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Study on the validity and reliability of Melbourne Decision Making Scale in Turkey

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This study is to analyze the validity and reliability of Melbourne Decision Making Questionnaire (MDMQ). The sample consisted of 650 university students. The structural validity of the MDMQ, as well as correlations among its sub-scales, measure-bound validity, internal consistency, item total correlations and test-retest reliability coefficients were determined. A confirmatory factor analysis found that the measure was compatible with the five sub-dimensions as depicted in the original scale and all items were well-placed in related sub-scales. Additionally, Cronbach's alpha coefficient was found for the sub-scales such as self-esteem, vigilance, buck-passing, procrastination and hypervigilance .80, .82, .77, .75 and 79 respectively. In the same vein, test-retest consistency was rated as .82, .75, .83, .71 and .72. In the light of this statistical analysis, MDMQ has proven to be a valid and reliable measuring scale for determining levels of self-esteem and decision-making styles of university students.

Key words: Decision making, decision making style, decision making questionnaire.

INTRODUCTİON

An individual typically faces problematic situations which constantly require decision-making and these decisions shape our lives. Whether decisions are made consciously or without awareness, or whether they bear good results or not, our decisions represent our essential purposes to face with the opportunities, challenges and uncertainties of life. For instance, such questions as "Which district of the city should I live?", "Should I go on with my education?", "Which profession should I choose?" show progresses we make in our carriers and lives. How we answer these questions substantially determines our position both in the society and in the world (Hammond et al., 1999). In a decision-making process, individual differences and abundance of options influence decision-making process. The existence of multiple options can make decision making even more difficult, thereby, causing distress in individuals and negatively influencing the decision-making process (Shiloh et al., 2001).

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In addition to individual differences in decision making, cultural differences in value judgment, social attributes and attitudes, instincts, dependency, family, peer pressure, memory, prejudices, coding of information, emotions, motivation, stress, psychoactive substances and problem-solving skills are also effective on the decision-making process (Byrnes, 1998; Klaczynski et al., 2001; Radford et al., 1986; Sinangil, 1993; Singh and Chaudhary, 2015; Yı and Park, 2003). Thus, many theories have been developed in order to explain this process (Baron and Brown, 1991).

Janis and Mann's (1977) conflict theory set the ground work to assess the systematic approaches to decision making. Conflict theory describes five types of decision-making styles and their relation with stress. A stressful event can potentially be any change occuring in the environment. If the change is sufficiently extreme, it may cause negative emotions (such as anxiety, feeling of guilt or shame) and negatively affect the individual information processing. If the psychological stress is at medium level in all stages of the decision-making process, the individual makes the best decision for himself. According to the conflict theory, five basic coping styles are used if a decision-making process is required in a stressful condition. These are: *Unconflicted adherence;* the decision-maker does not care about the signs related with the possible negative outcomes while making decision and decides to keep doing what he is doing. In this case, the individual may not experience stress or may experience it at a low level. *Unconflicted chance;* if there is a risk in not-changing the current situation but not any risk in changing the situation, the decision-maker selects the most appealing or the most advised decision without considering all alternatives. In this case, similar to the case of unconflicted adherence, the individual may not experience stress or may experience it at a low level. *Defensive avoidance;* the decision-maker avoids conflict by not making the decision or passing the decision on to another individual. In this case, the individual experiences a high level of stress and has to decide under the pressure of time. *Hypervigilance;* the decision-maker wants to make the decision as quickly as possible to resolve the situation. Since he makes his decision quickly, he may not consider all the consequences of his choices. In this case, individuals either experience high levels of stress or have to decide under the pressure of time. *Vigilance;* defines a decision-making process in which the individual makes his decision only after careful assessment of all possible alternatives including both positive and negative aspects. In this case, the level of stress is moderate and the individual does not feel the pressure of time (Friedman and Mann, 1993; Janis and Mann, 1977; Mann et al., 1997; Mann et al., 1998).

