Psychometric Validation of the Melbourne Decision Making Questionnaire in the Population of Bangladesh

Moslima Akter[1], Lutfun Naher[1], and Oli Ahmed[1]

Abstract

Decision-making styles play an important role in overcoming everyday challenges we face. Therefore, it is essential to have a psychometrically sound assessment tool to assess decision-making styles we use. This study aimed to validate the Melbourne Decision Making Questionnaire (MDMQ) in Bangla language and cultural context, addressing the lack of available measures for assessing decision-making styles use by the Bangladeshi people. In this study, data were collected from a sample of 300 university students (age mean = 21.20 years) who were selected using the convenience sampling technique. Confirmatory factor analysis supported the four-factor correlated model, as found in the original study. Discrimination indices of items in both classical test theory and item response theory approaches suggested that items could effectively discriminate between low scorers and high scorers in each subscale. Differential item functioning test results showed no preference to specific gender. Each subscale significantly correlated with Big Five personality traits and life satisfaction. Overall, the results suggest the MDMQ Bangla as a psychometrically sound tool to assess decision-making styles used by Bangladeshi adults. This measure has practical utility for researchers and mental health practitioners, enabling a deeper understanding of decision-making styles among Bangladeshi people, their antecedent factors and impact on daily life.

Keywords: buck-passing, decision-making, hyper vigilance, procrastination, validation, vigilance

In our daily life, we encounter stubborn and stressful situations that necessitate different coping strategies. Making effective decisions, we can overcome these situations. We can be satisfied in our individual and social life if we ameliorate our decision-making skills

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(Filipe et al., 2020). Decision-making is an elective and applicative program that depends on an individual's norms and preferences from a number of substitute (Certel et al., 2013; Rilling & Sanfey, 2011), exploring substitute choices (Gonzalez & Dutt, 2016), examining and assessing a plenty of related facts (Kunsch et al., 2014), sorting out erratic conditions (Guelle et al., 2014), and finally comprising the best activity schemes (Donovan et al., 2015). It is a permanent characteristic that guides individuals in circumstances which requires decisions (Leykin & DeRubeis, 2010). Decision making skills improve our ability to make decisions about the situations that require selections, helping us to attain our destination with confidence (Baron, 2008). We use decision making skills as a coping mechanism to deal with stressful situations in our daily life activities (Isaksson et al., 2014). Siebert et al. (2020) suggest that proactive decision-making increases an individual's abilities , which in turn increases satisfaction with decisions and overall life satisfaction.

There are several measures for assessing decision-making styles, such as the Iowa Gambling Task (IGT: Bechara, 2007), the General Decision-Making Style (GDMS: Scott & Bruce, 1995), and the Melbourne Decision Making Questionnaire (MDMQ: Mann et al., 1997). Among these measures, the MDMQ is the most widely used and validated tool to assess decision making styles. The MDMQ is a reformulation of the Flinders Decision Making Questionnaire (FDMQ: Janis & Mann, 1977). This measure assesses four decision-making styles: vigilance, hypervigilance, buck-passing, and procrastination. Vigilance is an adaptive and the most efficient decision-making strategy (Bailly & Ilharragorry-Devaux, 2011; Isaksson et al., 2014). A vigilant decision maker is more rational, takes responsibilities to make decisions, examines decisions from several choices, and finally selects the most rational one (Cotrena et al., 2018; Ding et al., 2020; Janis & Mann., 1977). Hypervigilance, buck-passing, and procrastination are considered maladaptive decision making strategies (Isaksson et al., 2014). A hypervigilant decision maker experiences higher mental and emotional stress, has difficulty in intentness and ignore problems (Ding et al., 2020; Isaksson et al., 2014; Janis & Mann., 1977). A buck-passing decision maker ignores responsibilities by handing them over to others (Ding et al., 2020; Isaksson et al., 2014; Janis & Mann., 1977). An individual using the procrastination decision-making style avoids thinking and talking about the problems, escapes from unpleasant and important task (Ding et al., 2020; Cotrena et al., 2018; Isaksson et al., 2014).

