Organizational Structural of Everyday Memory Failure across 10 Arab Countries

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Abstract

People with and without psychological problems commonly reported memory problems. The present study reported results from 10 Arab countries (Algeria, Egypt, Jordan, Kuwait, Lebanon, Palestine, Qatar, Saudi Arabia, Syria and Yemen). The total sample consisted of 2174 participants aged from 21 to 62 years, who completed an internet based everyday memory questionnaire. A multi-group confirmatory factor analysis was conducted to examine the organizational structure of everyday memory across the 10 Arab cultures and to examine whether everyday memory failure is underpinned by the same latent factor(s) across all Arab countries. The results revealed five pure latent common factors to everyday memory failure across all the Arabian countries studied. The Syrian participants were the best and the Egyptians were the worst at everyday memory functions, particularly in the age ranged between 40- 50 years. The results were discussed in light of literature on everyday memory and Arab cultural variations.

Keywords: Everyday Memory, Cross-Cultures, Measurement Equivalence.

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Introduction

Failures and successes in everyday memory have been of interest to cognitive psychologists since the early periods of William James and Sigmund Freud (Hermann, 1982). Everyday memory is regarded as the ability to retrieve, manage and represent memories related to everyday activities, such as remembering names, remembering daily plans that one needs to purchase at a supermarket, remembering to take medications, or remembering directions and telephone numbers (Baddeley, 1999). It has been suggested that understanding the context in which everyday memory takes place is crucial for predicting memory efficiency (Park et al., 1999). Therefore, the social environment, individual psychological circumstances, and asymmetrical and scheduled lives, as well as lifestyle in general, might impose additional demands on peoples' working memory, which may result in observable everyday memory failure. At the same time, the detection of memory failure during everyday activities is important for predicting dementia-related disorders because in the early stage of dementia, there are close relationships between memory complaints and performance (Crook & Larrabee, 1990).

Everyday memory failure has been documented in a variety of samples, including healthy children (Briscoe, Gathercole, & Marlow, 2001), adolescents (Grueneich, Herrmann, & Allen, 1985), young adults (Wu, Sun, Wu, Xu, & Li, 1998), elderly adults (West, 1986), brain-injured children (Kinsella, Murtagh, Landry, Homfray, & et al., 1996) and children and adults who have experienced trauma

(Geffen, Encel, & Forrester, 1991). Large bodies of experimental tasks and self-reported tools have been developed to evaluate memory in everyday life activities.

Moreover, numerous exploratory factor analytic studies have revealed significant information about the structure of everyday memory and changes in structure across age (Larrabee & Crook, 1989; Tomer, Larrabee, &Crook, 1994). Other studies have investigated stability in memory structure across age and gender and have shown that the structure did not vary as a function of either age or gender (Crook & Larrabee, 1988; Ericsson & Pennington, 1993; Larrabee & Crook, 1988; Tomer et al., 1994; Tomer, Larrabee, &Crook, 1994). Additionally, in a computerized everyday memory battery (Crook & Larrabee, 1988) reported four factors, i.e., general (verbal and visual) everyday memory, simple or basic attention, complex attention, vigilance and psychomotor speed. However, very little is known about the structure of everyday memory across different Arab countries and whether this memory structure is consistent across countries of origin.

Although there is notable interest in better understanding everyday memory, there is still a lack of objective tests that clearly assess the concept. This type of memory involves a large number of subtasks that differ dramatically according to factors such as lifestyle, workload, job type, individual differences and possibly cultural context(Baddeley, 1999).

There is a growing body of evidence that suggests the importance of cultural differences in cognitive processes. Among these findings are suggestions that Asians

have a more holistic cognitive style, whereas individuals from western countries were shown to have an analytic cognitive style, both of which are based upon the respective dependent vs. independent social environments- social environments predominant in these cultures. (Miyamoto & Wilken, 2013; O'Leary, Calsyn, & Fauria, 1980). However, research that compares behaviors among groups within similar cultural contexts is very rare. Research also should redirected to non-western contexts at both the individual and group levels (Singelis, 2000). Although the Arabian cultures share the same religion (Islam) and language (Arabic), individual and group differences in cognitive processes are expected to exist because culture is generally defined as the human-made part of the environment (Herskovits, 1955). This definition comprises three criteria, i.e., place, time, and language (Georgas & Berry, 1995; Triandis, 1980).