Individuals use different types of decision-making styles while making decisions (Janis and Mann, 1977; Kuzgun, 1995; Scott and Bruce, 1995). These styles are generally classified into two groups: positive and negative coping methods. In case of a decision-making process, a positive coping style is used when the decision is made by a careful search and assessment of options. The negative coping style is used when the decision is made without dwelling on options as in a limited time period or by buck passing.

According to Janis and Mann (1977) individuals using positive coping styles take some steps in decision-making process. These steps are: 1. Analyzing the alternative aspects of the goals, 2. Calculating all possibilities of the desired goals and defining the results of the choices, 3. Collecting information about not only the positive results of all options but also the risks, pros and cons of the negative results, 4. Carrying out an elaborative investigation to collect proper new information for better assessment of options, 5. Truly internalizing and considering each new information and expert view even if the new information or expert judgments do not support the direction of the first decision, 6. Before making the final decision, including the options which were not accepted at the beginning, reviewing all possible positive and negative results, 7. Make all necessary plans carefully and get ready to apply the chosen action, if expected various risks occur.

Mann *et al.* (1997) developed the Melbourne Decision Making Questionnaire (MDMQ) to define which coping manners are used by individuals in case of decision-making and determine the level of self-esteem. The MDMQ was adapted from the Flinders Decision Making Questionnaire (1982). The questionnaire was based on Janis and Mann's Conflict Theory. MDMQ is composed of two parts. The first part determines the level of self-esteem in decision-making process. Self-esteem in decision-making process provides the individual with the confidence and to feel sure about decisions. The second part pertains to decision-making styles. There are four types of decision-making styles in MDMQ. These are: *1. Vigilance:* defines the decision-making only after carefully investigating a range of alternatives and evaluating their positive and negative aspects, 2. *Buckpassingc:* is a version of defensive avoidance. This style defines the situation when the individual avoids decision-making and psses the buck. *3. Procrastination:* is another form of defensive avoidance. It emphasizes the situation when the individual continuously postpones decision making by engaging with other things and does not want to come up with a decision. *4. Hypervigilance:* this defines the instant decisions by the individual to avoid stress and conflict in case of limited time. In the questionnaire, vigilance is evaluated as a positive coping manner while buck-passing, procrastination and hypervigilance are evaluated as negative ones (Friedman and Mann, 1993; Janis and Mann, 1977; Mann et al., 1997).

Purpose of this study

Research on validity and reliability of the MDMQ were conducted in United States, Australia, New Zealand, Japan, Hong Kong, Taiwan, China and Turkey (Mann *et al.,* 1997). The scale is widely used in determining the decision-making styles of university students in the worldwide literature. In Turkey, three scale instruments were developed and adapted in order to determine decision-making strategies and styles of the university students. These scales are: *1. Decision Strategies Scale:* It was developed by Kuzgun (1993). It measures the decision-making strategies of the high-school and university students. 2. *Decision Making Styles Scale:* It was developed by Scott and Bruce (1995). The scale was adapted to Turkish by Taşdelen-Karçkay (2004). The scale measures the individual differences in the decision-making styles used by the university students while approaching to the problems in the decision making process. 3. *Melbourne Decision Making Questionnaire:* It was developed by Mann et al. (1997) and adapted by Deniz (2004). MDMQ was used in many studies both in Turkey and abroad (Avşaroğlu and Üre, 2007; Deniz, 2006, 2011; Mann et al., 1997; Mann et al., 1998; Sarı, 2010). Validity and reliability tests of the MDMQ were last carried out in 2004. Hambleton and Patsula (1999) stated that the validity and reliability analysis of the adapted scales should be replicated at certain intervals. In this regard, the aim of the present study is to replicate the validity and reliability of the Melbourne Decision Making Questionnaire, which was developed by Mann et al. (1997) and adapted to Turkish by Deniz (2004), for the university students.

METHODOLOGY

Participants

This study was conducted at Faculties of Education, Science and Literature, and Economics and Administrative Sciences of Mustafa Kemal University in the academic year of 2012-2013. The study group consisted of 650 volunteer students studying at these faculties. 338 of the students (52%) were female and 312 (48%) were male; the mean age was 21.2. In order to analyze the concurrent validity and reliability of MDMQ, 144 students studying at the Faculties of Education, Science and Literature, and Economics and Administrative Sciences of Mustafa Kemal University were included as the sample group and they completed the questionnaire on a voluntary basis. 79 of those students (54.9%) were female and 65 (45.1%) were male; the mean age was 20.8.