Studies showed that our decision-making is influenced by our mental health, such as depression (Cotrena et al., 2018; Leykin et al., 2010; Masureik et al., 2014; Umeh & Omari-Asor, 2011; Yang et al., 2014) and anxiety (Hartley & Phelps, 2012; Leykin & DeRubeis, 2010; Masureik et al., 2014; Umeh & Omari-Asor, 2011). Masureik et al. (2014) revealed that as anxiety level increase, the probability of utilizing the hypervigilant and defensive avoidance decision-making styles will also increases among senior learners (Grade 10 – 12), although they usually habituate to the vigilant decision-making style. Anxiety not only offering problems in making decision but also affect thought processes (Lerner et al., 2004). Depressed individual also have less interest in future decision-making and can't bring to bear an efficient decision making process when necessary (Leykin &

DeRubeis, 2010). Effective decision-making and satisfaction with life are closely related (Filipe et al., 2020). Unproductive decision-making may lead to dissatisfaction with life (Bubić & Erceg, 2016), while satisfaction with life has positive association with vigilance decision making style (Deniz, 2006; Kamhalová et al., 2013) and negative association with buck-passing, procrastination, and hypervigilance decision-making styles (Deniz, 2006). Egocentric people have difficulty in productive decision making (Arocena et al., 2011), which may contribute to the development of neuroticism personality (Pitel & Mentel, 2017). Studies revealed that the vigilance decision-making style is positively associated with conscientiousness and openness personality traits and negatively associated with neuroticism, but neuroticism has a contradictory relation with buck-passing and hypervigilance (Deniz, 2011; Fabio, 2006; Halama & Gurňáková, 2014; Rahaman, 2014).

This MDMQ has been validated in different languages and cultures - Spanish (Heredia et al., 2004), French (Bailly & Ilharragorry-Devaux, 2011), Turkish (Colakkadioglu & Deniz, 2015), Flemish (Bouckenooghe et al., 2007), Slovak (Sarmany, 1999), Italian (Nota & Soresi, 2000), Russian (Kornilova, 2013), German (Tipandjan, 2010), Brazilian Portuguese (Cotrena et al., 2017), Swedish (Isaksson et al., 2014), Bangla (Rahaman, 2014), Colombia (Isaza et al., 2021), and Portuguese (Filipe et al., 2020). Although Rahman (2014) assessed the psychometric properties, the author performed item analysis and exploratory factor analysis only. Moreover, the author reported only internal consistency reliability and explained variances. Therefore, we intended to assess psychometric properties of the Melbourne Decision Making Questionnaire in detail in Bangladeshi population. The psychometric properties were assessed using both classical test theory and item response theory approaches.

Method

Participants

In the present study, a sample of 300 university students, all from the University of Chittagong, Chattogram-4331, Bangladesh, was selected via convenience sampling technique. Their mean age was 21.20 years with a standard deviation of 2.11. Among the participants, 150 (50%) were male and 150 (50%) were female. Additionally, 240 (80%) were brought up in nuclear family and 60 (20%) in extended family. In terms of reported socio-economic status, 282 (94%) were in the middle class and 152 (50.7%) were living in city areas, and 148 (49.3%) in village areas.

Procedure

For the forward translation, two bilingual experts (fluent in both English and Bangla) translated the MDMQ into Bangla. These translations were then merged into Bangla. Next, the translated Bangla version of the MDMQ was back translated into English by two other bilingual experts. These back translations were combined into one. Two experts compared the content of the original scale with back translated version to assess any discrepancies

in meaning. They suggested that both versions had the same contents, and there were no discrepancies in meaning. Next, the translated Bangla MDMQ was tested on a sample of 30 university students selected through a convenience sampling technique. The Cronbach's Alphas were ranged from .57 to .84 and the corrected item total correlations ranged from .09 to .83. Only item 15 had low item correlation (.09). Therefore, this item was examined again, and necessary modifications were made following the same forward-backward translation procedure. This scale was included in the final study.

Measures

In the present study, the questionnaire booklet included the Melbourne Decision Making Questionnaire (MDMQ: Mann et al., 1997) Bangla (translated in the present study), the Big Five Personality Inventory-10 (Rammstedt & John, 2007; Bangla version: Ahmed & Hossain, 2020), and the Satisfaction with Life Scale (SWLS: Diener et al., 1985) in Bangla (Jesmin, n.d.), along with a demographic information form covering age, gender, family type, socio-economic status, and current residence areas.

Melbourne Decision Making Questionnaire (MDMQ)

The Melbourne Decision Making Questionnaire (MDMQ: Mann et al., 1997) comprised 22 items and four subscales. Vigilance ("When making decisions, I like to collect a lot of information") and Buck-passing ("I prefer to leave decisions to others") included six items each, and Procrastination ("When I have to make a decision, I wait a long time before starting to think about it") and Hypervigilance ("After a decision is made, I spend a lot of time convincing myself it was correct") included five items each. Participants responded to each item using a three-point Likert-type scale, ranging from 'not true for me' (0) to 'true for me' (2). The total score can range between 0 to 44. In the present study, the MDMQ was translated into Bangla from English following the forward-backward translation procedure (described in the Procedure subsection).