Nisbett and colleagues conducted a number of studies at the University of Michigan in the United States, and in Beijin and Seoul, examining a large number of cognitive processes, i.e., visual attention, encoding and recognizing visual materials within their cultural context (Nisbett & Borgida, 1975; Nisbett & Kunda, 1985; Nisbett & Miyamoto, 2005; Nisbett, Peng, Choi, & Norenzayan, 2001) and eye-tracking processes while performing visual tasks (Qutub, 2008). Their findings are in general agreement with most psychologists of the last century in that (a) basic cognitive processes are universal and all humans are prepared with the same set of attentional, memorial, learning, and inferential procedures; (b) these basic cognitive processes are executed in a similar manner regardless of the content upon which they are operating;

(c) general learning and inferential processes offer children what they need to learn about the world during development, and the content of these learning processes is supplied by these basic processes and (d) the content of human minds, beliefs, values, social norms, which differ based upon the notion that the social, political and economic worlds of different people, are different (Nisbett & Norenzayan, 2002).

Cross-cultural research on memory has focused on the effects of language on memory (e.g., (Ishikawa & Nobe, 1998; Klass, 1999; Lau & Hoosain, 1999; Santamaria-Garcia, 2011).The present study instead administered the Everyday Memory Questionnaire (EMQ-R) to a large number of participants across as many Arab cultures as possible, examining the factorial structure of everyday memory across all of the participating countries and testing for possible cultural variations in everyday memory by means of testing for latent mean differences within the participating countries.

The present study administered the EMQ-R to a large number of participants across 10 Arab cultures to examine the structure of everyday memory across all of the participating countries and testing for possible cultural variations in everyday memory by means of testing for latent mean differences among participants from participating countries.

Methodology

Participants

In total, 2174 participants aged 21 to 62 years completed an internet-based everyday memory questionnaire. All of the participants volunteered to take part in this study after thousands of email messages were sent to individuals in Arab countries. The EMQ-R was uploaded to the "Suet Website," which is a dedicated internet data-collection device. The questionnaire has been available online since 28-12-2011. The data collected within the first 12 months after release were utilized in the present study. The collected data were from participants in 10 Arab countries (i.e., Algeria, Egypt, Jordan, Kuwait, Lebanon, Palestine, Qatar, Saudi Arabia, Syria and Yemen). The majority of the participants were from Egypt, Tunisia, and Algeria, and the fewest were from Kuwait, Saudi Arabia and Qatar.

Table 1: Number of participants by countries of origin and gender

Countries of Origin	Gender	N
Algeria	Male	110
	Female	110
	Total	220
Egypt	Male	110
	Female	110
	Total	220
Jordan	Male	110
	Female	110
	Total	220
Kuwait	Male	110
	Female	110
	Total	220
Lebanon	Male	110

	Continu . Table (1)	
	Female	110
	Total	220
Palestine	Male	110
	Female	110
	Total	220
Qatar	Male	110
	Female	110
	Total	220
Saudi Arabia	Male	110
	Female	110
	Total	220
Syria	Male	110
	Female	110
	Total	220
Yemen	Male	97
	Female	97
	Total	194
Total	Male	1087
	Female	1087
	Total	2174

The data from participants who were older than 62 years old and younger than 20 years old were excluded from the analysis. The data from participants who failed to provide information such as age, gender, religion and country of origin were excluded from the records within the first four months, and afterwards the programming of the questionnaire on the website was modified such that a participant could not advance in the survey until he/she answered the previous question to ensure that all participants delivered all required information. Preliminary data analysis showed no significant differences among the ten countries in either education or religion.