Data collection tools

Melbourne decision making questionnaire (MDMQ), Decision making styles scale (DMSS) and Problem solving inventory (PSI) were used as data collection tools in the study.

Melbourne decision making questionnaire. Melbourne decision making questionnaire (MDMQ) I-II was prepared by Mann et al. (1997) based upon Flinders decision making questionnaire I-II. The first part of the questionnaire (MDMQ I) aims to identify self-esteem in the decision making process. It consists of six items. These items are answered by marking one of the three following categories: 2 (True for me), 1 (Sometimes true), and 0 (Not true for me). The maximum score that one can obtain from the questionnaire is 12 and the minimum is 0. While higher scores indicate a higher self-esteem in decision making, lower scores show that the individual has a lower self-esteem in decision making. The answers given to the items 2, 4, and 6 are scored reversely. Cronbach's alpha value of the scale was found to be .74 (Mann et al., 1997).

The second part of the questionnaire comprises vigilance, buck passing, procrastination, and hyper-vigilance subscales. The subscales vigilance and buck-passing have six and the procrastination and hyper-vigilance have five items. These items are answered in the same way as in self-esteem subscale. The maximum score that one can obtain from the vigilance and buck-passing subscales is 12 and the minimum is 0. The maximum score that one can obtain from the procrastination and hyper-vigilance subscales is 10 and the minimum is 0. In all subscales, higher scores indicate the use of the related decision style. For the sample chosen from six countries, Cronbach's alpha coefficients were found to be .80, .87, .81 and .74 for the vigilance, buck-passing, procrastination, and hyper-vigilance, respectively (Mann et al., 1997).

The adaptation study of the Melbourne Decision Making Questionnaire was conducted by Deniz (2004). In the results of the analyses, total item correlations of 26 items out of a total 28 items in the scales were found to be over 33 and the total item correlation of the remaining 2 items were 26 and 27. It was understood that the item loads were statistically sufficient. Internal consistency coefficients of the MDMQ were found to be .72, .80, .78, .65 and .71 for the self-esteem, vigilance, buck-passing, procrastination, and hyper-vigilance subscales respectively and the test-retest consistency was .85, .83, .87, .68 and .84 in the same order. It was also found that the MDMQ showed significant relations with compatible scales, Problem Solving Inventory (Heppner and Petersen 1982) and Decision Strategies Scale (Kuzgun, 1992), at around .01 and .05. These results clearly show that the MDMQ I-II is highly valid (Deniz, 2004).

Decision making styles scale. Decision Making Styles Scale (DMSS) was developed by Scott and Bruce (1995) in order to identify the decision making styles of individuals while approaching various problems in the decision making process. The scale consists of 25 items and 5 subscales. The subscales of the scale are the rational, intuitive, dependent, avoidance, and spontaneous decision making styles. The items are answered by marking one of the following five categories: 1 (strongly disagree), 2 (disagree), 3 (uncertain), 4 (agree) and 5 (strongly agree). The maximum score that one can obtain from each subscale is 25 and the minimum is 5. In all subscales, the sum of scores indicate the use of the related decision style.

Adaptation, reliability and validity studies of the scale was conducted by Taşdelen-Karçkay (2004). A five-factor construct was found in the explanatory factor analysis that was performed through Varimax rotation method. Cronbach's alpha internal consistency coefficient was found to be .76 for the rational subscale of DMSS, .78 for the intuitive, .76 for the dependent, .79 for the avoidance and .74 for the spontaneous subscales. All of those observations related to the scale provided sufficient data on the validity and reliability.

