

# Adaptation and validation of the Melbourne Decision Making Questionnaire to Brazilian Portuguese

## Adaptação e validação do Melbourne Decision Making Questionnaire em português brasileiro

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### Abstract

**Introduction:** Decision making (DM) is among the most important abilities for everyday functioning. However, the most widely used measures of DM come from behavioral paradigms, whose ecological validity and standalone use has been criticized in the literature. Though these issues could be addressed by the use of DM questionnaires as a complementary assessment method, no such instruments have been validated for use in Brazilian Portuguese. Therefore, the aim of this study was to conduct the translation and validation of the Melbourne Decision Making Questionnaire (MDMQ) for use in a Brazilian population.

**Methods:** The adaptation of the MDMQ involved the following steps: translation, back-translation, expert review and pilot study. These steps were followed by factor analysis and internal consistency measurements, which led to the exclusion of 4 items from the scale. The 18-item version of the MDMQ was then administered to a validation sample consisting of healthy adults, as well as patients with bipolar disorder (BD) and major depressive disorder (MDD).

**Results:** The instrument displayed good internal consistency, with the hypervigilance subscale showing the lowest, though still acceptable, Cronbach's alpha value. Its factor structure was comparable to that of the original MDMQ according to confirmatory factor analysis. Nevertheless, the MDMQ was sensitive to both depression severity and the presence of MDD and BD, both of which are known to have an impact on DM ability.

**Conclusion:** The version of the MDMQ produced in the present study may be an important addition to neuropsychological assessment batteries with a focus on DM and related abilities

**Keywords:** Decision making; surveys and questionnaires; psychometrics; neuropsychology.

### Resumo

**Introdução:** A tomada de decisão (TD) é uma das habilidades mais relevantes para a funcionalidade. No entanto, esta habilidade é geralmente avaliada por meio de tarefas comportamentais, cuja validade ecológica tem sido questionada. De acordo com a literatura, a avaliação da TD deve ser complementada por questionários ou escalas, instrumentos estes que não estão disponíveis no português brasileiro. Desta forma, o objetivo deste estudo foi a tradução e validação de uma versão do Melbourne Decision Making Questionnaire (MDMQ), o instrumento mais amplamente utilizado na avaliação da TD, para uso em português.

**Métodos:** A adaptação da MDMQ foi realizada através da tradução, retrotradução, avaliação por painel de juízes e estudo piloto. A versão da escala produzida neste processo foi submetida a análise fatorial e avaliação de consistência interna, levando a exclusão de 4 itens da escala original. A versão resultante da MDMQ, contando com 18 itens no total, foi então utilizada em estudo de validação, em que a TD foi comparada entre adultos saudáveis e portadores de depressão e transtorno bipolar.

**Resultados:** O instrumento demonstrou consistência interna satisfatória, apesar da obtenção de alfas de Cronbach relativamente baixas para a subescala de hipervigilância. A estrutura fatorial do questionário traduzido foi semelhante a observada no instrumento original. Todas as medidas derivadas da MDMQ, mostraram-se discriminativas na comparação entre adultos saudáveis e portadores de transtornos mentais.

**Conclusão:** A versão da MDMQ produzida neste estudo poderá realizar uma importante contribuição para a prática clínica e pesquisa neuropsicológica acerca da TD.

**Descritores:** Tomada de decisões; inquéritos e questionários; psicometria; neuropsicologia.

## Introduction

Decision making (DM) is among the most relevant constructs studied in cognitive neuroscience. It is a necessary ability for adequate functioning, and is often impaired in patients with psychiatric disorders such as schizophrenia,<sup>1</sup> obsessive-compulsive disorder,<sup>2,3</sup> bipolar disorder (BD)<sup>4</sup> and depression,<sup>5</sup> and neurological disorders such as multiple sclerosis<sup>6</sup> and traumatic brain injury.<sup>7</sup> Recent studies have also identified it as a significant predictor of clinical outcomes such as treatment dropout and relapse in substance disorders<sup>8,9</sup> and future substance use in patients with BD.<sup>10</sup> Given their ubiquitous presence across psychiatric conditions, DM impairments have been described by some authors as transdiagnostic markers of mental illness.<sup>11</sup>