Measure and procedures

In this study, the revised version of the Everyday Memory Questionnaire-Revised (EMQ-R) was used (Baddeley, 1997; Sunderland, Harris, & Baddeley, 1983; Sunderland, Harris, & Baddeley, 1984). This version encompasses both the 22 original and 6 additional questions. This questionnaire is the most widely used self-reported tool to assess the functioning of everyday memory. Although this tool was developed to investigate the consequences of closed-head injury, it has been found to be very useful for use with healthy adults (Cornish, 2000). Each of the 28 questions describes activities that people complete every day and commonly forget. On a nine-point scale, participants are required to rate the frequency of the occurrence/forgetting the occurrence for each in the last six months, where 1 = (not at all in) and 9 = (more than once a day). The questionnaire, as mentioned above, was uploaded onto a website so that participants could browse, read, test instructions, and respond entirely online. The website was programmed to score the results and to provide a spreadsheet with the data for analysis using any statistical software. The questionnaire was translated into Arabic and standardized in a large Arab sample (Soliman & Elfar, 2008). The authors found that the questionnaire had good convergent, divergent and factorial validity (Please review :Soliman & Elfar, 2008) for more information about the standardization of the questionnaire).

Statistical Analysis

In this study, a Multi-Group Confirmatory Factor Analysis (MG-CFA) was used to examine the factorial structure of Everyday Memory by testing for measurement invariance simultaneously across the10 country groups (i.e., Algeria, Egypt, Jordan, Kuwait, Lebanon, Palestine, Qatar, Saudi Arabia, Syria and Yemen). An MG-CFA with 28 items that used three tests to measure everyday memory was run.

Non-significant X2 values, as indicators of model fit, should indicate that the data are not different from the model. It should be noted that in large sample sizes, the X^2 is always significant because it is extremely sensitive to sample size (Byrne, 2010). Therefore, three fit indices were used as signs of model fit. A group of fit indices were used in the present study as follows: the Comparative Fit Index (CFI; (Bentler, 1990), in which a value close to 1 indicates a good fit; Bollen's (Bollen, 1989) Incremental Fit Index (IFI), in which a value close to 1 indicates a good fit; the Standardized Root Mean Square Residual (SRMR), in which a value close to 0 indicates a good model fit; and the Root Mean Square Error of Approximation (RMSEA), in which a value of .08 or less indicates a practical error of approximation (Browne & Cudeck, 1993). All of the models were fully nested. Therefore, the X^2 difference was used to compare the model fit; if the X2 difference is not significant, the simpler model should be accepted based on parsimony (Bollen, 1989).

Succinctly, the model fit was tested for each group separately and then the data were combined into one multi-group analysis to test for measurement equivalence across the 10 groups. All analyses were performed using Amos Software Version 18 (Arbuckle, 2009).

Results

One objective of the current study was to examine the factor structure of everyday memory as suggested by the pioneer study by (Cornish, 2000) in which there were five pure factors that comprised everyday memory. These factors were spatial memory, retrieval, conversational monitoring, task monitoring and memory for activities. This, in turn, showed that the factors appeared to reflect latent memory processes instead of just resemblances among tests.

Initially, the construct validity of the questionnaire was examined by means of testing for the five-factor model that was identified by (Cornish, 2000) on a sample of 600 participants from Saudi Arabia. Confirmatory Factor Analysis (CFA) is a well-established technique that examines construct validity through the factor structures of tools in two different groups or cultures. CFA is an application of structural equation modeling designed to measure the association between scores with one or more latent variables. The adequacy of a given model is tested by the families of fit indices, which examine the extent to which the model can reproduce an empirical covariance matrix.

In this study, a number of global fit indices were used to examine the extent to which the WM data fit a two-factor model. The indices used were $\chi 2$, which is the

traditional fit indices; a non-significant value indicates a very good data fit. However, the $\chi 2$ was very sensitive to sample size, as the value increased when it was subjected to sample size. Consequently, the result underestimated the model fit. Therefore, additional fit statistics were used to reduce the influence of the sample size and the model complexity. The other fit indices were the Incremental Fit Index (IFI) and the Non-Normed Fit Index (NNFI), where the original model was compared with a baseline or null model and the cut-off value for model fit was .90. Another fit index used was the Comparative Fit Index (CFI), where the value indicating a good fit should be not less than 0 and not more than 1 (Bentler, 1990). This index is considered the most valid index because it is less sensitive to sample size and shows a negligible downward bias compared with the other indices (Steiger, 1990). Finally, the Root Mean Square Error of Approximation (RMSEA) was selected because it is less sensitive to sample size and the number of variables in the model and has a cutoff value for model fit at .08 (Bentler, 1990). The confirmatory factor analysis was run using the Amos software.

