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STANDARDIZATION MEASUREMENT OF REACTION TIME IN TRANSLATION EQUIVALENCE TASK OF ARABIC ENGLISH BILINGUAL SPEAKERS

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Abstract: *Establishing a standard measurement time is a desirable one as it could improve to assess the level norms of the subjects while implementing a linguistic task such as Translation Equivalence as in lexical decision, semantic correlation either related or unrelated. In each and every task, there is a given time to participants to respond and to react for the task handed over to them. The aim of this paper was to set up a standard measurement of reaction time in Translation Equivalence task of lexical items from Arabic language into English language. The time, then, most probably depends upon the nature of the task. RTs recorded while subjects implemented the visual task using DMDX software program. Results ranged between 500 to 2500 msec for the whole process. One-sample test was used to test the value measurement for 30 native subjects positively (including timing of onset and offset) regardless negative ones. The finding measurement result was 850 msec. Hence, standard measurement Reaction Time in which the subject reacted to the stimuli either on or below this standard measurement time is considered mostly faster, correct and accurate. In contrast, during standard assessment, the subjects encounter above this standard measurement can be slower and frustrating to the speed required in this task.*

Keywords: *Arabic language, DMDX, Lexical items, Measurement, Reaction Time, Stimuli Translation Equivalence.*

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I. INTRODUCTION:

Translation is the process of rendering lexical items from source language (SL) into target language (TL). Gekoski's (1969) dissertation speaks directly to the point that translation is a special language skill. Association of a given word with its translation equivalent may be one of the spontaneous ways of processing that word. Thus the translation equivalent of a word might be available to the bilingual sometime after he/she has heard or seen the language stimuli.

Equivalence can be identified as one of the most contentious and thus potentially most significant concepts in the study of translation. As stated in Halverson (2006),the concept include three key elements: two entities between which a relationship holds , a relationship (of quantity , interchangeability, sameness , similarity) and a quality or feature according to which the relationship between the two elements is defined (e.g., value, quality, significance, effect, meaning, etc).

Bilingualism is broadly defined by Weinreich (1953) as "the practice of alternately using two languages."Hence, the American linguist, Bloomfield's (1933) claim that a bilingual should possess "native-like control of two or more languages".Additionally, Bilinguals function differently from monolinguals on a variety of cognitive tasks. Bilinguals have better developed auditory language skills than monolinguals,Martin L. Albert & Loraine K.Obler.(1978).

As per Shen& Franz, 2005, they stated that in research where more than one key is used to trigger the timer (e.g., yes/no responses), slower left hand reactions (for right-hand dominant participants) need to be accounted for and counterbalanced. Screen and keyboard rates can vary widely andcan, also, contribute dozens of milliseconds to RTs.

Reaction time, then, is the interval between the presentations of a stimulus both visual or audio stimulus and the response to them. In his paper, A Literature Review on Reaction Time, Robert J. Kosinski (2013) stated that reaction timehas been a favorite subject of experimental psychologists since the middle of the nineteenth century.Three basic kinds of reaction time experiments named by Psychologists (Luce, 1986; Welford, 1980). Those experiments called types of RT experiments which are: simple reaction, recognition reaction, and choice reaction time experiments. The one, which the current study focused on, is the recognition reaction time experiments. In recognition reaction time experiments,

there are some stimuli of memory set, and others distractor set. Recognition reaction experiment refers to a visual stimuli either word or non-word; following all guidelines from the instructor in this regard.

Historically, Donders (1868), considered as the pioneer of reaction time by his comparison among these types of RT experiments. O'Shea and Bashore (2012) reviewed these early studies and they agreed those notions. . Many researchers have confirmed that reaction to visual stimulus is very fast within the mean of reaction times being 180-200 msec (Galton, 1899; Woodworth and Schlosberg, 1954; Fieandt *et al.*, 1956; Welford, 1980; Brebner and Welford, 1980). Perhaps this is because a visual stimulus takes 20-40 msec to reach the brain (Marshall *et al.*, 1943). It was, then, for about 120 years, the accepted figures for mean simple reaction times for college-age individuals have been about 190 ms (0.19 sec) for light stimuli and about 160 ms for sound stimuli (Galton, 1899; Fieandt *et al.*, 1956; Welford, 1980; Brebner and Welford, 1980). Laming (1968) concluded that simple reaction times averaged 220 msec but recognition reaction times averaged 384 msec. In Henry and Rogers (1960) theory of "memory drum": those more complex responses require more stored information, and hence take longer. The status of this theory was reviewed by Klapp (2010). McNamara and Altarriba, (1988) obtained two steps mediated priming in a sequential lexical decision task in which items were presented one at a time on the computer screen and subjects responded to each as it appeared. Pace of presenting was rapid (80-100 ms response stimulus interval). Ratcliff and McKoon (1981) showed that priming in item recognition was statistically reliable when the SOA (Stimulus Onset Asynchrony) between the prime and the target was as short as 100 msec. Becker (1980) ,also,used a relatively long SOA of 1050 ms.This look like rejected according to the current study as the subjects get more confusing either to react on time or to perform better.