However, DM difficulties can occur even in the absence of neuropsychiatric dysfunctions,<sup>12</sup> and as such, efforts to prevent biases and improve DM ability have also extended to healthy adult populations.<sup>13</sup> In healthy adults, DM has also been found to be a predictor of important clinical indicators such as heavy alcohol use, stress, well-being and depression symptoms.<sup>14,15</sup>

Most investigations of DM impairment, especially in psychiatric populations, rely on instruments designed for performance measurement, such as the Iowa Gambling Task (IGT),<sup>16</sup> a computerized instrument which evaluates DM under uncertainty or risk in a simulated card game. This task has been used to study DM impairments in BD,<sup>17</sup> major depressive disorder (MDD),<sup>5</sup> schizophrenia,<sup>1</sup> and obsessive-compulsive disorder.<sup>18</sup> Although these studies have made important contributions to the literature, additional measures of DM could complement these findings and perhaps address some of the limitations associated with the use of the IGT. These limitations include the difficulty identifying the cognitive processes underlying DM on the task,<sup>19</sup> its sensitivity to context-specific factors such as mood, as well as methodological variability in terms of scoring methods and number of trials.<sup>20</sup>

One possible way to complement the study of DM in psychiatric, neurological and healthy populations could be the use of more ecological assessment tools such as questionnaires or scales. Such instruments have been identified as having greater clinical and ecological validity than many behavioral or experimental tasks in the neuropsychological literature.<sup>21</sup> A recent review of DM questionnaires and scales identified the Melbourne Decision Making Questionnaire (MDMQ)<sup>22</sup> as the most widely used instrument of its kind.<sup>23</sup> The questionnaire is based on the conflict theory of DM proposed by Janis

and Mann,<sup>24</sup> and aimed to study this cognitive process within the social and affective context in which it is typically encountered. According to the conflict theory, any situation in which a decision must be made is a powerful source of intrapersonal stress due to its potential for material, financial or personal loss. The three main factors that determine the way people cope with this stress are: knowledge of the risks involved in each alternative, hope of finding superior alternatives and belief that there is sufficient time to select and ponder the consequences of alternatives available. Each combination of these factors results in a different style of DM. For instance, in an attempt to escape the stressful situation, individuals may uncritically adopt any alternative available, ignore important information about the risks involved in the process, or even avoid it altogether by procrastinating or passing on the responsibility to other individuals; these behavior patterns constitute the unconflicted adherence, unconflicted change and defensive avoidance strategies outlined by the theory. Alternatively, individuals may become hypervigilant, impulsively choosing a course of action in a desperate attempt to escape the stress of DM, or exercise a vigilant strategy, by weighing alternatives carefully and choosing an alternative in an adaptive and adequate manner.

The MDMQ therefore evaluates four different patterns of DM, namely, vigilance, hypervigilance, buck-passing and procrastination. Since its development, the MDMQ has been successfully used to examine the association between DM and personality,<sup>25-28</sup> psychiatric disorders,<sup>29</sup> substance use,<sup>30-32</sup> and symptoms of depression and anxiety.<sup>33</sup> The MDMQ has been adapted from the original English into several other languages, including French,<sup>34</sup> Italian,<sup>35</sup> Spanish,<sup>36</sup> Swedish,<sup>37</sup> and Turkish,<sup>38,39</sup> and proved to be a valuable addition to the literature in each of these languages. However, it has not yet been adapted into Brazilian Portuguese. Given the widespread use of the IGT in the Brazilian literature,<sup>40</sup> and the unavailability of questionnaires and scales to complement this assessment, the adaptation of an instrument such as the MDMQ into Brazilian Portuguese would be a valuable addition to the existing literature.

As such, the aim of the present study was to conduct the translation and adaptation of the MDMQ into Brazilian Portuguese, and collect evidence of its validity and reliability by analyzing its factor structure, internal consistency, and sensitivity to external factors which are known to influence DM, such as the presence of psychiatric disorders (BD and MDD) and depression symptoms of varying levels of severity.