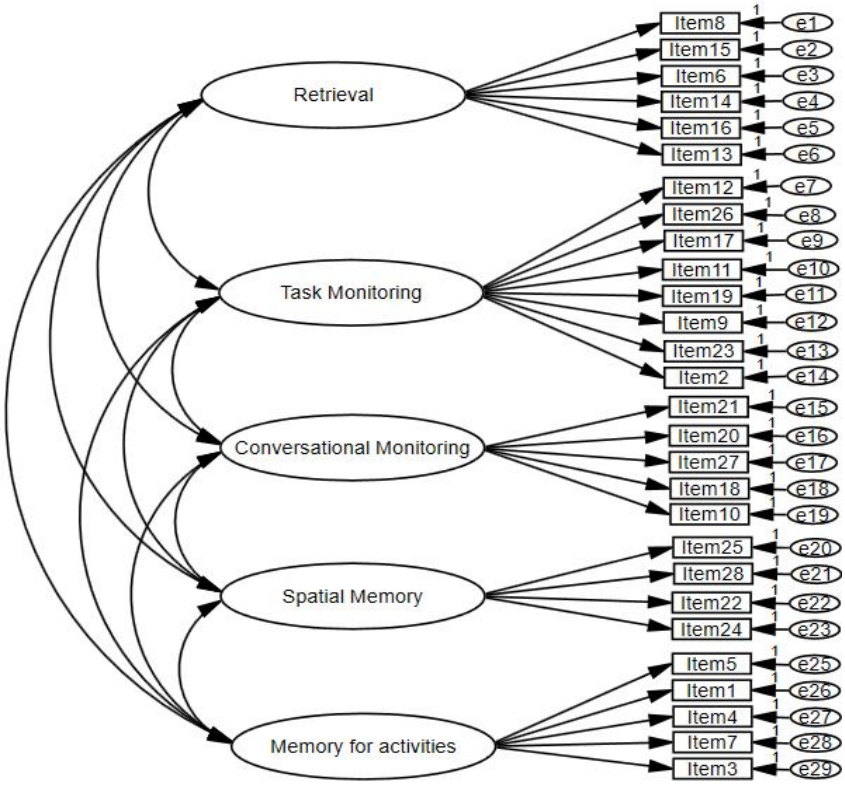

Figure 1: Theortical five factors model of everyday memory

Univariate normality was examined (Kline, 1998; S. G. West, Finch, & Curran, 1995) by using recommendations for cutoffs for skewness = 3 and kurtosis = 10. All of the skewness and kurtosis values were below the cutoff values. Descriptive statistics are shown in table 2. MG-CFA results showed that X2 = 323.65 was not significant, which was expected because of the large sample size. Nevertheless, all of the fit indices were below or at the cutoff scores as follows: CFI = .96, IFI = 98, NNFI = .97, RMSEA = .06. This indicates good construct validity for the EMQ-R questionnaire.

Examining the facture structure across the 10 Arab countries

A Multi-Group Confirmatory Factor Analysis (MG-CFA) with 28 items measuring the everyday memory constructs was run to examine the factorial structure of Everyday Memory by testing for measurement invariance simultaneously across the 10 countries(i.e., Algeria, Egypt, Jordan, Kuwait, Lebanon, Palestine, Qatar, Saudi Arabia, Syria and Yemen). The invariance for the 10 cultures was tested through four hieratical models. In Model 1 (the baseline model), the configural invariance was examined, where all of the parameters were unconstrained and the model's parameters were assumed to be unequal across the 10 samples. After constraining all of the factor loadings as invariant across the two samples, model 2 was obtained. When model 1 was nested in model 2, a non-significant $\chi 2$ suggested equal factor loadings across the 10 cultures. In addition to constraining the factor loadings in model 2, the factor intercepts were set to be equal across the two samples to obtain model 3. When model 3 was nested in model 2, all of the fit indices suggested that invariant factor intercepts existed across the 10 cultures. To obtain model 4, all of the item errors, variance and covariance were assumed to be equal across the 10 samples as well as the factor loadings and factor intercepts in model 3. After model 4 was nested within model 3, all of the fit indices suggested that variance in item errors, variance and covariance across the 10 samples. The values of the fit indices used for the model comparisons are shown in Table 3.

