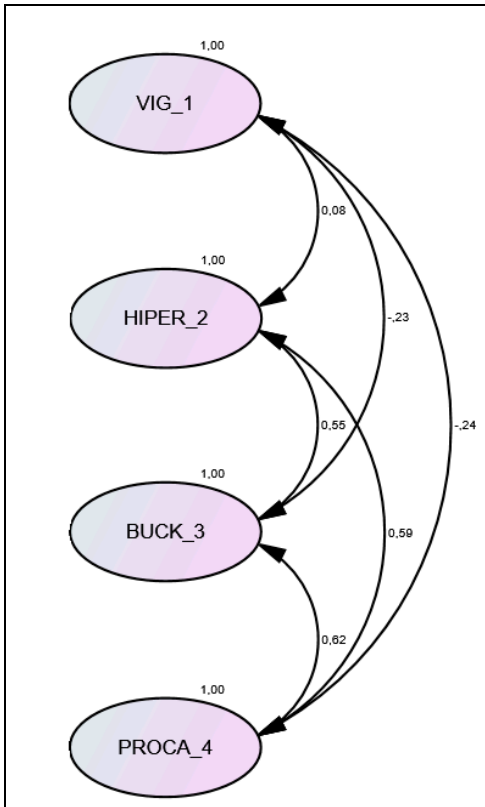

M12	←	BUCK_3	.76
M13	←	BUCK_3	.70
M14	←	BUCK_3	.66
M15	←	BUCK_3	.69
M16	←	BUCK_3	.54
M17	←	BUCK_3	.49
M18	←	PROCA_4	.48
M19	←	PROCA_4	.63
M20	←	PROCA_4	.69
M21	←	PROCA_4	.71
M22	←	PROCA_4	.71

Figure 1. Confirmatory Factor Analysis of the MDMQ.

Figure 2 shows the GDMS Confirmatory Factor Analysis (CFA) using the same method and procedure. The goodness-of-fit indices were Chi-Square (χ^2): 1065.605; Degrees of freedom (df): 199; χ^2/df: 5.36; Goodness of Fit Index (GFI): 94; Tucker-Lewis Index (TLI): .95; Comparative Fit Index (CFI): .96 and Root Mean Square Error of Approximation (RMSEA): .053.

Standardized Regression Weights

Item			
G1	←	RAT_1	.70
G2	←	RAT_1	.72
G3	←	RAT_1	.70
G4	←	RAT_1	.78
G5	←	RAT_1	.70
G6	←	INT_2	.89
G7	←	INT_2	.94
G8	←	INT_2	.72
G9	←	DEP_3	.68
G10	←	DEP_3	.66
G11	←	DEP_3	.68
G12	←	DEP_3	.74

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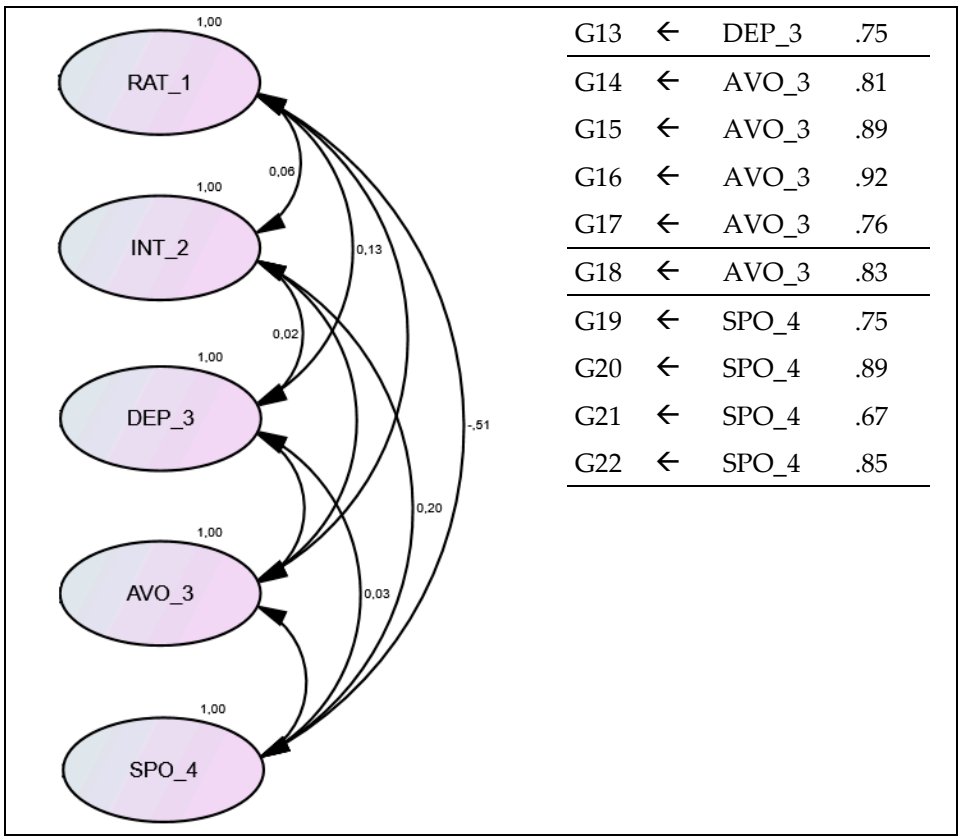