Big Five Personality Inventory-10 (BFPI-10)

The Big Five Personality Inventory-10 (BFI-10) is a self-reported brief measure for quick assessment of the Big Five personality traits. This inventory contains 10 items, and each trait assessed by two items. Participants responded to each item using a five-point Likert-type scale, ranging from 'Strongly Disagree' (1) to 'Strongly agree' (5). Total scores ranged between 2 and 10 for each trait. The authors reported acceptable reliability and validity of this measure (Ahmed & Hossain, in press; Costa & McCrae, 1992). In the present study, inter-item correlations of the subscale were sufficient, ranged between .19 and .55 (Pallant, 2016). Confirmatory factor analysis also showed that this inventory had good model fits (χ^2 = 24.05, df = 25, p = .52, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMR = .08).

Satisfaction with Life scale (SWLS)

SWLS is a five-item measure for assessing life satisfaction. Participants responded to each item of this scale using a seven-point Likert-type scale, ranging from 'Strongly Disagree'

(1) to 'Strongly agree' (7). The total score ranged from 5 to 35. A score of 20 indicated a neutral position that was neither life satisfaction nor dissatisfaction. Scores below 20 suggested dissatisfactions with life, and scores above 20 suggested satisfactions with life. This measure was found suitable for use with different age groups (Diener et al., 1985). In the present study, this scale has acceptable internal consistency reliability ($\alpha = .75$). Confirmatory factor analysis also showed that this inventory acceptable good model fits ($\chi^2 = 16.36$, df = 5, $p = .01$, CFI = .97, TLI = .94, RMSEA = .09, SRMR = .07).

Statistical Analysis

IBM SPSS version 25, RStudio 2023.06.2, and jMetrik were used to analyze the data. The psychometric properties of the MDMQ-Bangla were examined using both classical test theory (CTT) and item response theory (IRT) approaches.

In CTT, item analysis (Corrected item-total correlation, Cronbach's Alpha) and confirmatory factor analysis were performed. In IRT, the Graded Response Model (GRM) was utilized, as this model is suitable for Likert-type polytomous items. Before running the GRM, assumptions (unidimensionality, local dependence, and monotonicity) were examined. Next, item fits (S- χ^2) were examined. In GRM, slope and threshold parameters were examined. In addition, differential item functioning (DIF) bias between males and females were examined. Finally, Pearson Product-Moment correlation coefficient was performed to assess the correlation between decision making styles, personality traits, and life satisfaction.

Ethics

This study was carried out following the Declaration of Helsinki and its later amendments or comparable ethical standards. The Ethical Review Committee of the Department of Psychology, University of Chittagong, Bangladesh approved this study (ERB-PSY-CU-24-2021).

Results

Table 1 presents the descriptive statistics and item-level psychometric properties of the Melbourne Decision Making Questionnaire (MDMQ). The skewness (ranges between -1.35 to .90) and kurtosis (ranged between -1.12 to .66) values were between the recommended ranges by Kim (2013), which suggested the normality of the data.

Classical test theory approach

Item analysis results (Table 1) demonstrated that all items had a higher corrected item-total correlation (<.20; Kline, P. 1986). These values ranged between .47 and .58 for the Vigilance subscale, between .33 and .58 for the Buck-passing subscale, .25 and .51 for the Procrastination subscale and .36 and .47 for the Hypervigilance subscale). Only item 12 of

the Buck-passing subscale had a low corrected item total correlation (>.20). Therefore, this item was excluded in subsequent analysis.

Table 1

Item level psychometric properties of the Bangla version of Melbourne Decision Making Questionnaire.

Items	M	Skewness	Kurtosis	CITC	Factor loading
Vigilance					
Item 1	1.42	-.45	-.67	.56	0.63
Item 2	1.32	-.34	-.65	.47	0.53
Item 3	1.72	-1.35	.66	.51	0.56
Item 4	1.44	-.78	-.51	.58	0.64
Item 5	1.52	-.87	-.24	.56	0.69
Item 6	1.45	-.70	-.49	.54	0.64
Buck-passing					
Item 7	.50	.70	-.24	.33	0.48
Item 8	1.03	-.04	-1.10	.44	0.51
Item 9	.69	.58	-.10	.58	0.74
Item 10	.77	.41	-1.12	.54	0.72
Item 11	1.31	-.42	-.73	.42	0.39
Item 12	1.67	-1.38	.96	.19	
Procrastination					
Item 13	1.23	-.35	-.97	.43	0.42
Item 14	.95	.07	-.90	.51	0.58
Item 15	1.30	-.47	-.85	.30	
Item 16	.88	.17	-.98	.42	0.66
Item 17	.47	.87	-.22	.25	0.47
Hypervigilance					
Item 18	.85	.23	-1.00	.38	0.60
Item 19	.71	.51	-.99	.36	0.52
Item 20	1.11	-.07	-.42	.40	0.44
Item 21	1.19	-.32	-1.11	.36	0.48
Item 22	1.11	-.17	-.10	.47	0.49

CITC = corrected item-total correlation.