Problem solving inventory. Problem Solving Inventory (PSI) was developed by Heppner and Petersen (1982) in order to identify the self-perception of the individuals regarding the problem solving skills. The inventory is a 6 point likert scale consisting of 35 items. The items are answered by marking one of the following six categories: 1 (always behave like this), 2 (mostly behave like this), 3 (often behave like this), 4 (sometimes behave like this), 5 (rarely behave like this) and 6 (never behave like this). The answers are scored from 1 to 6. The minimum score that one can obtain from the inventory is .32 and the maximum is 192. Higher total score obtained from the inventory indicates lower problem solving skills; by the same token lower total score implies higher problem solving skills. As a result of the conducted studies, Cronbach's alpha coefficient of internal consistency was found to be 90 for the entire scale. The range of the item-total score correlations of the scale changed between .25 and .71 while the test-retest reliability varied between .83 and .89.

Problem Solving Inventory was adapted by Taylan (1990) and Şahin et al. (1993). In the study by Taylan (1990), the correlation coefficient obtained from the translation reliability was found to be high and test-retest reliability coefficient was .66. In their study on a total of 244 university students, Şahin et al. (1993) found the Cronbach's alpha reliability coefficient of the scale as .88. In the study on criterion related validity, on the other hand, the correlation coefficient with the Beck Depression Inventory was .33. Following the factor analysis, a total of 6 factors were derived in the scale as impulsive/careless style, careful style, avoidant style, evaluative style, self-confident style, and planned style. All of the observations conducted for the scale provided enough evidence on the validity and reliability.

Procedures

Before collecting the data, all of the required permissions were taken and information about the purpose and voluntarism was explained to the participants. The questionnaires took 10 minutes to complete and were completed in classes under the teacher's' supervision. Moreover, for the criterion related validity and reliability studies of the MDMQ, one week later from the application of MDMQ and PSI, DMSQ were applied. Both applications were completed in 15 to 20 min. A group of students that participated in the study (n=144) were retested after four weeks for the test-retest reliability of the scale.

Data analysis

Within the scope of construct validity of the MDMQ, Confirmatory Factor Analysis (CFA) was conducted in order to confirm the original factors. Due to the categorical scoring of the data (2-1-0), CFA was performed by using the correlation matrix and asymptotic covariance matrix. Diagonally Weighted Least Squares (DWLS) was chosen as the method of estimation. Finney and Distefano (2013) reported that when the DWLS estimation method is preferred, TLI, CFI and RMSEA fit indexes could be used for the fit evaluation of the model. In this regard, these fit indexes were utilized in the goodness of fit assessment. This analysis was performed by using LISREL 8.70 software.

For the criterion related validity and test-retest reliability of the study, Pearson correlation analysis was utilized; and Cronbach's alpha coefficient and total item correlations were used for the reliability analysis. These analyses were conducted by using the SPSS 17 software.

RESULTS

The results regarding the construct validity, inter-correlations of the sub-scales with each other, concurrent validity, Cronbach's alpha internal consistency, item-total score correlation and test-retest reliability are presented.

Construct validity

The construct validity of the MDMQ was examined through the statistical technique of Confirmatory Factor Analysis (CFA). CFA was performed via the correlation matrix and asymptotic covariance matrix. DWLS was used as a method of estimation. Finney and Distefano (2013) reported that when the DWLS estimation method is preferred, TLI, CFI and RMSEA fit indexes could be used for the fit evaluation of the model. In this regard, these fit indexes were taken into consideration in the assessment of goodness of fit. CFA results indicate a good fit of the model (TLI= 0.94, CFI= 0.95, RMSEA= 0.08). In the light of these values, it was determined that five-component model of the Melbourne Decision Making Questionnaire showed a high goodness of fit for the university sample and the factor construct of the Turkish form was consistent with the factor construct of the original form.

Furthermore, the path diagram of the model obtained via CFA is shown in Figure 1.

As seen in Figure 1, in the first part of the scale, self-esteem (Factor 1) obtained with CFA is related to determining the self-esteem level in decision making. The factor loads of the items belonging to this six-item subscale vary between .63 and .87.

The vigilance (Factor 2) that is included in the second part of scale, involves a careful investigation for a number of alternatives and the evaluation of the positive and negative sides of these alternatives in the decision making situations of an individual. Similarly, the factor loadings of the items belonging to this six-item subscale vary between .50 and .92. Buckpassing (Factor 3) involves avoiding decision making and leaving the responsibility to others.