II. DMDX

DMDX is awindow display program with millisecond accuracy. Itdoes usually attempt to test lexical items by examining the difference in reaction times between words and non-words in recognition tasks. The RTs (i.e., the time between presentation of the stimulus and when the button was released) was recorded and the average time was calculated (Forster, 2002).

III. TYPE OF STIMULUS

There are two types of stimulus: 1) Visual and 2) Audio. The visual one includes many things related to motions such as words, distractions, pictures, graphs etc. An audio stimulus, from the other perspective includes videos, pronunciation either letter by letter or word by word, and many other related things to the realm of sound stimuli.

IV. METHODOLOGY:

i. Participants:

30 native Arabic English bilingual candidates from M.A. and Ph.D. degree in English language study at the University of Mysore participated in this study.40 % were women and 60% were men. With a high intermediate level of proficiency in their second language, all subjects had exposure to L2 as a medium of instructions for at least 5 years. They had studied English language as a foreign language at least four years. They got their B.A. degree in English language. The average age of the subjects was ranged from 23 to 35 by an average of 29 years old. They completed two years in a foreign country like India. All of them were normal and none of them known or reported to any hearing, visual, neurological, emotional, physical or psychological pathology that could interfere with the experiment. Additionally, they were right handed and belong to highly economic income group.

The study was conducted with the understanding and consent of the participants. They were provided information in the language they were capable of understanding and were explained about the aims, methods of the research and approximate duration of the testing.

ii. Design:

The study comprised an experiment of a Lexical Decision Task (LDT) in which a condition of Translation Equivalence was presented. Hence it included different words stimuli which appeared in the middle of the screen. First, a prime word appeared during 500 msec. Second, there is a gap of a given time of500 msec between the prime and target words to think, and to be ready for the appearing the coming up visual stimuli. Finally, the target English word took its place and emerged in the middle of the screen and vanished after a given 1,000 msectime duration. The whole duration of process was 2500 msec. The subject has to respond in this duration.When the time elapsed, the other stimuli emerged in the screen automatically. Though, the subjects would press the button or not, the lexical item takes its given time.

iii. **Materials**:

200 lexical items of Arabic and English language have been selected for this task. Primes were always given in Arabic language and target in English. Both primes and targets were selected from the manual questionnaire that built up for the PhD thesis in this regard (Establishing Corpus in Arabic and English languages, Not published yet), that held information about word frequency, clarity, flexibility, and speed. The lists of these lexical units contained and focused only on the Noun word class. The final selected list was carrying out an average of 70% words and 30% non-words. Non-words were developed based on the phontactic rules. All words have been formed from 3-12 letters by average of 6.4 letters. In order to counterbalance the experiments, each list of stimuli was systematized when presented to the participants by using DMDX software. (Forster, J. 2002).

iv. **Equipment:**

- ✓ To administer the stimuli, HP Pavilion dv4-5110us 14-Inch Laptop (Black)was used.
- ✓ DMDX software version 4.0.4.4 (Forster& Forster, 2003),which is a useful software in various psycho-cognitive tests, especially in assessing, memory, reaction time, and other cognitive processes. It was used for calculating the latency and accuracy of the lexical decision.

v. **Trial**:

Lexical decision studies include such practice sessions followed by an abundance of experimental trails. Fitzpatrick and Izura's (2011) study, for example, included 20 practice trails followed by 72 experimental ones. Balota and Chumbley (1984) utilized as many as 60 practice trials before subjected received experimental trials. It is an excellent idea to make the subjects accustomed to experimental procedures without adversely affecting the final results. In this study, ten type of word/ prime and word/target trials were used. Trials carried out results which are not included in the data.