Table 2 presents the scale level psychometric properties of the MDMQ Bangla. Confirmatory factor analysis (CFA) results show that the four-factor correlated model of the MDMQ Bangla had good model fits (χ^2 = 290.51, df = 183, p < .01, CFI= 0.96, TLI=

0.95, RMSEA= 0.04, SRMR= 0.07). However, factor weights showed that item 15 had a low factor weight (.25). This item was excluded, and CFA run again. The revised model also had good model fits (χ^2 = 209.51, df = 164, p = .01, CFI= 0.98, TLI= 0.98, RMSEA= 0.03, SRMR= 0.06) (Table 2 and Figure 1). Results in Table 2 also demonstrated that subscales of the MDMQ Bangla had acceptable internal consistency reliabilities (between 0.60 and 0.70; Kline, P. 2015) (alpha ranged between 0.63 and 0.78, omega ranged between 0.64 and 0.79). The mean inter-item correlations for subscales were also within the recommended range, ranging from 0.25 to 0.38 (.20 - .40; Briggs & Cheek, 1986). Standard error of measurement scores being below half of the respective subscales' standard deviation suggest that the test scores are relatively precise and the observed scores are close to the true scores with minimal error.
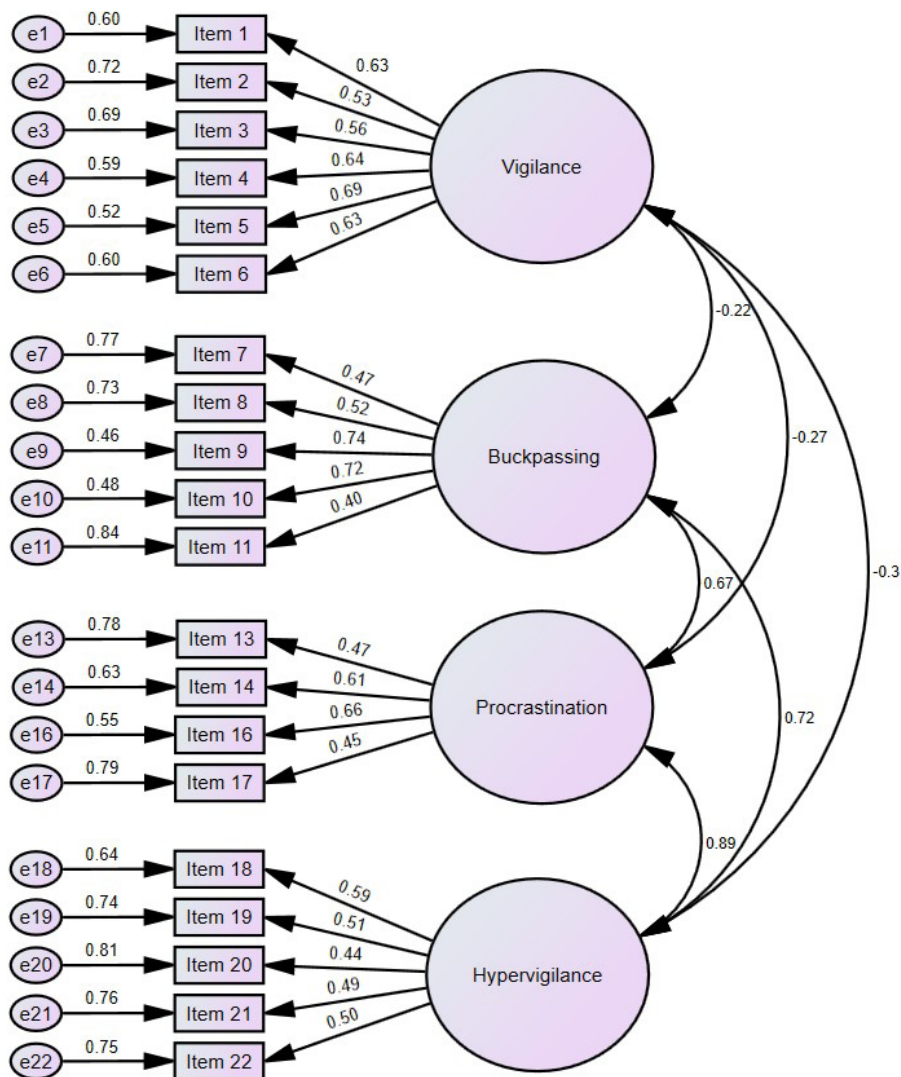
Table 2

Scale level psychometric properties of the Bangla version of Melbourne Decision Making Questionnaire.