The factor loadings of the items belonging to this five-item subscale vary between .73 and .86. Procrastination (Factor 4) involves a continuous delay, postponement, ignorance of decision making by an individual. Similarly, the factor loadings of the items belonging to this five-item subscale vary between .74 and .84. Finally, hypervigilance (Factor 5) involves a hurried, impulsive approach to a decision making as the individual feels the pressure of time to find a solution. This subscale is also made up of six items and the factor loadings of the items change between .74 and .83.

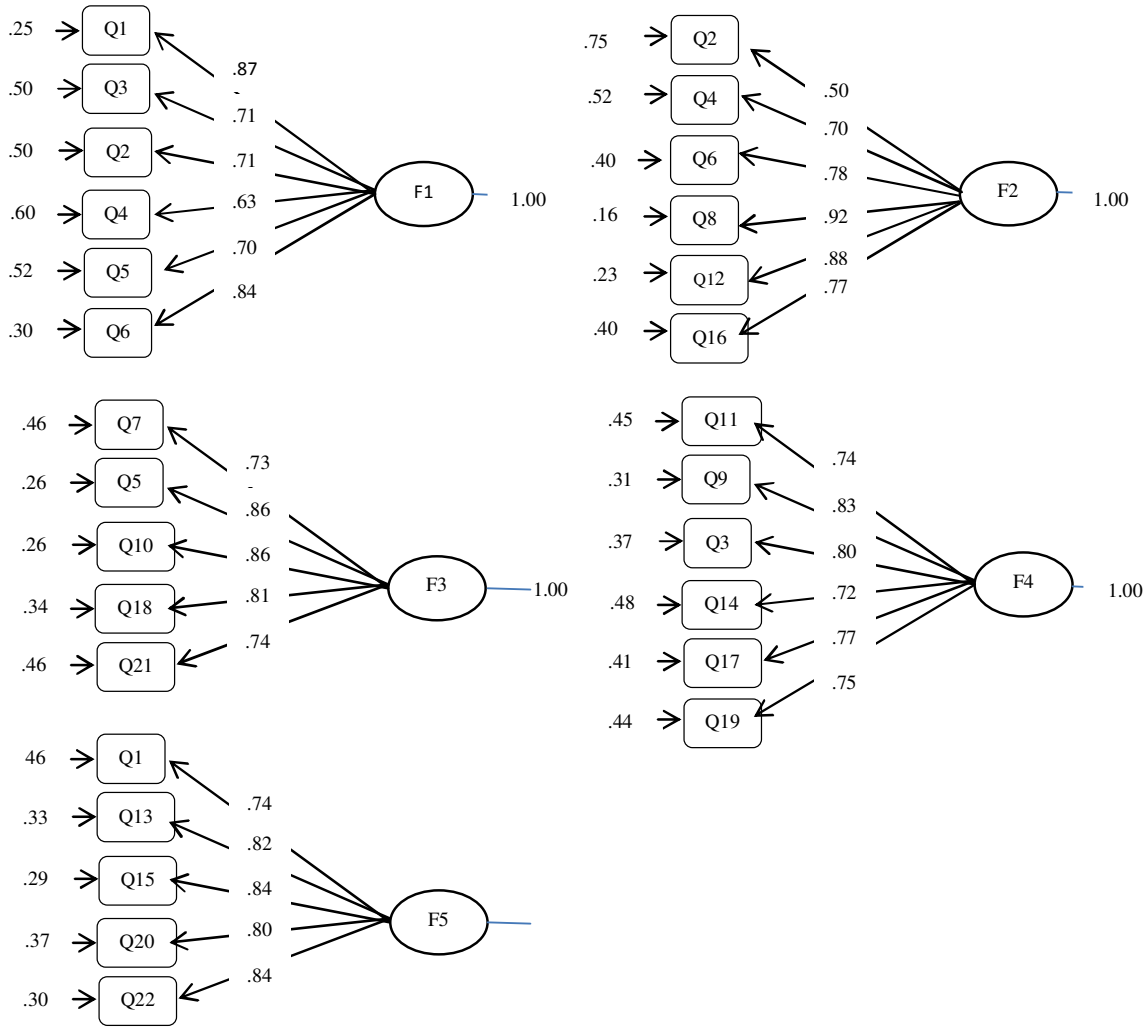

Figure 1. CFA results related to the forms. (Note: Q (Question), F (Factor)).