G13	←	DEP_3	.75
G14	←	AVO_3	.81
G15	←	AVO_3	.89
G16	←	AVO_3	.92
G17	←	AVO_3	.76
G18	←	AVO_3	.83
G19	←	SPO_4	.75
G20	←	SPO_4	.89
G21	←	SPO_4	.67
G22	←	SPO_4	.85

Figure 2. Confirmatory Factor Analysis of the GDMS.

3.4. MDMQ and GDMS Convergence Analysis

Convergent validity occurs when there is a very close relationship between two tests that measure the same or similar construct [46]. Different statistical procedures are used to evaluate construct validity, from Pearson correlation, factor analysis, multiple regression models to structural equation models (SEM). Structural equation models estimate the effect and relationships between multiple variables. They are less restrictive than regression models because they allow measurement errors to be included [47]. Structural equation models allow us to observe postulated connections between some latent variables. These latent variables are linked to observed variables whose values appear in a data set. Connections can be presented using diagrams and arrows that indicate the value of the connection. Two highly connected latent variables indicate that the observed variables of each latent variable have high convergence or construct validity [48].

Figure 3 shows a SEM diagram including the different domains of the MDMQ and the related GDMS. High correlations between the error terms (variance) indicate that the observed variables are positively or negatively connected. Based on the highest modification indices (MI), the Vigilance error terms have been correlated with Rational (.49) and Spontaneous (-.29), Rational and Spontaneous (-.42). Modification indices were 361.02, 122,74 and 315,69 respectively. The standardized regression weights show the connection of each domain of the MDMQ and the GDMS with its respective latent variable and the correlation between the two questionnaires (.96). The goodness-of-fit indices are as follows: χ^2: 228,029; Degrees of freedom (df): 21; χ^2/d.f.:10.85. Goodness of Fit Index: .97: Tucker-Lewis Index: .90; Comparative Fit Index: .94; Root Mean Square Error of Approximation: .059.

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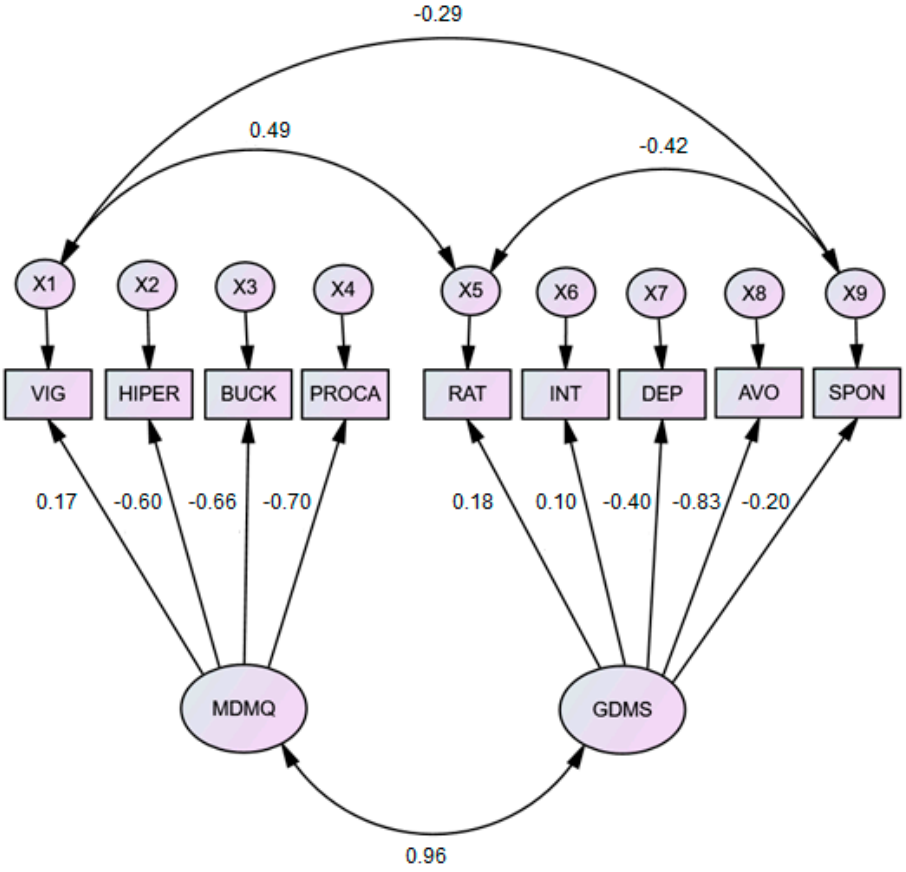