	Vigilance	Buck-passing	Procrastina-tion	Hypervigi-lance	Suggested cut off
Alpha	0.78	0.71	0.63	0.64	≥ 0.7
Omega	0.79	0.72	0.61	0.64	≥ 0.7
Mean inter-item correlation	.38	.32	.28	.26	Between .15 to .50
Standard error of measurement	1.16	1.25	1.13	1.35	Smaller than SD/2
Model fits of confirmatory factor analysis					
χ^2 (df, *p* value), χ^2/df	209.51 (164,.009), 1.28				Nonsignificant
CFI	0.98				>.95
TLI	0.98				>.95
RMSEA	0.03				<.08
SRMR	0.06				<.08

Figure 1

Confirmatory Factor Analysis of the Melbourne Decision Making Questionnaire (First order model).

Item response theory approach

Table 3 and Supplementary Table 1 demonstrate the results from the item response theory approach. Supplementary Table 1 shows that vigilance and buck-passing had moderate unidimensionality, while the rest of the two subscales had weak unidimensionality. Regarding local dependance, p-values (adjusted for false discovery rate) for residual

correlations of all the items were above .05. These nonsignificant p-values suggested that there was no violation of the local dependence assumptions. Regarding monotonicity, there were no significant violations of monotonicity. These results showed that all the IRT assumptions were met. Item fit statistics (Table 3) shows that all S-χ^2 values were not significant. These results suggested that items belonged to their respective subscales.

Table 3

IRT item fits, slop, threshold outputs of the MDMQ Bangla

Items	Item fits			Slop parameter (a)	Threshold parameter (b)	
	S-χ^2	Df	P value		b_1	b_2
Vigilance						
Item 1	2.98	4	.56	1.91	-2.21	0.10
Item 2	6.51	6	.37	1.44	-2.21	0.37
Item 3	6.66	5	.25	1.96	-3.10	-0.83
Item 4	7.81	5	.17	2.11	-1.64	-0.11
Item 5	5.57	4	.23	1.95	-2.09	-0.26
Item 6	3.44	5	.63	1.77	-2.08	-0.09
Buck-passing						
Item 7	12.47	9	.19	1.03	0.34	2.85
Item 8	12.45	9	.19	1.16	-1.21	1.02
Item 9	2.78	7	.90	2.62	-0.06	1.14
Item 10	11.74	7	.11	2.32	-0.25	1.09
Item 11	13.70	8	.09	1.07	-2.38	0.36
Procrastination						
Item 13	3.41	5	.77	1.07	-1.83	.54
Item 14	4.61	4	.77	2.70	-.73	.95
Item 16	2.54	5	.77	1.31	-.77	1.41
Item 17	4.82	5	.77	.86	.46	3.70
Hypervigilance						
Item 18	6.68	8	.53	1.07	-0.78	1.66
Item 19	8.19	9	.52	1.01	-0.22	1.92
Item 20	7.01	8	.54	1.23	-1.83	1.15
Item 21	13.77	8	.09	1.16	-1.52	0.50
Item 22	6.23	8	.62	1.82	-1.17	0.65

Table 3 also presents the slope and threshold parameters of the subscales. Concerning the vigilance subscale, item 2 had a high slope (1.45), and the rest of the items had a very high slope parameter (1.77 – 2.11). These items provide sufficient information about latent