Table2: Descriptive statistics for the Saudi sample that were used to test for validity and reliability

Items	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Mean	4.54	2.49	4.39	4.04	5	3.65	3.57	3.90	3.51	2.12	4.68	2.53	2.22	3.65
Median	4	2	3	4	5	3	3	4	3	1	4	1	1	3
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	9	9	9	9	9	9	8	9	8	9	9	9	9	9
SD	2.57	1.91	3.16	2.57	2.52	2.18	2.04	2.45	2.10	1.99	2.96	2.25	1.65	2.33
Skewness	.31	1.78	.33	.57	.15	.56	.45	.50	.66	2.13	.14	1.41	1.77	.91
Kurtosis	-1.13	2.74	-1.46	-.87	-1.23	-.54	-.97	-.99	-.64	3.91	-1.58	1.13	3.86	.021
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Mean	3.22	2.71	3.37	3.71	3.15	1.53	2.45	3.06	2.18	2.24	3.94	2.62	2.84	3.35
Median	3	2	3	3	3	1	2	2	1	1	3	2	1	2
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	8	8	9	9	9	9	8	9	9	9	9	8	9	9
SD	1.83	1.73	2.07	2.58	2.03	1.71	1.77	2.26	2.04	1.89	2.21	2.03	2.81	2.49
Skewness	.46	1.04	.83	.51	.71	3.51	1.43	1.28	1.81	1.85	.57	1.17	1.21	.78
Kurtosis	-.58	.66	-.17	-.91	-.26	12.21	1.75	.78	2.17	3.08	-.83	.12	.01	-.65