Figure 3. Path analysis diagram comparing the MDMQ with the GDMS.

4. Discussion

Decision making is an everyday process in which information is collected and alternatives are evaluated to choose the most appropriate among various possibilities. As mentioned in the introduction, researchers have designed different models to investigate human decision making. Decision making is a multidimensional construct in which different aspects are measured, such as individual styles [13,14], decision outcomes [12], proactive decision making [16], etc. Age, gender, culture, and different individual psychological variables intervene in the decision-making process [1] [3,6].

The present study was designed to evaluate jointly two of the most popular decision-making questionnaires, the MDMQ and GDMS, in a large sample of the general population with a similar proportion in gender, age ranges and in the same sociocultural and racial context. The MDMQ was developed according to a general conflict theory of decision making under stress [2] (Janis & Mann,1977), and the GDMS related decision-making styles to trait variables, such as mental health, self-esteem, or locus of control [49].

The first objective was to explore the psychometric properties of both questionnaires in a joint sample. The results indicate robust construct validity assessed by both exploratory and confirmatory factorial procedures. The internal consistency of the different domains is satisfactory. These results are in line with both those reported in cross-cultural studies from different countries [18] , and those carried out in our socio-cultural context [7,20].

The second objective was to explore the relationships between the different domains of both questionnaires to identify similarities and differences. The results indicate that the MDMQ presents two types of negatively related domains; one made up of Vigilance, and three of non-Vigilance (Hypervigilance, Buck-passing, and Procrastination). The GDMS presents some domains related negatively (Rational-Spontaneous) and others positively (Dependent-Avoidant or Avoidant-

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Spontaneous). The others seem to have little connection with each other. Exploratory factor analyses confirm the structure of four and five factors respectively, with low secondary factor loadings.

The relationships between the nine domains of the two questionnaires obtained in the aforementioned correlational analyses are also visualized in the principal components analysis of three factors, where the three non-Vigilant domains of the MDMQ are placed in the same factor as Avoidant and Dependent of the GDMS, while Rational and Vigilance form a second factor together with Spontaneous (negative). Intuitive and Spontaneous loads in the third factor. The relationships between domains of the two questionnaires are also reproduced in the connections observed between the latent variables of each questionnaire presented in the first two figures.

The third objective was to analyze the domains of both questionnaires using a structural equation model generating two correlated latent variables, to observe the agreement between the two questionnaires considering that they incorporate domains that are positively and negatively related to each other. This procedure has been used to compare constructs measured by questionnaires that have demonstrated high overlapping through correlations or exploratory factor analysis [50,51]. The error terms of the domains were correlated with more extreme modification indices. As can be seen, the two latent variables obtain a high correlation, indicating that both questionnaires measure related aspects of the same construct.

This study has strengths and limitations. A strength is the large sample of healthy subjects of the same culture from the general population, with a similar proportion of women and men and age ranges minimizing effect age. A limitation of this type of study is its cross-sectional nature, which could compromise the validity of the results in other different contexts. A study in different countries and languages would be appropriate to ascertain the effect of culture. In future studies, both questionnaires could also be compared together with personality variables, self-esteem, locus of control, stress, or other mental health variables, to know if either of them better predicts these variables.

The MDMQ was developed to study the theory of conflict, choice, and commitment, while the GDMS was developed to study the use of reasoned, logical, and structured approaches to decision making. Both have excellent convergent validity and can be used interchangeably in research. Vigilance and Rational styles measure very similar psychological aspects, whereas Hypervigilance, Buck-passing and Procrastination are like the Dependent style, while the Spontaneous style goes in the opposite direction of Rational Vigilance. However, from a global perspective, both questionnaires faithfully measure a general decision-making construct with some different nuances.

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