## Method

This study was conducted in two stages, consisting of the (1) adaptation process and (2) empirical validation of the MDMQ, respectively. Each of these stages involved a different set of participants and procedures, which will be described in the following sections.

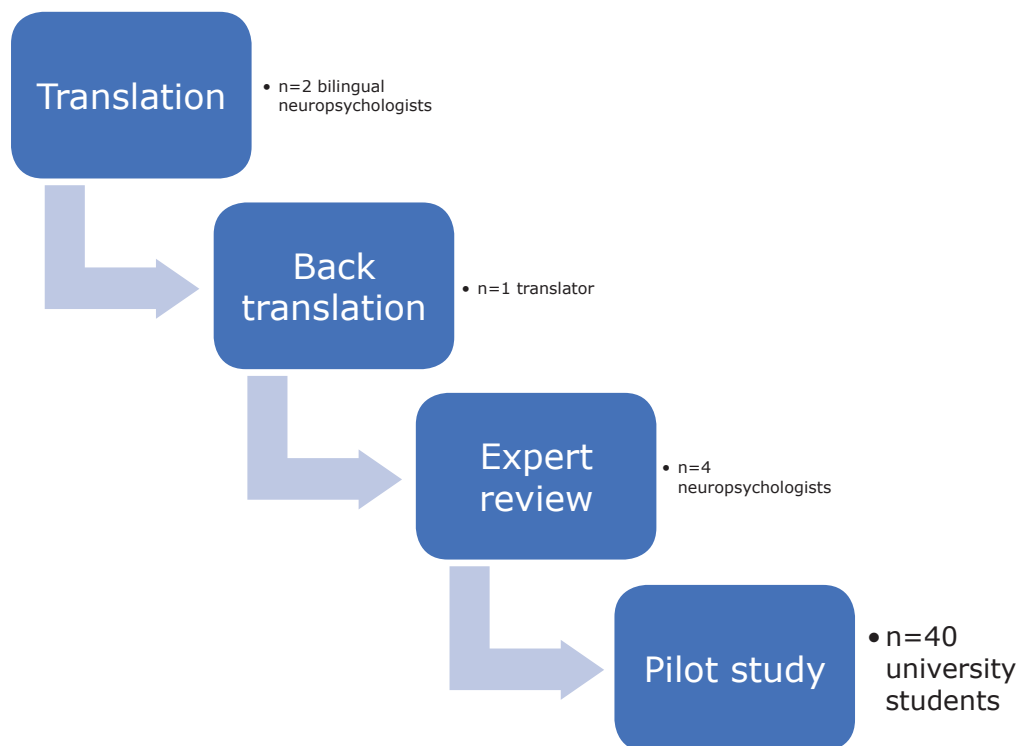
### Adaptation of the MDMQ

The adaptation of the MDMQ into Brazilian Portuguese was carried out in four steps. The first involved the independent translation of the original scale by two bilingual psychologists with expertise in neuropsychological assessment. This was followed by a creation of a consensus version of the scale in Portuguese based on the two translations. This instrument was then submitted to back translation from Portuguese to English, to determine the extent to which the translated items conveyed the original meaning of the items in the scale. Discrepancies identified in this process were rectified by a rewording of the Portuguese items. After these adjustments, the Portuguese version of the MDMQ was reviewed by a panel of four expert judges with experience in neuropsychological assessment. The

judges were provided with information regarding the theoretical background of the scale, if necessary, and asked to identify which DM strategy was evaluated by each item in the instrument. All issues raised by the judges were addressed before submitting the scale to a pilot study in the fourth step of the adaptation process. An illustration of the stages involved in the adaptation of the MDMQ into Brazilian Portuguese is shown in Figure 1.