vi. **Procedures**:

- The subjects were selected in a comfortable position facing the 14 inches screen of HP laptop.
- The procedures were carried out on an alley environment.
- Participants instructed to be ready for the task, focused on the screen and focused on the buttons (1) and (0) on a keyboard. When the stimuli appeared on the screen,

the subjects have to read the stimuli and they have to decide whether it is a word for equivalent translation or a non-word. Words and non-words were matched in terms of lengthy and familiarity. If the word is equally fine, he/she has to press the button (1). Otherwise, the subject has to press the button (0). After pressing any one of the keys, everything will record automatically in DMDX software program either positive or negative. Time taken, also, recorded for the process of taken a decision in each and every lexical unit in the study. In other words, subjects' response was recorded with a button press and was saved as separated files. These files were used for latency measure. Latency was measured from the appearance of the stimulus on the screen till the vanished of the target stimuli on the screen within a given time duration of 2500 msec for three stages in this process. Additionally, either the subject press the button or make a delay, DMDX administered to finalize the given duration time for each lexicon. When the time elapsed, another stimulus emerges on the screen automatically till the 200 lexical items complete, either the subject presses the button or not. The lexical decision, then, used to measure the RT in the test language.

vii. Results and discussion:

Table (1)one-sample test for Reaction time of TE in Arabic English language.

One-Sample Test

	Test Value = 850			
	t	df	Sig. (2-tailed)	
Translation Equivalence-Reaction time	-.010	29	.992	

The test for the above mentioned task used SPSS 17.6 . It was, then, one-sample test of RT in TE of lexical items from Arabic language into English language which have been reported in table (1). The result reveals the measurement of the responding time has taken as 850 msec based on recognition type of RT experiment. Hence, there was statistically no significant emerged between the sample of RT either by the time that has taken or by the standard measurement value that has given for the study (t (29) = -.010, p= .992). In this regard, then , it is coming to the say that, the hypothesis has put up for this task in which the subject has to finalize the task in a given duration of responding time 850 msec based on

literature reviews has been implemented properly and more accurately. Therefore, the predicted hypothesis has been accepted.

To extend, some candidates might they are smart and their comprehension is very high and may they respond within 400 msec, 500 msec and a while. Some may they respond in duration of 700-1200 msec and these candidates considered good in the speed. But the other category may require a long duration of time that may extend to 3000 msec and they are considered very weak in terms of speed. That is what, if the subject response on time of standard measurement duration given in this study or below the standard, they considered very good and their answers could be more impressive, and accepted, but if they response above the standard measurement time, they will be frustrated in the task and their speed will be considered as very weak and / or poor in term of RT for the whole process of 2500 msec.

V. CONCLUSION:

The current study that aimed in the direction of establishing standard measurement for the speed of RT to the subjects who are able to implement the task of Translation Equivalence from Arabic language into English language in respect of Reaction Time.The experiment carried out in this study, then, provided strong evidence that standard measurement of RT has been recognized and identified during the TE task.

According to recognition type of RT experiment and based on the scientific study, it has been observed that there was no statistically significance in a given prediction duration of time 850 msec out of 2500 msec as reported statistically in table (1). Thus, this time has been given to get more accurate answer without any related delayed problems as of those psychological issues. If the subject will press the button to answer within this duration or below it, all his/ her feedback answers will be taken into consideration that they are accepted, accurate, strong and very impressive ones based on the standard measurement. Otherwise, the answer will show the weakness of the subjects based on the time shown in table (1) because the answer is above the standard measurement and the subjects considered highly very weak-in this case- in term of RT. In this regard, it has to say that most of the whole subjects have to finalize the task in the given standard time duration. The procedures of establishing a standard measurement Reaction Time of Translation Equivalence have been treated and/or sketched empirically by using a time keeping device

of DMDX software to record the entirely process for the whole subjects participated in this study from the first to the last of the 200 lexical itemsthat have been given in a task.

This finding serves to corroborate with the hypothesis that the translation representation mediated between words and non-words from the first to the second language in a bilingual mind. This implies that if the subjects have a very good background, a perfect mental lexicon, they will be, then, ensure the memory store to facilitate a better choice to make a lexical decision. This finding, also, enhanced the scholars to evaluate their subjects based on their speed in term of RT in their TE task for any given language either national or international. Additionally, this finding can be attributed to the correct responses of the subjects in the standard measurement of RT.

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