traits. Item 1 and item 2 were more difficult compared to the rest of the items in which a higher latent trait or theta is required to endorse response option 'True for Me'. Regarding the buck-passing subscale, item 7, 8, and 11 had a moderate slope parameter (1.03 – 1.16), and the other two items had a very high slope parameters (2.32 – 2.62). Item 9 and 10 provide more information about the latent traits compared to the items with a moderate slope parameter. Item 7 required a higher latent trait or theta to endorse this item compared to the rest of the items 'Sometimes True'. Regarding procrastination, item 13, 16, and 17 had a moderate slope parameter and provided sufficient but less information than item 14 (.86 – 2.70). Item 17 required a higher latent trait or theta to endorse this item compared to the rest of the items 'Sometimes True'. About the hypervigilance subscales, all the items had a moderate slope parameter except item 22 (1.01 – 1.82). All the items required a higher latent trait or theta to endorse the response option 'True for Me'. The scale information curve (SIC) (Figure 2) shows that vigilance subscales provide more information about latent traits or theta compared to other subscales. Table 4 shows the DIF contrasts of the MDMQ scale between males and females. Non-significant Mentel-Haenzsel χ^2 values suggest the absence of DIF bias in all the items. None of the items of the MDMQ Bangla has a preference to any specific gender.

Figure-2

Scale Information curves of the Buck passing, Hyper vigilance, Procrastination and Vigilance subscales of the MDMQ-Bangla.
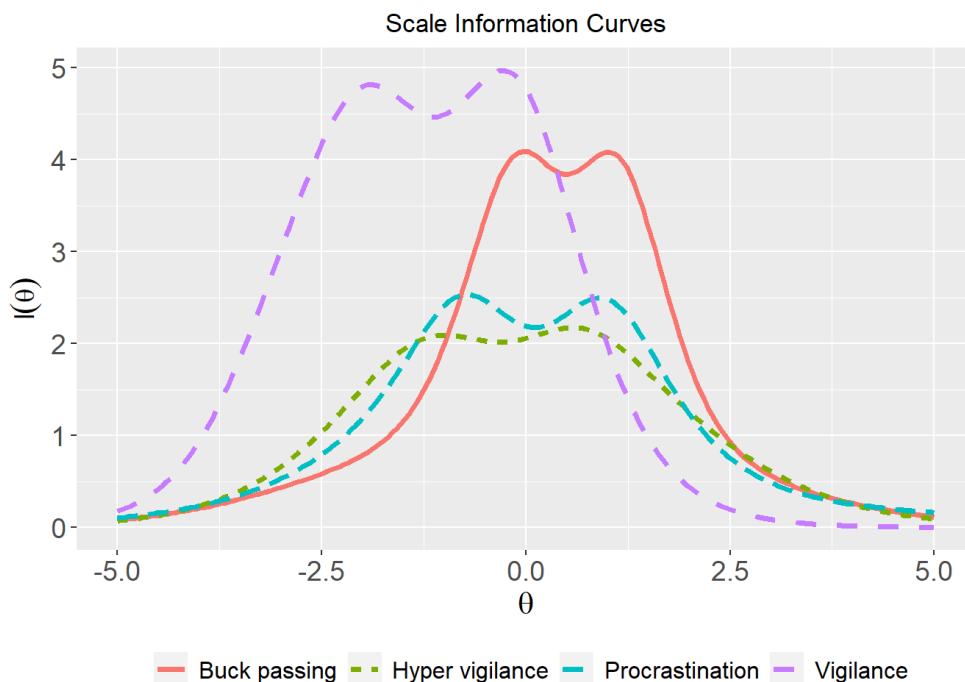
Table 4

Differential Item Functioning Statistics of this scale between male and female group

Vigilance		Buck passing		Procrastination		Hyper vigilance	
Items	**M-H χ^2 (p)**	**Items**	**M-H χ^2 (p)**	**Items**	**M-H χ^2 (p)**	**Items**	**M-H χ^2 (p)**
Item 1	.55 (.46)	Item 7	1.05 (.31)	Item 13	5.37 (.02)	Item 18	3.98 (.05)
Item 2	2.48 (.12)	Item 8	.05 (.86)	Item 14	2.51 (.11)	Item 19	2.98 (.08)
Item 3	.50 (.48)	Item 9	.00 (.96)	Item 16	.68 (.41)	Item 20	2.48 (.12)
Item 4	.20 (.65)	Item 10	1.15 (.28)	Item 17	.06 (.81)	Item 21	.62 (.43)
Item 5	.18 (.67)	Item 11	.03 (.87)			Item 22	.16 (.69)
Item 6	.24 (.62)						