### Validation

Upon completion of the adaptation process, the scale was administered to a larger sample in order to collect evidence of its validity and reliability. As a general rule, factor analysis studies tend to include 5 to 10 participants per observable variable, though simulation studies suggest that a minimum sample size of 200 may be required to conduct this type of analysis with sufficient statistical power.<sup>41</sup> As such, the validation sample for the present study included a total of 234 participants. The sample consisted of healthy adults, as well as patients with MDD and BD. Patients were recruited from the mood disorders outpatient unit of a psychiatric hospital, a university teaching clinic,



**Figure 1** - Methodological procedures involved in the adaptation and validation of the Melbourne Decision Making Questionnaire into Brazilian Portuguese

and private practice. Control participants were selected by convenience from work and university settings, as well as the community at large.

All patients were at least 18 years old, and had at least one year of formal education. The following exclusion criteria were applied to the sample: uncorrected sensory impairments which would interfere with task performance, neurological conditions, and pregnancy or lactation. Patients with psychotic symptoms at the time of testing or who reported substance abuse within the previous month were also excluded from participation. The control group was selected using the same criteria, and was screened for mood disorders according to DSM-5 criteria, cognitive impairment and intellectual disability.

### Instruments

The MDMQ consists of 22 statements which describe attitudes toward DM or behaviors and thoughts that individuals may exhibit in such situations. For each of these 22 items, the respondent is asked to rate the extent to which these describe his behavior on a Likert scale ranging between 'True for me' (score 2), 'Sometimes true' (score 1) and 'Not true for me' (score 0). The MDMQ is composed of four subscales, each related to one of the DM styles described by Janis and Mann's conflict theory.<sup>24</sup> The vigilance scale, the only one to tap into an adaptive DM style, is composed of six items that describe a thoughtful and cautious approach to DM (e.g., "When making decisions I like to collect a lot of information."). The procrastination subscale, composed of five items, contains statements such as "Even after I have made a decision I delay acting upon it." The buck-passing subscale contains six items in total, all referring to a tendency to shift responsibility onto other individuals during situations of DM (e.g., "I prefer that people who are better informed decide for me."). Both procrastination and buck-passing are considered avoidant styles of DM. The last subscale refers to hypervigilance, which leads the individual to seize impulsively and uncritically upon any alternative available in a desperate attempt to end the stress caused by the DM situation (e.g., "I cannot think straight if I have to make a decision in a hurry").

In addition to the MDMQ, participants in the validation study were assessed by means of questionnaires and screening instruments to identify and confirm inclusion and exclusion criteria. The Mini-Mental State Examination (MMSE)<sup>42,43</sup> was used to screen for symptoms of dementia, while the Block Design and Vocabulary Subtests from the Wechsler Adult Intelligence Scales (WAIS-III)<sup>44</sup> were used to exclude intellectual disability. Participants were also administered the Mini

International Neuropsychiatric Interview (MINI),<sup>45</sup> and those with a diagnosis of MDD or BD completed the Hamilton Depression Rating Scale (HDRS)<sup>46,47</sup> and the Young Mania Rating Scale (YMRS)<sup>48,49</sup> to evaluate current mood state.

### Data analysis

Data were analyzed using both descriptive and inferential methods. Expert ratings in the adaptation stage of the instrument were interpreted based on percent agreement. The demographic and clinical characteristics of the validation sample were examined using mean and standard deviation (SD) values, as well as absolute frequencies and percentages, when applicable.

The internal structure of the MDMQ was evaluated using confirmatory factor analysis (CFA) with weighted least squares means-variance (WLSMV) estimation. Model fit was determined using the root square mean error of approximation (RMSEA), as well as the comparative fit (CFI) and Tucker-Lewis indices (TLI). The cutoff values for model fit adopted in the present study were >0.95 for the CFI and TLI, and <0.06 for the RMSEA.<sup>50</sup> These procedures were performed using the MPlus statistical software, version 6.12. Internal consistency analyses were performed using the Cronbach's alpha coefficient for the scale as a whole, as well as each of the subscales identified. Lastly, MDMQ scores were compared among participant groups in the validation sample using a two-way analysis of variance (ANOVA), with diagnosis (none vs. MDD vs. BD type I vs. type II) and depression severity (none vs. mild vs. moderate vs. severe) as between-subject factors.