Criterion related

In order to evaluate the criterion related validity of the MDMQ, Problem Solving Inventory (PSI) and Decision Making Styles Scale were used. The correlation coefficients between the scores obtained from the self-esteem, vigilance, buck-passing, procrastination and hypervigilance subscales of the MDMQ and the scores obtained from the rational, avoidant, dependent, intuitive and spontaneous subscales of the PSI and DMSS are given in Table 1.

As seen in Table 1, while there are positive significant relations between the scores obtained from the self-esteem and vigilance subscales of the MDMQ and the rational subscale scores of the DMSS, there are negative significant relations between the PSI scores and the other subscale scores of the DMSS. On the other hand, while there are negative significant relations between the scores obtained from the buck-passing, procrastination and hypervigilance subscales of the MDMQ and the rational subscale scores of the DMSS, there are positive significant relations between the PSI scores and the other subscale scores of the DMSS.

Reliability

The reliability of the MDMQ was examined with the methods of Cronbach's alpha internal consistency coefficient and total item correlations. Cronbach's alpha internal consistency of the MDMQ is respectively .80 for the Self-Esteem subscale, .82 for the Vigilance subscale,

Table 1. Correlations between the MDMQ and PSI-DMSS subscales.

MDMQ Alt Ölçekleri	PSI	DMSS Rational	DMSS Avoidant	DMSS Dependent	DMSS Intuitive	DMSS Spontaneous
Self-esteem	-.60**	.23**	-.34**	-.33**	-.38**	-.30**
Vigilance	-.40**	.31**	-.40**	-.38**	-.44**	-.37**
Buck-passing	.38**	-.20*	.23**	.21**	.28**	.25**
Procrastination	.25**	-.24**	.39**	.30**	.26**	.25**
Hyper-vigilance	.27**	-.38**	.33**	.36**	.39**	.36**

Note: **p<.01, * p<.05.

.77 for the Buck-Passing subscale, .75 for the Procrastination subscale, and .79 for the Hypervigilance subscale. Furthermore, item-total score correlations ranged between .60 and .77 for the Self-Esteem subscale, .62 and .70 for the Vigilance subscale, .42 and .61 for the Buck-Passing subscale, .50 and .65 for the Procrastination subscale and finally .57 and .68 for the Hypervigilance subscale.

Test-retest reliability

When the MDMQ was re-administered to the same group after four weeks, the correlation between two applications was found to be r=.82 (n=144, p<.01) for the Self-Esteem subscale, r=.75 (n=144, p<.01) for the Vigilance subscale, r=.83 (n=144, p<.01) for the Buck-Passing subscale, r=.71 (n=144, p<.01) for the Procrastination subscale and r=.72 (n=144, p<.01) for the Hypervigilance subscale.

DISCUSSION

The present study examined the validity and reliability of the Melbourne Decision Making Questionnaire, which was developed by Mann et al. (1997) in order to identify the self-esteem level and coping styles of individuals during the decision making process and adapted to Turkish by Deniz (2004), on a different sample group. In this regard, first of all, Confirmatory Factor Analysis (CFA) was applied in order to verify the factor construct of the scale. The main reason for using CFA was to determine whether the factor construct of the form was verified with the present study that was conducted on university students. The CFA indicated that the MDMQ was fit in five subscales as it is in the original scale and all items were placed in the related subscale. These subscales are Self-Esteem, Vigilance, Buck-Passing, Procrastination and Hyper-vigilance. In the light of CFA, it was determined that five-component model of the Melbourne Decision Making Questionnaire showed a high goodness of fit for the university sample and the factor construct of the Turkish form was consistent with the factor construct of the original form. These findings show similarity with the results of the study conducted by Mann et al.(1997). These results show that the scale is applicable as in the original form.