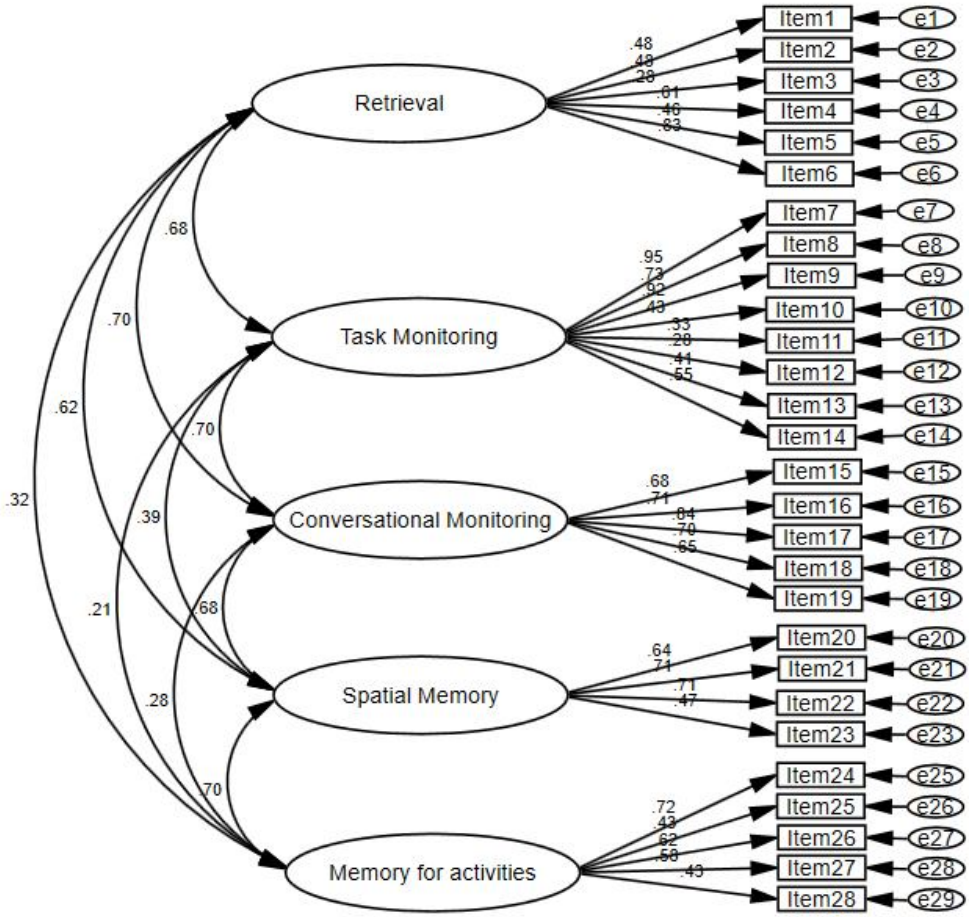

Figure 2: Schematic representation of five factors everyday memory

Table 3 Testing for measurement invariance across the 10 samples

Models	**Description**	**χ2**	**df**	**χ2/Df**	***p***	***CFI***	***IFI***	***SRMR***	***RMSEA***
1	No constraint on the model parameters	3400	36877.597	10.84635	00	.96	.96	.95	.05
2	Assumption equal models' weights	3607	36894.090	10.22847	00	.96	.96	.96	.04
3	+ Assumption equal models' intercepts	3742	36902.015	9.861575	00	.94	.94	.94	.06
4	+ Assumption equal models' covariance	3994	36927.091	9.245641	00	.93	.93	.92	.06
Model comparisons		**Δχ2**	**Δdf**			***ΔCFI***	***IFI***	***SRMR***	***RMSEA***
Model 1 - model 2		207	16.493			.00	.00	.01	.01
Model 2 - model 3		135	7.925			.02	.02	.02	.02
Model 3 - model 4		252	25.076			.00	.00	.00	.01

Examining latent mean differences

Due to the invariance suggested by configural, metric ad scalar invariances and because the variance at the strict level when all of the factor intercepts, residual variance, and latent factors' means were constrained to be equal in Model 4, the authors examined the latent mean differences among the 10 groups. To do so, the latent mean value in the first group within the CFA multi-group analysis was set to zero and the rest of mean values of the other groups were left free.

Table 2:

Items	Factors	Algeria	Egypt	Jordan	Kuwait	Lebanon	Palestine	Qatar	Saudi Arabia	Syria	Yemen
11	Retrieval	.55	.53	.55	.54	.54	.54	.54	.54	.55	.53
14		.71	.71	.72	.71	.71	.71	.71	.72	.71	.71
10		.69	.68	.71	.68	.70	.69	.70	.70	.69	.70
16		.62	.62	.63	.62	.63	.62	.63	.61	.63	.61
17		.73	.76	.72	.75	.73	.75	.73	.73	.74	.72
21		.58	.53	.60	.53	.60	.54	.58	.55	.58	.59
15	Task Monitoring	.53	.57	.53	.57	.55	.56	.56	.54	.57	.55
9		.95	.95	.94	.95	.94	.95	.94	.95	.93	.94
8		.73	.73	.73	.74	.73	.74	.73	.74	.72	.74
7		.93	.93	.94	.94	.92	.94	.92	.94	.92	.93
1		.49	.51	.49	.51	.49	.51	.48	.52	.49	.51
6		.60	.60	.60	.60	.61	.59	.61	.60	.60	.60
23		.37	.35	.37	.35	.38	.34	.38	.34	.36	.36
2		.44	.42	.43	.42	.44	.41	.44	.42	.43	.43
13	Conversational Monitoring	.70	.59	.75	.59	.74	.60	.74	.67	.71	.68
24		.50	.54	.44	.55	.44	.55	.44	.49	.48	.49
12		.70	.80	.67	.80	.68	.79	.69	.73	.73	.73
26		.39	.48	.33	.48	.33	.48	.33	.43	.37	.42
20		.80	.76	.83	.76	.82	.76	.82	.78	.82	.80
28	Spatial Memory	.52	.49	.48	.50	.47	.51	.46	.51	.45	.50
4		.28	.32	.25	.32	.25	.33	.24	.33	.23	.31
27		.07	.02	.02	.03	.02	.04	.01	.03	.00	.04
22		.08	.13	.16	.11	.17	.10	.18	.10	.22	.11
3	for Memory Activities	.28	.23	.28	.24	.27	.24	.27	.28	.25	.27
18		.78	.74	.79	.75	.79	.75	.79	.77	.78	.77
25		.51	.52	.49	.52	.49	.52	.49	.54	.47	.54
19		.62	.68	.61	.68	.62	.68	.62	.63	.63	.65
5		.39	.29	.40	.30	.40	.30	.40	.33	.38	.35