## Results

### Adaptation

Upon completion of the translation and back translation stages of the adaptation process, the MDMQ was reviewed by a panel of experts to determine the extent to which each of the items captured their intended DM strategy. For 17 of the items, judgments of content validity were agreed upon by 100% of judges, whereas a 75% agreement rate was reached on further 3 items (items 2, 4, and 14), and a 50% agreement rate was observed on item 8 ("I avoid making decisions."). Item 5 proved to be particularly problematic, and resulted in several concerns being raised by the judges who believed it did not adequately capture the theoretical construct of hypervigilance. As such, to ensure the content validity of this subscale, a new item, based on the definition of hypervigilance provided by Mann

et al.,<sup>22</sup> was created and substituted for item 5 in the final version of the scale. The resulting version of the MDMQ was then pilot tested for comprehensibility in a sample of 40 university students with 18 to 50 years of age ( $M=22.58$ ;  $SD=6.96$ ). All participants completed the scale successfully, and no comprehension or interpretation issues were identified on any of the items.

### Validation

The clinical and demographic characteristics of each subgroup of participants in the validation sample is shown in Table 1.

In the first stage of the validation process, the factor structure of the Brazilian version of the MDMQ was analyzed using CFA to determine whether the scale conformed to a 4-factor model, as expected. Although all factor loadings were significant at  $p<0.001$ , the parameters for model fit did not meet the specified cutoff values. The CFA for the full, 22-item scale yielded the following parameters:  $RMSEA=0.095$ ,  $CFI=0.905$  and  $TLI=0.892$ .

The reliability of each subscale was then calculated using Cronbach's alpha. The results of this procedure identified two items which, if deleted, would increase the reliability of their respective subscales. These were items 15 and 16, from the buck-passing and vigilance subscales, respectively. A reassessment of model fit using CFA on the scale without these two items also failed to produce a satisfactory model ( $RMSEA=0.160$ ,  $CFI=0.728$  and  $TLI=0.693$ ).

We then proceeded to evaluate the item-total correlations for the remaining 20 items in their respective subscales. This process revealed that all but two items, both in the hypervigilance subscales, had item-total correlations  $>0.40$ . Items 5 and 17 yielded

item-total correlations of 0.315 and 0.374, respectively. These two items were then removed, and the model fit of the remaining 18 items was reevaluated using CFA. This time, though the RMSEA was slightly above the cutoff value, both the CFI and TLI were found to be acceptable:  $RMSEA=0.069$ ,  $CFI=0.964$  and  $TLI=0.958$ . All item loadings were significant at  $p<0.001$ . Though item 2 in the hypervigilance scale still had an item-total correlation slightly below 0.4, its removal from the scale had a significant negative impact on model fit parameters. As such, all 18 items were retained in the final version of the scale.

The internal consistency of the scale as a whole was found to be  $\alpha=0.824$ , while corresponding values for each of the subscales were as follows:  $\alpha=0.857$  for vigilance,  $\alpha=0.853$  for buck-passing,  $\alpha=0.664$  for hypervigilance and  $\alpha=0.791$  for procrastination. The final items in the MDMQ are shown in Table 2.

After the psychometric properties of the scale and its final format were defined, total scores were calculated for each subscale by adding up the ratings of the relevant items. The correlations between factor scores were then calculated. The results of this analysis are shown in Table 3.

As can be seen in the table, significant positive correlations were identified between all three maladaptive styles of DM. Adaptive decision-making, on the other hand, showed a significant negative correlation with procrastination and buck-passing, and so significant association with hypervigilance.

