THE INFLUENCE OF LANGUAGE ON RESEARCH RESULTS

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Abstract
Research results are our tool for approaching reality and truth. Validity and reliability of research instruments is the gate to reach generalizable results. The validity and reliability of an instrument are important aspects that allow for using the instrument in future research. This study tried to investigate if language influences the results of a survey applied to students in two languages (Arabic and English). The study utilized responses from (239) students from a Jordanian public university. Results indicated a significant difference between the means of the Arabic and English language surveys used. Results and conclusions are reported.
Keywords: Language influence, social networks, research methods, survey translation, instrument validity, gender, Jordan.

1. INTRODUCTION

English language is one of the major research and communication language used across the word. Still it is not the most popular native language in the world, where resources indicate that it comes fourth behind Mandarin Chinese, Hindi and Spanish (Vistawide, 2013). Based on that, scientists conduct research in their environments, and report research in another language. Also, research utilizes instruments in their original English language, but subjects in research fill the surveys and they are not native English language speakers. Questionnaires are one of the important tools to collect data and understand systems and relationships. Based on that, many instruments are developed and used without even validation; even after data collection, many instruments are not validated for the purpose of understanding different issues. The survey language is a major component that needs to be checked for consistency, validity and reliability.

On the other hand, language is an important factor that influences responses. In a global economy, language is a major factor that influences communication and carries a great deal of emotional intensity related to the culture of the native country (Puntoni, Langhe & Van Osselaer, 2009). Based on that,

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using an English-based instrument in an Arabic language environment, will yield inaccurate results. This study explored the influence of language on the results of a survey conducted in a public university and a quality check on students' services offered by a private university in Oman. The following section will explore the literature related to the topic followed by the data and results of the study. The forth section will report conclusions and future work.

2. LITERATURE REVIEW

In the area of advertising, information processing of ads and advertisements is critical when language is not consumers' first/native language. Multiple studies were conducted and concluded that language differences may trigger different echoes of brands and products, and thus attributes of products might be weighted differently by consumers (Puntoni, Langhe & Van Osselaer, 2009). Another study conducted on a random sample of Greek-Canadians residing in Eastern Canada, where 500 surveys were collected and analyzed. Results indicated that conducting research with multiple versions of languages will threat the validity of research and will give misleading results based on research ethnic and cultural issues (Richard & Toffoli, 2009).

Research in the area of language validation focused mainly on language learning. A study by Woodall (2002) indicated that switching between languages will make tasks more difficult. On the other hand, research indicated that language and cultural values of the country in which the study is conducted, would matter and need to be taken into account in empirical investigations (Peltokorpi, 2010).

Based on previous literature, survey language illustrated an important role in influencing research. It is important to make sure that research using instruments will yield accurate results and when conducted in different environments will yield similar results; that means, the instrument is valid and reliable. This paper focuses on survey language issues used in any type of research and thus will utilize literature related to survey language more than language learning or advertising. Such issue will manipulate research conducted for quality purposes especially when conducted in countries where English language is not the first language.

A comprehensive study conducted by a group of researchers on a wide scale and in 24 countries utilized 3,419 undergraduate students concluded that language has an impact on the way people respond to survey questions. The project was conducted between the years 2001 and 2003 and included two major projects. The survey included items related to cultural values and was distributed in English language and in the native language of each country.

Finally countries were not the same in the two projects as some countries were dropped and others added and 16 countries were common in both studies (Harzing et al., 2005; Harzing et al. 2009). As stated previously, both studies confirmed the influence of language on responses depending on the survey version. Finally, differences between countries were larger for native languages version than for the English version.

On a local application of similar concepts, a study explored the influence of language on 102 Hong Kong Chinese managers where half of them completed a Chinese survey and the other half completed an English survey. The study concluded that managers' responses would be consistent with the culture and language of survey, thus research would lose important information if not conducted in subjects' native language (Ralston, Cunniff & Gustafson, 1995).

As part of a larger study by Berkanovic (1980), 202 Hispanic individuals were identified and 86 individuals were interviewed in Spanish, where the rest of the group interviewed in English. The author concluded that any research conducted using different language or at least utilized the backward translation would yield inaccurate results. Backward translation will decrease language influence and increase the reliability of the instrument (Brislin, 1976). The method depends on multiple paths for language translation, where a group of experts translate the instrument into the native language, and then another group translates it into English and both versions are compared to see differences. The results will indicate if the translation is correct or not.