As for the correlations between the subscales of the MDMQ, it was determined that the self-esteem subscale has a positive relation with the vigilance subscale while it has negative relations with the negative coping styles (buck-passing, procrastination, hyper-vigilance). Moreover, the negative coping styles were also found to show positive relations with each other. This finding could be interpreted as the individuals with a higher self-esteem use the careful decision making style and not the negative coping styles. These results are consistent with the findings of the studies conducted by Çolakkadıoğlu, (2012), Çolakkadıoğlu and Güçray (2007, 2012), Epstein and Meier (1989), Friedman and Mann (1993), Larrick, (1993), Mann et al. (1997), Philips et al. (1984) and Temel et al. (2015).

For the concurrent validity of the scale, the relations between the DMSS and PSI scores were examined. While there are positive significant relations between the scores obtained from the self-esteem and vigilance subscales of the MDMQ and the rational subscale scores of the DMSS, there are negative significant relations between the PSI scores and the scores of avoidant, dependent, intuitive and spontaneous subscales of the DMSS. This might indicate that the individuals with a higher self-esteem in decision making are self-confident, have higher problem solving skills, use a positive style in decision making, and do not prefer to use negative styles. Heppner and Anderson (1985) reported that individuals without a self-confident approach to problem solving cannot feel confident in decision making, either. In their study, they concluded that those who cannot solve their problems in en efficient way are too anxious, worried and insecure. Similarly, the individuals using a positive style in decision making have higher self-esteem and problem

solving skills and do not prefer to use negative styles in decision making. In their study, Phillips et al. (1984) identified positive relations between logical decision making and problem solving skills. The results obtained show consistency with the other studies in the literature (Cenkseven-Önder and Çolakkadıoğlu, 2013; Çolakkadıoğlu, 2012; Çolakkadıoğlu and Güçray, 2007, 2012; Deniz, 2004; Friedman and Mann, 1993; Güçray, 2001; Mann et al., 1997; Mann et al., 1988; Radford, Mann, Ohta and Nekane, 1993).

While there are negative significant relations between the scores obtained from the buck-passing, procrastination and hyper-vigilance subscales of the MDMQ and the rational subscale scores of the DMSS, there are positive significant relations between the PSI scores and the scores of avoidant, dependent, intuitive and spontaneous subscales of the DMSS. This might indicate that individuals using negative styles in decision making have lower self-esteem and problem solving skills in decision making and do not prefer to use positive styles. The results are consistent with the other studies in the literature (Cenkseven-Önder and Çolakkadıoğlu, 2013; Çolakkadıoğlu, 2012; Çolakkadıoğlu and Güçray, 2007-2012; Deniz, 2004; Friedman and Mann, 1993; Heppner and Anderson, 1985; Johnston and Driskell, 1997; Mann et al., 1989; Mann et al., 1997; Mann et al., 1988; Radford et al., 1993).

When the Cronbach's alpha internal consistency coefficients of the MDMQ subscales are examined, it can be inferred that the relation between the change in the answers given for each item and the variability in the total subscale score of that specific item is sufficiently high. These results show that the scale measured reliably the self-esteem and decision making styles of the university students in the decision making process. Mann et al. (1997, 1998) and Deniz (2004) also reported similar findings in their studies.

When the test-retest correlation coefficients are reviewed, it is seen that the subscales perform a consistent measurement. These results also show consistency with the findings of the studies that were conducted on a Turkish sample (Deniz, 2004). When the correlations of each item with the related subscale score were checked, the correlation values were found to be high. This indicates that the items fit into the appropriate factor and support the reliability of the scale.

In conclusion, the present study showed that the self-esteem and decision making styles have a common intercultural characteristic in decision making and the Melbourne Decision Making Questionnaire (I-II) is a valid and reliable tool that could be useful in the studies related to decision making in Turkey as well as in practical applications. In this regard, it is concluded that the scale could be helpful for the studies that will describe the relations between the decision making and various factors such as, problem solving, level of stress, anger, self-esteem. Moreover, it is suggested that further studies should be conducted with different samples for the validity and reliability of the scale.

Conflict of Interests

The authors have not declared any conflict of interests.

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