Total values for each subscale scores were also compared between groups in the validation sample in a two-way ANOVA, with diagnosis and mood state as between-subject factors. Scores on the vigilance scale displayed a significant main effect of diagnosis ( $F_{3,226}=3.150$ ,  $p=0.026$ ,  $\eta_p^2=0.042$ ). Post-

**Table 1** - Demographic and clinical characteristics of each participant group

	<b>Control (n=101)</b>	<b>MDD (n=60)</b>	<b>BD type II (n=37)</b>	<b>BD type I (n=36)</b>
Age	28.67 (11.22)	37.57 (13.89)	41.74 (14.83)	44.05 (12.02)
Education <sup>†</sup>	15.40 (3.71)	14.95 (4.56)	15.56 (5.02)	12.42 (5.90)
SES	30.62 (7.08)	30.11 (7.62)	31.31 (8.38)	25.17 (8.57)
FRW	18.50 (4.27)	16.51 (5.44)	16.13 (4.86)	12.08 (5.83)
HDRS	1.70 (2.03)	9.70 (7.82)	13.23 (10.02)	14.25 (9.64)
YMRS	0.75 (1.50)	1.49 (1.89)	3.53 (10.02)	2.28 (3.87)
IQ	120.46 (11.33)	117.58 (11.72)	112.12 (10.53)	103.38 (11.17)
Gender (F;n)*	46 (45.5%)	42 (60.0%)	28 (75.7%)	31 (86.1%)

Data presented as mean and standard deviation, unless otherwise specified.

BD = bipolar disorder; FRW = frequency of reading and writing; HDRS = Hamilton Depression Rating Scale; IQ = intelligence quotient; MDD = major depressive disorder; MMSE = Mini-Mental State Examination; SES = socioeconomic status; YMRS = Young Mania Rating Scale.

\* Absolute and relative frequency of female participants.

<sup>†</sup> Years of formal education.

hoc tests revealed that control participants (M=15.63; SD=3.07) scored higher than participants with BD type I (M=11.94; SD=5.34,  $p<0.001$ ) and BD type II (M=13.71; SD=4.52,  $p=0.045$ ).

Scores on the hypervigilance scale displayed a significant main effect of mood state ( $F_{3,226}=4.377$ ,  $p=0.005$ ,  $\eta_p^2=0.058$ ). Post-hoc tests revealed that participants with no symptoms of depression (M=5.64; SD=2.71) obtained lower scores on this subscale than those with either mild (M=7.52; SD=2.54,  $p=0.023$ ) or moderate (M=8.79; SD=1.84,  $p<0.001$ ) symptoms of depression.

The procrastination subscale also displayed a main effect of mood state ( $F_{3,226}=3.577$ ,  $p=0.015$ ,  $\eta_p^2=0.048$ ).

Post-hoc tests revealed that participants with no symptoms of depression (M=7.45; SD=3.88) as well as those with mild symptoms (M=9.02; SD=4.31) obtained lower scores on this subscale than those with moderate symptoms of depression (M=11.95; SD=2.90),  $p=0.001$  and  $p=0.051$ , respectively. The main effect of participant diagnosis on the procrastination subscale also approached significance ( $F_{3,226}=2.598$ ,  $p=0.053$ ,  $\eta_p^2=0.035$ ), and as such, post-hoc tests for participant subgroups were also conducted. These procedures revealed that control participants (M=6.78; SD=3.60) scored lower than subjects with MDD (M=8.75; SD=4.07,  $p=0.052$ ), BD type II (M=9.24; SD=4.71,  $p=0.002$ ) and BD type I (M=9.92; SD=3.88,  $p<0.001$ ) on this subscale.