Other researchers proposed more than back-translation to improve the survey validity, where they based their recommendations on cultural cues (Su & Parham, 2002). On the same line, another study utilized a well validated personality instrument in both English and Spanish language, and concluded to same results as bilingual subjects showed different personalities when responding to the two instruments (Ramírez-Esparza, Gosling, Benet-Martínez, Potter & Pennebaker, 2006).

On the other hand, and in a study that contrasted responses of 52 Canadian college students against 70 Hong Kong Chinese students attending Canadian colleges, researchers conducted an experiment where 47 students completed a survey in Chinese and 23 in English (Toffoli & Laroche, 2002). Research emphasized the need to take into consideration the Chinese communication characteristics based on the difference in response to the advertising message and survey language. Results reinforced the similarity between bilingual Chinese students and North Americans, and proposed a tool for formulating persuasive messages in foreign cultures. Similarly, and in a contradicting fashion, two studies reported by Ji, Zhang and Nisbett (2004) and concluded that culture has a major effect on

responses regardless of language and place of testing. Such conclusion was based on a research conducted on bilingual students.

3. THE OMANI STUDY

This study extended a previously conducted and published work with a larger sample and a different instrument (Abu-Shanab, 2011). The first data collected was part of quality assurance process requirements, where subjects were requested to fill a survey in December 2009 evaluating the services provided by a university college in Oman. The survey was distributed in December twice: the first time using an English language version and the second one using an Arabic language version. The English survey utilized 61 responses, and the Arabic one utilized 31 responses. The period between conducting the two surveys was 2 weeks and the samples in both were randomly selected and can be considered similar with respect to their academic status.

Results supported research hypothesis, where Arabic language responses were higher than English language responses and significantly different (at alpha less than 0.05). This result supports the findings of more than one previous study reported in the literature (Harzing et al., 2005; Harzing et al., 2009). On the other hand, the limitations reported by the author of this work were the small sample size in general and the size of Arabic sample compared to the English Sample. Also, the author recommended a more thorough translation of the instrument used.

Finally, the instrument used might be specific to the objective of quality process and might utilize a more commonly known topic by users. The work of Abu-Shanab (2011) was published in a local conference in the area of quality assurance.

4. RESEARCH METHOD AND SAMPLE

When looking deep into the Omani study we find that results were significant and for all items of the instrument (20 items), which might be influenced by a general attitude towards the language use of the college in the quality process and the pressure on students in studying in a language different than their native one. Also, the study utilized an instrument that might be sensitive to students (students services in the college), which calls for further research.

To neutralize the influence of study, culture, and the formal attitude towards the college (Ji et al., 2004; Toffoli & Laroche, 2002; Puntoni et al., 2009; Ralston et al., 1995), this study tried to explore a different

sample that relates to a simple and common topic. Also, this study tried to overcome the sample size limitation by using a larger sample within a different context (Hair, Anderson, Tatham & Black, 1998).

Based on the previous experience in Oman, and the limitations of the study, this research aimed at attaining the following objectives and emphasizing the mentioned contributions:

- Arabic language is the fifth spoken language in the world (Vistawide, 2013), where much research is conducted in this language. The original language of research might be English or any other language, but still instruments of study can be of both languages. On the other hand, English is the second language in the country and is adopted by public and private schools since first grade and up to high school. Finally, many universities teach in English in the bachelor degree (and graduate studies) and especially in information technology disciplines.

- This study aims at studying the influence of language on research findings.

- Also, to overcome the limitation of the topic, this study used the social network topic as a base for the instrument.

- Also, to overcome the sample limitations, this study tried to increase sample to more than 100 per category and to use a fairly balanced sample (gender based).

- This study is the first in the Arab region (up to the knowledge of authors).

- This work, if supported, would raise many questions related to the utility of using English language in both teaching and research. It is important to note that many institutions and universities in the Arab region use many forms and instruments for diverse purposes (performance evaluation, information collection, and public polls), and they use either or both languages Arabic and English.

Based on the previous sections, language is a crucial factor in research, where the instrument language plays a major role in affecting the results. To investigate the influence of language and see if such factor influences research findings, this research has two major hypotheses:

Ha: There is s significant difference between the means of the responses of subjects on the Arabic Language and English Language surveys. (Where Hai indicates a hypothesis related to Ha and for item number i, with i ranging from 1-20)

Hb: The means of the Arabic Language survey will be higher than the means of the English language survey. (Where Hbi indicates a hypothesis related to Hb and for item number i, with i ranging from 1-20)

5. DATA ANALYSIS AND DISCUSSIONS

This study tried to utilize responses from 239 students studying information technology topics and in their first and second year of study. Such sample satisfies the limitations considered in the previous sections and the statistical requirements. The instrument revolved around a common and familiar topic to students (Facebook benefits and downsides). Such topic would not have a conflict with students' status in the assigned courses, and would report a neutral result in relation to the sensitivity of the topic. The instrument included 20 items using a 5 points Likert scale, with (1) indicating a total disagreement with the statement and (5) indicating a total agreement with the statement.