M-H χ^2: Mentel-Haenzsel χ^2

Reference group= Male; Focal group= Female

Correlation analysis results (Supplementary Table 2) showed that vigilance had a significant negative association with the other three scales (between r = -.14 and r = -.23). Buck-passing, procrastination, and hypervigilance were also positively and significantly correlated with each other (between r = .47 and r = .58). Table 5 also shows the associations of MDMQ's subscales with personality traits and life satisfaction. Vigilance has a significant positive association with agreeableness, conscientiousness, openness, and life satisfaction (ranged between $r = .13$ and $r = .29$), and a significant negative association with neuroticism ($r = -.30$). Buck passing has a significant negative correlation with extraversion, agreeableness, conscientiousness, openness and satisfaction with life (ranged between $r = -.13$ and $r = -.32$), and a significant positive correlation with neuroticism ($r = .38$). Table 5 also shows that procrastination has a significant negative correlation with extraversion, agreeableness, conscientiousness, openness, and satisfaction with life (ranged between $r = -.23$ and $r = -.39$) and a significant positive correlation with neuroticism ($r= .37$). Hypervigilance has a significant negative correlation with extraversion, agreeableness, conscientiousness, openness, and satisfaction with life (ranged between $r= -.19$ and -.36) and a significant positive correlation with neuroticism ($r= .45$). These results suggest the convergent validity and concurrent validity of the MDMQ Bangla.

Table 5

Correlations of the subscales of MDMQ Bangla to Big Five Personality Traits and Life Satisfaction

Sub-scales	Vigilance	Buck-passing	Procrastination	Hypervigilance
Extraversion	.09	-.23**	-.24**	-.19**
Agreeableness	.20**	-.20**	-.33**	-.31**
Conscientiousness	.13*	-.32**	-.39**	-.30**
Neuroticism	-.30**	.38**	.37**	.45**
Openness	.29**	-.34**	-.39**	-.36**
Life satisfaction	.20**	-.13*	-.23**	-.25**

*p<.05, **p<.01

Discussion

The Melbourne Decision Making Questionnaire (MDMQ; Mann et al., 1997) is one of the most used scales for assessing decision-making styles across different cultures. In the present study, psychometric properties of the MDMQ were examined using both classical test theory and item response theory approaches, as there was a lack of validated assessment tool for assessing decision making styles of Bangladeshi young adults. Results showed that all items, except item 12, had good item discrimination indices. Good item discrimination indicates that these items were able to differentiate between low scorers and high scorers in decision-making styles' subscales. Among the subscales, items in the vigilance and buck-passing subscales had higher corrected item-total correlation than those in the procrastination and hypervigilance subscales. Cotrena et al. (2018) found a similar pattern of item discrimination indices in the Brazilian version of the MDMQ. A lower discrimination index would be due to the cultural and language differences in meaning. Future studies will be needed to explore the discrepancy.

The confirmatory factor analysis results showed good model fits for the four factors first-order model of the MDMQ Bangla version. The four-factor structure of the MDMQ Bangla version is consistent with the original study (Mann et al., 1997) and other validated versions (e.g., Cotrena et al., 2018; Isaksson et al., 2014). However, item 15 had a low factor loading and excluded from the model. Item 15 was about taking a long time before starting to think. Social desirability bias could be a reason for lower factor loading of this item. We have an innate tendency to present ourselves as an ideal one. Being an ideal, this item would be responded to in a different pattern compared to the rest of the items in the procrastination subscale.

Results regarding internal consistency reliability showed that the MDMQ Bangla version had good internal consistency reliability. Most studies in other cultures and languages found good internal consistency reliability and a split half reliability for the MDMQ subscales and the full scale (e.g., Cotrena et al., 2017; Filipe et al., 2020; Mann et al., 1997). However, the internal consistency reliability of the procrastination and hypervigilance subscales was lower than the commonly suggested cutoff value (.70). The procrastination subscale had four items and the hypervigilance subscales had five items. Lower internal consistency reliability would be due to the shorter length of the subscales. The lower but acceptable reliability of procrastination and hypervigilance were consistent with the previous studies (e.g., Cotrena et al., 2018; Isaza et al., 2021).

One of the significant strengths of this present study is that the psychometric properties of the MDMQ-Bangla were assessed through an IRT model (graded response model [GRM]). The GRM model was selected due to its high suitability for polytomous response items. To the best of the authors' knowledge, this is the first study that assessed the psychometric properties of the MDMQ using an IRT approach. Results showed that the MDMQ Bangla version performed adequately to assess the decision making styles of the Bangladeshi people. Moderate to very high slope parameters suggested that all items provided sufficient information about the respective decision making styles. Majority of the items in the vigilance subscale needed a lower threshold endorsement compared to the items in three other subscales. This subscale is more efficient to discriminate people using lower level of vigilance decision making styles. As this decision-making style is a positive decision-making style and the rest of three are negative decision-making styles, therefore, lower difficulty level of vigilance subscale compared to other subscales is expected. SIC suggested that vigilance subscale provide more information about the latent trait. However, SIC also suggested that procrastination and hypervigilance subscales provided relatively lower information about the latent traits. As these are negative decision-making styles and also socially undesirable, therefore, it might be related to lower information compared to the vigilance subscale. Differential item functioning test results also explored the absence of item response bias between males and females. It is also another strength of the present study.