**Table 2** - Final translation of items in the Melbourne Decision Making Questionnaire

Original version	Final version	Decisional style
1. When making decisions I like to collect a lot of information.	Quando tomo uma decisão, eu gosto de reunir uma quantidade de informações.	Vigilance
2. After a decision is made I spend a lot of time convincing myself it was correct.	Depois de tomar uma decisão, passo bastante tempo me convencendo que fiz a escolha certa.	Hypervigilance
3. I put off making decisions.	Eu adio minhas decisões sobre as coisas.	Procrastination
4. I do not make decisions unless I really have to.	Eu não tomo decisões a não ser que seja realmente preciso.	Buck-passing
5. Even after I have made a decision I delay acting upon it.	Mesmo após ter me decidido, demoro para agir conforme minha decisão	Procrastination
6. I prefer to leave decisions to others.	Eu prefiro deixar que os outros decidam por mim.	Buck-passing
7. I avoid making decisions.	Eu evito tomar decisões, porque para mim é difícil resolver.	Buck-passing
8. I take a lot of care before choosing.	Eu tenho bastante cuidado antes de tomar uma decisão.	Vigilance
9. When I have to make a decision I wait a long time before starting to think about it.	Quando eu preciso tomar alguma decisão, espero bastante tempo antes de pensar sobre ela.	Procrastination
10. I cannot think straight if I have to make a decision in a hurry.	Não consigo pensar direito quando preciso tomar uma decisão com pressa.	Hypervigilance
11. I prefer that people who are better informed decide for me.	Eu prefiro que pessoas que estejam mais informadas tomem as decisões por mim.	Buck-passing
12. I consider how best to carry out a decision.	Eu levo em consideração qual a melhor maneira de fazer a decisão.	Vigilance
13. I waste a lot of time on trivial matters before getting to the final decision.	Eu perco bastante tempo com coisas de menos importância antes de chegar a uma decisão final.	Procrastination
14. I like to consider all of the alternatives.	Gosto de pensar em todas as alternativas.	Vigilance
15. I delay making decisions until it is too late.	Eu espero para tomar decisões até que seja tarde demais.	Procrastination
16. If a decision can be made by me or another person I let the other person make it.	Se uma decisão pode ser feita por mim ou por outra pessoa, deixo a outra pessoa decidir.	Buck-passing
17. I try to be clear about my objectives before choosing.	Eu gosto de ter objetivos bem claros antes de tomar uma decisão.	Vigilance
18. I feel as if I am under tremendous time pressure when making decisions.	Me sinto como se estivesse sob muita pressão de tempo quando tomo decisões.	Hypervigilance

**Table 3** - Correlations between subscales of the 18-item Melbourne Decision Making Questionnaire

	1	2	3
1. Vigilance	-	-	-
2. Hypervigilance	-0.015	-	-
3. Procrastination	-0.246*	0.560*	-
4. Buck-passing	-0.246*	0.540*	0.640*

\*  $p<0.001$ .

Lastly, the buck-passing scale reflected main effects of both diagnosis ( $F_{3,226}=3.809$ ,  $p=0.011$ ,  $\eta_p^2=0.051$ ) and mood state ( $F_{3,226}=3.808$ ,  $p=0.041$ ,  $\eta_p^2=0.038$ ). Post-hoc tests revealed that participants with BD type I ( $M=9.76$ ;  $SD=5.17$ ) obtained higher scores on this subscale than both the control subjects ( $M=5.39$ ;  $SD=3.97$ ,  $p<0.001$ ) and participants with MDD ( $M=7.13$ ;  $SD=4.30$ ,  $p=0.022$ ). A significant difference was also observed between the scores obtained by control subjects and those with BD type II ( $M=8.26$ ;  $SD=5.44$ ) on this subscale,  $p=0.002$ . Post-hoc tests for mood state revealed that individuals with no symptoms of depression ( $M=5.90$ ;  $SD=3.96$ ) obtained lower scores on this subscale than those with mild ( $M=8.89$ ;  $SD=5.31$ ,  $p=0.023$ ) or moderate ( $M=9.79$ ;  $SD=4.55$ ,  $p=0.020$ ) depression.

## Discussion

The aim of the present study was to adapt the MDMQ to Brazilian Portuguese, and collect evidence of its validity and reliability by analyzing its factor structure, internal consistency, and sensitivity to external factors which are known to influence DM. Throughout the adaptation process, measures were taken to preserve both the semantic qualities of the original items as well as their relationship to the DM styles they were each meant to represent. Linguistic equivalence was ensured by involving both translation and back-translation methods, and the content validity of each item was investigated by a group of expert judges with experience in DM assessment. The ability of the translated instrument to evaluate the DM strategies proposed by Mann et al.<sup>22</sup> was corroborated by both the factor analysis procedure and the results of the comparative study. The factor structure of the translated instrument was comparable to that of the original MDMQ according to CFA. The instrument as a whole, as well as most of its subscales, displayed good internal consistency. The hypervigilance subscale showed the lowest, though still acceptable, Cronbach's alpha value. Lastly, the MDMQ was sensitive to both depression severity and the presence of MDD and BD, both of which are known to have an impact on DM ability.