The items were adopted from reports and previous studies from the Internet and mainly in English language. The instrument was reviewed by the author and then forwarded to three PhD holders to translate into Arabic.

The second step adapted from Brislin's work (1976) was to reverse the translation backward to English using three different PhD holders. Finally, the author and another three PhD holders in the IT College reviewed the 20 items and commented on the statements and amended the original version of the instrument and its translation. The demographics of the sample are shown in Table 1. Also, Table 2 shows the description, mean and standard deviation for all items.

TABLE 1 - SAMPLE DEMOGRAPHIC

Category	Sub-Category	Total	%
Language Distribution	Arabic Language	119	49.8
	English Language	120	50.2
Gender distribution	Male subjects	96	40.2
	Female subjects	141	59
	No sex reported	2	0.8

To answer the research question: is there an influence for survey language on research findings? Also, to test for the two research hypotheses an ANOVA test was conducted comparing the means of all items based on language as a defining factor. The test results indicated significant differences (at the α < 0.05) in seven items (35% of the survey size).

Such result supports hypotheses Ha1, Ha8, Ha9, Ha12, Ha15, Ha16, Ha19. On the other hand, among the seven significant items, six of them indicated a higher Arabic language mean than the English language mean, except hypothesis Ha12. Chances to support all the 20 partial hypotheses are low, but a 35% of hypotheses is a substantial result. Table 3 shows the ANOVA test results with the partial

means and standard deviations of all items for the Arabic and English languages. Also, the F value and its significant are shown in the same table.

Figure 1 shows a visual representation of the means of the two languages.

TABLE 2 - MEANS AND STANDARD DEVIATIONS OF ALL ITEMS OF SURVEY

| #	Item Description	Mean	Standard Deviation
1	I can search and find new and old friends (classmates & relatives)	4.314	0.999
2	I can find new opportunities for work, travel and education	3.381	1.192
3	It makes it less difficult when communicating with strangers for the first time	3.699	1.192
4	It makes it easy for me to join groups with similar interests (likes and dislikes)	3.803	1.262
5	I can find required information easily through network contacts	3.820	1.151
6	I can find accommodations and locations easily	3.540	1.198
7	I can target specific people for marketing/relationship and for free	3.611	1.172
8	I can network with other professionals in my field	3.819	1.265
9	It is entertaining and amusing	3.983	1.232
10	I can get immediate feedback on ideas and requests	3.707	1.212
11	More and more people (overwhelming - overcrowding)	3.360	1.358
12	Long distance relationship weakening	3.315	1.317
13	Unsupported by physical adjacency	3.350	1.153
14	Exposing more information about me (privacy risk)	3.693	1.303
15	Excessive addiction	3.832	1.238
16	Possible stalking from unwanted people	3.628	1.230
17	Acquaintances being labeled as friends	3.485	1.236
18	Takes a long time to build real relationships	3.506	1.353
19	Loss of face-to-face contact (communication)	3.672	1.351
20	Waste of time and resources	3.515	1.423
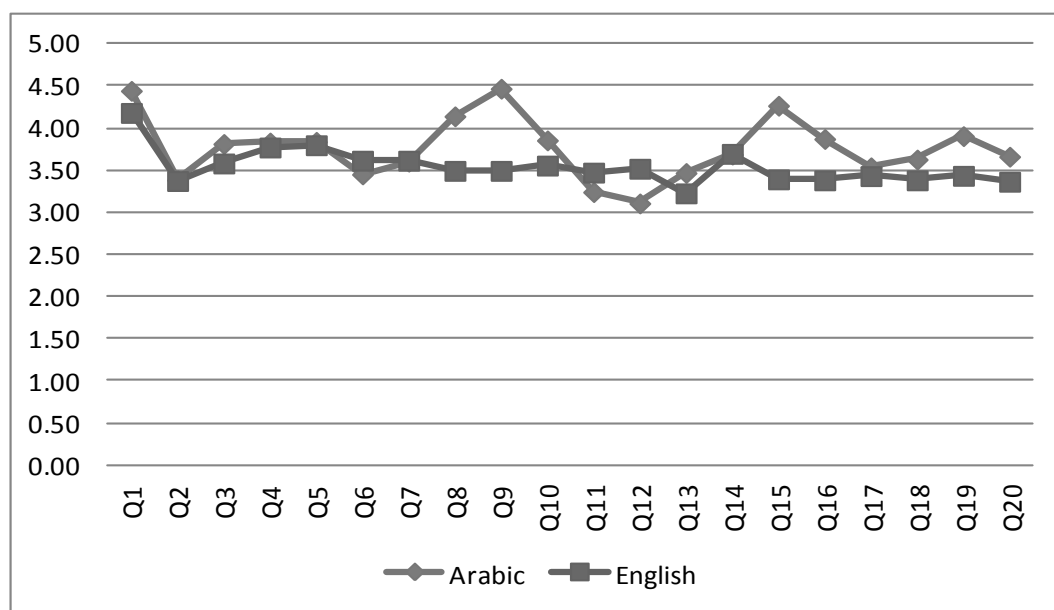
FIGURE 1 - A VISUAL REPRESENTATION OF THE MEANS OF ITEMS ACCORDING TO LANGUAGE