The descriptive statistics show that Syrians scored higher than the rest of the Arab groups and that Egyptians scored the lowest. However, the inferential statistics indicated that there were no underlying significant differences among the ten Arab cultures in any of the five latent mean differences as follows: Retrieval (X^2 = 2.93,p > .05); Task Monitoring X^2 =.16,p > .05); Conversational Monitoring X^2 =.35,p > .05);Spatial Memory X^2=.49,p > .05); Memory for Activities X^2 =.19,p > .05).

Discussion

The current study was intended to validate the Arabic version of the EMQ-R and to investigate the structure of everyday memory across different cultural groups in the Arab world. The results showed acceptable construct validity for the confirmatory factor analysis and indicated a good model fit for the five-factor model. Although the X2 value was not significant –as expected because of the large sample size- all of the fit indices that were adopted suggested a good model fit. This result is consistent with that has been suggested by (Cornish, 2000) in which there were five latent factors underlying the construct as measured by the EMQ-R. This also suggests similarities between the samples of the western countries and the Arab ones and that people from the two different cultures perceived the concept of everyday memory in the same way.

When testing for cultural variations among the 10 Arab countries by means of examining the measurement invariance of everyday memory failure through four additive steps, the results showed that the structure of everyday memory was consistent across the 10 cultures. This equivalence was indicated by the configural invariance in step 1 of the confirmatory factor analysis, in which the number of factors (5) and factor loadings were similar across the 10 groups.

A third aim of the current study was to examine mean differences among the 10 Arab countries in everyday memory. The previous studies examined the mean differences among different ethnic groups at the level of observed mean differences, and this level lacks actual validity due to the differences might be traced to measurement errors (Wu, 2010). Therefore, the authors attempted to investigate the mean differences at the level of latent means. The results showed that there were no significant difference among the 10 Arab cultures in any of the five latent means. Although the confirmatory factor analysis did not fully achieve the highest level of measurement invariances across the 10 cultures because of the invariance in measurement error and intercepts, these results imply that the differences could be due to measurement errors.

These results support the previous notion (e.g., Nisbett & Norenzayan, 2002) that cognitive processes are universal in nature but work differently subject to sociocultural context. Furthermore, with respect to cultural differences, our results were consistent with (Cash, 2007), who suggested a positive relationship among culture, cognitive processes such as verbal short-term and working memory and are also consistent with the findings of (Imbo & LeFevre, 2010), who suggested insignificant cultural differences existed in problem-solving skills in contradiction. While the results by (Imbo & LeFevre, 2010) were conducted on two western or holistic cultures and used problem-solving tasks, the results here are still very similar. Cross-cultural research suggested that geography, religion, language, nationality and race directly or indirectly affect human cognition. However, researchers argue that basic cognitive processes are universal and work in the same way everywhere (Nisbett

& Norenzayan, 2002). Nevertheless, previous work has suggested that this universality is not the case all of the time, as the cognitive processes function within the environmental and cultural atmosphere.

It could be concluded that (a) the EMQ-R has good construct validity in the Arabic cultures, (b) the people from the ten Arab cultures perceived the concept of everyday memory similarly and (c) there were no significant latent mean differences among the 10 cultural groups in any of the five sub-factors of everyday memory. This indicates that the cognitive processes particular to everyday memory are culture-free and do not vary subject to the cultural context.

Limitations and future research. The results from the current study are limited to (a) the Arab countries that took part, (b) the period of time in which the administration of the questionnaire took place, the age range from 21 to 62 years and (d) healthy adults.

Future work should use the latent mean differences, not the observed means, when comparing two or more cultures because the latter could result in the reporting of measurement errors, not real differences. Additionally, more investigation into a border range of cognitive processes outside the laboratory setting are needed.

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