Findings regarding the high prevalence of maladaptive DM strategies relative to adaptive DM in patients with mood disorders corroborate those obtained by Radford et al.<sup>29</sup> Participants with both BD type I and BD type II obtained lower scores on the vigilance scale than control participants, corroborating the current literature regarding the presence of DM impairments in both of these disorders.<sup>17,51</sup> The presence of higher procrastination scores among patients with BD and

control subjects is also in agreement with the literature, which has cited procrastination difficulties as a major cause of clinical distress among patients with this condition.<sup>52,53</sup> The fact that both BD type I and BD type II differed from control participants on the buck-passing scale is also an important finding. Conflict theory defines buck-passing as an avoidant DM strategy, in which the decision-maker shifts responsibility to someone else in order to escape or avoid the stress associated with DM.<sup>22</sup> Though avoidant coping styles are usually associated with MDD,<sup>54</sup> they have also been found to be highly prevalent in individuals with BD.<sup>55</sup>

The MDMQ was also sensitive to differences in depression severity in the sample. Interestingly, participant scores on all three maladaptive DM subscales differed between control subjects and individuals with mild symptoms of depression. This finding corroborates previous literature, in which even subclinical symptoms of depression have been found to influence DM in patients with a history of depressive episodes.<sup>56</sup> Given that difficulties in DM are considered a diagnostic criterion for a MDD episode together with other cognitive impairments,<sup>57</sup> the fact that the Brazilian version of the MDMQ was able to identify differences between asymptomatic individuals and those with varying levels of depression provides important evidence of its criterion-related validity.

Although the primary goal of the present study was to collect evidence of the validity of the MDMQ, the present findings also speak to its potential applicability to clinical settings. In addition to complementing the assessment of DM using behavioral tasks, the MDMQ provides several advantages over existing instruments with regard to the assessment and management of impairments in DM ability. Unlike instruments such as the IGT, which can be used to categorize DM as impaired or unimpaired but provide little indication as to the processes associated with any difficulties identified, the MDMQ identifies specific profiles of maladaptive DM. The behaviors described in the questionnaire reflect the patient's daily functioning and shed light on the coping styles used by the individual in response to stressful situations. The results provided by the MDMQ can therefore be used to target clinical interventions and comprehend the association between the patient's symptoms and cognitive or behavioral traits. A person's responses to the MDMQ, and scores on each subscale of maladaptive DM according to the conflict theory, may help clinicians identify dysfunctional behaviors or coping strategies. The conflict theory of DM has already been successfully integrated into intervention strategies in English-speaking countries,<sup>58</sup> and as such, the development of a theoretically-sound version of

the MDMQ in Brazilian Portuguese may contribute to treatment strategies in the local population. The MDMQ is also a paper-and-pencil instrument, which does not require any special equipment for administration or scoring, and can be easily used across different clinical and research settings.

The present findings must be interpreted in light of some limitations. These include the fact that the back-translation procedure was conducted only once, and did not involve a consensus between multiple translators, and the low reliability of the hypervigilance scale. However, it is important to note that the hypervigilance scale was also identified as having the lowest Cronbach's alpha coefficient of all MDMQ subscales at the time of its development,<sup>22</sup> and that the value obtained in the present study was similar to that observed in other investigations of the psychometric properties of the MDMQ.<sup>26</sup>

Nevertheless, the present study produced a reliable and valid version of the MDMQ in Brazilian Portuguese. To date, this may be the only standardized questionnaire in Brazilian Portuguese which allows for the assessment of this particular cognitive skill. This instrument will hopefully contribute to the existing literature on both the neuropsychology and cognitive underpinnings of different psychiatric and neurological disorders, and make for an important complementation of existing findings using behavioral instruments such as the IGT.

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No conflicts of interest declared concerning the publication of this article.

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