TABLE 3 - THE ANOVA TEST ACCORDING TO LANGUAGE (WITH PARTIAL MEANS)

Q #	Language	N	Mean	Std. Deviation	F	Sig.
Q1	Arabic	119	4.445	0.909	4.167	**0.042**
	English	120	4.183	1.069		
Q2	Arabic	119	3.387	1.187	0.006	0.940
	English	120	3.375	1.203		
Q3	Arabic	119	3.815	1.221	2.270	0.133
	English	120	3.583	1.157		
Q4	Arabic	119	3.832	1.210	0.129	0.720
	English	119	3.773	1.318		
Q5	Arabic	119	3.840	1.127	0.073	0.787
	English	120	3.800	1.178		
Q6	Arabic	119	3.454	1.199	1.119	0.291
	English	120	3.617	1.182		
Q7	Arabic	119	3.605	1.106	0.006	0.939
	English	120	3.617	1.238		
Q8	Arabic	119	4.143	1.174	16.593	**0.000**
	English	119	3.496	1.275		
Q9	Arabic	119	4.471	0.955	43.979	**0.000**
	English	119	3.496	1.288		
Q10	Arabic	119	3.857	1.076	3.674	0.056
	English	120	3.558	1.321		
Q11	Arabic	119	3.244	1.420	1.738	0.189
	English	120	3.475	1.290		
Q12	Arabic	119	3.109	1.395	5.933	**0.016**
	English	119	3.521	1.206		
Q13	Arabic	119	3.471	1.148	2.622	0.107
	English	118	3.229	1.150		
Q14	Arabic	119	3.689	1.326	0.002	0.960
	English	119	3.697	1.286		
Q15	Arabic	119	4.269	1.039	33.745	**0.000**
	English	119	3.395	1.270		
Q16	Arabic	119	3.874	1.273	9.866	**0.002**
	English	120	3.383	1.139		
Q17	Arabic	119	3.538	1.301	0.426	0.515
	English	120	3.433	1.172		
Q18	Arabic	119	3.630	1.308	1.998	0.159
	English	120	3.383	1.391		
Q19	Arabic	119	3.908	1.235	7.417	**0.007**
	English	119	3.437	1.424		
Q20	Arabic	119	3.664	1.422	2.625	0.107
	Total	239	3.515	1.423		

To verify the results of the language tests conducted, a major factor in the literature was explored to see if a similar result will be yielded. The new factor proposed is gender, where such predictor might have a major influence. This research assumes that the influence of language did not happen by chance, but supports a major causality that supports our premise in this paper. To test for gender influence, the

same test conducted on language was performed on gender, where an ANOVA test was conducted for the 20 items. Table 4 shows the same results described for language in Table 3.