Results regarding the correlation among subscales revealed the convergent validity of the MDMQ Bangla version. This finding is consistent with previous studies (e.g., Cotrena et al., 2018; Mann et al., 1997). Moreover, lower to moderate correlation between personality traits and MDMQ subscales, lower but significant correlations between life satisfaction and MDMQ subscales showed the concurrent validity of the MDMQ-Bangla. This result indicates that people with extraversion, agreeableness, conscientiousness, and openness personality pattern may choose vigilant decision making style than other type of decision making styles, whereas neuroticism personality prefers buck-passing, procrastination and hypervigilance decision making style. The findings of the relation between personality traits and MDMQ are supported by previous studies (Bayram & Aydemir, 2017; Riaz et

al., 2012; Tamir & Robinson., 2004; Wood, 2012). Satisfaction with life depends on an individual's judgment ability to achieve personal goals (Diener et al., 1985) and was found to be correlated with decision making. In fact, invalid decisions forecast negative affect and dissatisfaction with life (Bubić & Erceg, 2016). Vigilance is associated with active emotional regulation, increased well-being, and therefore satisfaction with life (Kamhalová et al., 2013) and it is said that vigilance is the most significant predictor of life satisfaction (Bahadir & Certel, 2013).

Limitations and future directions of the Study

Nevertheless, the present study evolved a reliable and valid Bangla version of Melbourne Decision Making Questionnaire (MDMQ). However, there were several limitations. Firstly, the current data were collected via a convenience sampling method and from students. It would be more feasible if we could collect data from various categories. A future study should include a representative sample from all socio-demographic groups. Therefore, this future study would be well informed about the measurement invariance of MDMQ Bangla among different groups, making it more robust measure for assessing decision making styles of the Bangladeshi people. Secondly, the data in the present study was self-reported, which would be subjected to social desirability bias. Despite the above limitations, the Bangla MDMQ version has excellent psychometric properties to assess the different types of decision making styles (vigilance, buck-passing, procrastination, and hypervigilance) among the Bangladeshi culture. As Bangla MDMQ provides a quick assessment of decision making styles, it would be helpful for mental health professional to assess several decision making styles of an individual.

Conclusion

The present study demonstrated that the MDMQ Bangla version has satisfactory psychometric properties in both classical test theory and item response theory approach. This measure has acceptable internal consistency reliability, a satisfactory discrimination index, construct validity, convergent, and concurrent validity. The MDMQ Bangla version would be helpful for researchers and other potential users, including mental health practitioners to learn more about decision making styles of Bangladeshi people and its antecedents' factors, and impact on daily life.

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Appendices

Supplementary Table 1

H coefficients, monotonicity, local dependence outputs of THE Bangla-MDMQ

	H coefficients	Monotonicity			Local dependance G^2 p values					
		#ac	#vi	#zsig	Item1	Item2	Item3	Item4	Item5	Item6
Vigilance										
Item1	.46	4	0	0						
Item2		6	0	0	.61					
Item3		6	0	0	.99	.65				
Item4		4	0	0	.94	.99	.94			
Item5		4	0	0	.94	.99	.61	.94		
Item6		6	0	0	.94	.61	.65	.94	.99	
Buck-passing					Item7	Item8	Item9	Item10	Item11	
Item7	.40	4	0	0						
Item8		6	0	0	.55					
Item9		6	0	0	.14	.55				
Item10		6	0	0	.55	.55	.72			
Item11		12	1	0	.54	.34	.47	.55		
Procrastination					Item13	Item14	Item16	Item17		
Item13	.36	12	0	0						
Item14		12	0	0	.54					
Item16		12	0	0	.29	.29				
Item17		6	0	0	.76	.81	.39			
Hypervigilance					Item18	Item19	Item20	Item21	Item22	
Item18	.32	6	0	0						
Item19		6	0	0	.78					
Item20		6	0	0	.87	.87				
Item21		6	0	0	.87	.87	.87			
Item22		6	0	0	.78	.23	.87	.23		

Supplementary Table 2

Correlations among the subscales of Bangla-MDMQ.

	Buck passing	Procrastination	Hypervigilance
Vigilance	-.14*	-.23**	-.21**
Buck passing		.46**	.49**
Procrastination			.57**

*p=.05, **p=.01