Results indicated that the means of 2 items were significant when compared based on gender. Items Ha2, Ha12 indicated a lower mean for males than females. Such result when compared to language result indicates a stronger influence for language than gender. Figure 2 shows a visual representation of the means of both categories of gender.
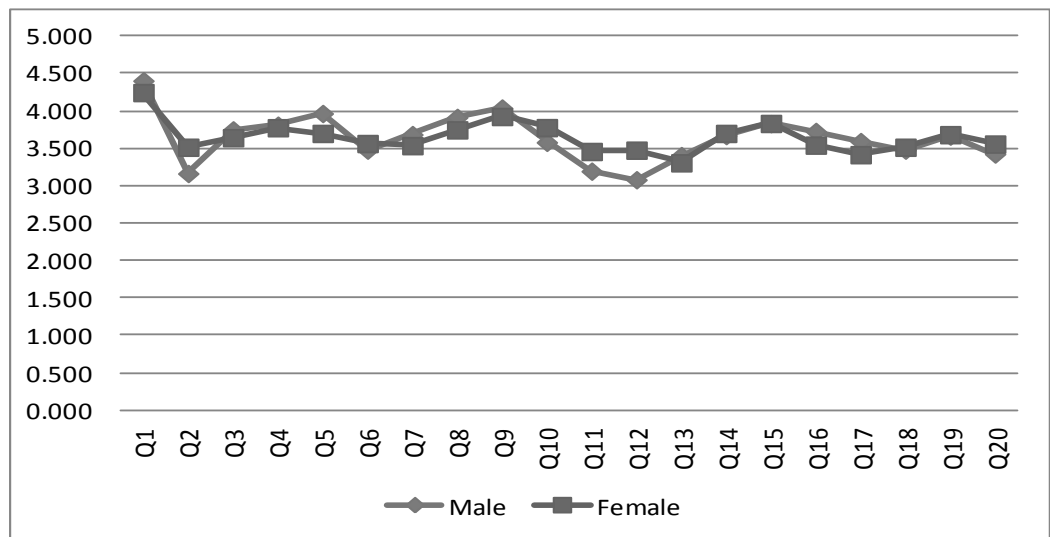

FIGURE 2 - A VISUAL REPRESENTATION OF THE MEANS OF ITEMS ACCORDING TO GENDER

6. CONCLUSIONS AND FUTURE WORK

This study aimed at exploring the influence of language on research findings using a sample of 239 students in a public university. Results indicated a significant difference between the means of the Arabic and English language surveys for 7 items, which supports 7 partial hypotheses of this study. Also, the item means of the Arabic language survey were higher than the English language survey for all significant items except one. To verify our results the same test was conducted using a common factor in the literature (gender of respondents), where results indicated a weaker result with only two items showing significant results.

The previous result when compared to the Omani study might show a more realistic result where a full support of all 20 hypotheses is not expected, but a 35% of hypotheses is a fair indication of the importance of language in survey research. The results of this work implies that language is an important factor in research, where researchers should adopt well validated instruments, and try to translate the instrument to local language, and finally, re-validate new instrument through a rigor

statistical method. Such result calls for more research in this area to support our findings. Finally, cultural issues might have an influence in this area of research, which calls for more research.

TABLE 4 - THE ANOVA TEST ACCORDING TO GENDER (WITH PARTIAL MEANS)

		N	Mean	Std. Deviation	F	Sig.
Q1	Male	96	4.406	1.022	1.423	0.234
	Female	141	4.248	0.987		
Q2	Male	96	3.167	1.228	5.004	**0.026**
	Female	141	3.518	1.156		
Q3	Male	96	3.750	1.114	0.439	0.508
	Female	141	3.645	1.243		
Q4	Male	96	3.813	1.316	0.041	0.840
	Female	140	3.779	1.230		
Q5	Male	96	3.969	1.090	3.094	0.080
	Female	141	3.702	1.182		
Q6	Male	96	3.479	1.240	0.312	0.577
	Female	141	3.567	1.161		
Q7	Male	96	3.688	1.155	0.920	0.338
	Female	141	3.539	1.180		
Q8	Male	96	3.917	1.194	0.980	0.323
	Female	140	3.750	1.320		
Q9	Male	96	4.042	1.239	0.477	0.490
	Female	140	3.929	1.233		
Q10	Male	96	3.583	1.202	1.505	0.221
	Female	141	3.780	1.219		
Q11	Male	96	3.198	1.366	2.149	0.144
	Female	141	3.461	1.350		
Q12	Male	96	3.083	1.319	5.280	**0.022**
	Female	140	3.479	1.283		
Q13	Male	96	3.406	1.166	0.402	0.527
	Female	139	3.309	1.141		
Q14	Male	95	3.674	1.308	0.027	0.870
	Female	141	3.702	1.313		
Q15	Male	96	3.833	1.319	0.000	0.988
	Female	140	3.836	1.191		
Q16	Male	96	3.729	1.252	1.264	0.262
	Female	141	3.546	1.216		
Q17	Male	96	3.594	1.219	1.148	0.285
	Female	141	3.418	1.249		
Q18	Male	96	3.479	1.240	0.046	0.831
	Female	141	3.518	1.437		
Q19	Male	96	3.667	1.270	0.011	0.915
	Female	140	3.686	1.394		
Q20	Male	96	3.427	1.449	0.498	0.481
	Female	141	3.560	1.411		

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