

Modeling Pronunciations of Arab Broca's aphasics using Moss Talk Words Technique

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Abstract:

Background: *There has been a debate in the language over the years as to whether or not MossTalk Words program fits Arab Broca's aphasics (BAs) due to that language differences and also the fact that the technique has not yet been used for aphasics with semantic dementia (SD aphasics).*

Aims: *To oversimplify the above mentioned debate slightly for purposes of exposition, the purpose of the present study is to investigate the "usability" of this program as well as pictures and community as therapeutic techniques for both Arab BAs and SD aphasics.*

Method: *The subjects of this study are two Saudi aphasics (53 and 57 years old respectively). The former suffers from Broca's aphasia due to stroke while the latter suffers from semantic dementia. Both aphasics can speak English and have used Moss Talk Words program in addition to intensive picture-naming therapeutic sessions for two years. They were tested by one of the researchers four times (a time per six months). The families of the two subjects in addition to their relatives and friends played a major part in all therapeutic sessions.*

Conclusion: *Results show that in averages across the entire therapeutic sessions, MossTalk Words program was clearly found more effective in modeling BAs' pronunciation than that of SD aphasic. Furthermore, picture-naming intensive exercises in addition to the positive role of the community members played a major role in the progress of the two subjects' performance.*

Keywords: *MossTalk Words, Program, Technique, Broca's aphasia, Semantic dementia, subjects, picture, community.*

1. INTRODUCTION

Nobody can deny the role of computer programs in the field of medication. Starting from taking over some routine book-keeping problems and freeing medical practitioners to focus more on important issues and ending with routing the patient to the appropriate department in accord with his sex, age, principle complaints, and so on (L.B. Holm, et al., 2012; van Lenet, et al., 2012; Bromley, 2012). Computers can also be medically exploited to call unusual features of the patient's history to the physicians' attention (Hudson, 2012; Mehrotra, et al., 2012; Editorial Board & publication information, 2013). To draw a generalization upon such issue, it can be said that the large-scale medical plans, medicine, and books that encourage periodic diagnostic physical examinations might not be feasible without such computer aids (Scott, et al., 2012; Saki,

et al., 2013; Juhola, et al., 2013; Song, et al., 2013; Szaleniec, et al., 2013; and Rodríguez-González&Alor-Hernández, 2013). Raphael (1972) describes the medical situation in the actual life of the Americans. He draws a painful picture when he states:

“The continued accelerating expansion of medical knowledge tends to frustrate even the most conscientious specialist's attempt to keep abreast of this field. Spiraling costs are putting good medical care beyond the reach of a large segment of our population, and placing the whole future of private medicine in the United States in jeopardy, Can computer helps change this dismal picture?” (Raphael, 1972: p.302)

Commenting on such ideas, Kupka&Wilsing (1980) add: "Computer-guided programs development and menu techniques are special subjects of system-guided dialogues. The dialogue consists principally of system questions and user answers." (Kupka&Wilsing, 1980: p.21)

Handa (1990) introduces his book titled: “Computers and Community” by insisting on the importance and the advantages of using computers to teach some language's skills. He states”...we see that the computer offers immense possibility for restructuring relation in both classes and societies.”(Handa, 1990: introduction)

Similar to this opinion is Barker & Kemp's opinion in Handa's book. Criticizing the traditional method of teaching some language skills, the researchers comment: “Current-traditional instructors complain that students “have nothing to say and they themselves have carefully taught the students to say the same thing over and over again.” (ibid, 1990, P.6)

In spite of this opinion, they admit in another context that aphasics who really intend to model their pronunciation need to balance between the theoretical knowledge of pronunciation and the practical ability represented by the use of MossTalk Words technique. They conclude, “ Whatever uses of this strategy will be put to in the applied speech, the effectiveness of such uses will depend more on a controlling pedagogy and its theoretical base than on the technical capabilities of the machines themselves.”(ibid, 1990, P.26)

Karat& Bonnet (1991) and Kilian (2000) recommend using the computer as a means of treatment due to its tremendous benefits. From their integration in language treatment, computer laboratories become a physical center for aphasics' community- a place to meet partners in collaborative projects, to share suffering with others, and to find solutions for their language disorders (Ranganath, et al., 2013; Kelly, et al., 2013; Shin, et al., 2013; Wang, et al., 2013; and Origlia, et al., 2013). In addition to their roles as treatment tools, Canagarajah et al., (2002) assesses the values of using computers as pedagogic tools. The team discusses their uses as technological means through which literacy is overcome and pronunciation is modeled. The term “Multi-literacies”, according to Canagarajah, “suggests that to be literate today requires competencies in multimodal and multilingual forms of communication.” (Canagarajah et al.,ibid: pp. 212-213)

Li, et al., (2013), Świetlicka, et al., (2013), Delcroix, et al., (2013), Skantze, &Hjalmarsson (2013), Gajšek, et al., (2013), van Dalen & Gales (2013), and Cui, et al., (2013) are of the view that psycho neurolinguists should pay attention when using computers as means for treatment due to computers' faults and problems, notably in matters concerning grammar. Summarizing a number of grammatical as well as stylistic aspects that can be revised by the word processor, Hermant&Lann (2002) conclude, “... because computers cannot understand the content of a sentence, more of the programs that evaluate style and grammar are neither consistently accurate nor do they always offer appropriate alternatives.” (Canagarajah et al.,ibid: p. 488).

Advantages of computers, Hermant&Lann add “are restricted to classrooms by having word processing software in the classroom.” (Canagarajah et al.,ibid: p. 404)

It is worthy to mention that “computers were first used in the 1960 before process-based pedagogy took hold in an effort to evaluate the teaching of grammar, spelling and punctuation, and the evaluation of students’ compositions....” (Canagarajah et al., ibid: p. 482)

One more point is “the development of word software programs in the last ten years marked the first and most pervasive influence of computers on composition.” (Canagarajah et al., ibid: p.482)

When learning how to overcome phonetic or phonological phenomenon relating to aphasics, the first thing that faces researchers is the everyday words. Generally speaking, words can be understood via two basic elements: the exposure to these words in real language circumstances or what is known as vocabulary teaching (Ahmed, 2012) using any vocabulary tool beginning from e-dictionaries and culminating with computer programs. However, a more thorough investigation is clearly needed to determine whether such programs can be applied more widely. This paper represents a step in that direction. Since computer programs are currently at best an imperfect technique, there is no gold standard by which to judge successful application of modeling aphasics’ pronunciations. Moss Talk Words is one of these programs that help aphasics ameliorate their pronunciations. It has been selected in this study as a technique through which aphasics can model their pronunciations (Healey &Sullivan, 2002; Bitzer, 2010; and Simon, et al., 2012; van Lent, et. al., 2012).

The need for computer programs during aphasia therapeutic programs is evident in modeling aphasics’ pronunciations. They can be used as useful means for learning, especially with word-forms e.g., take, takes, taking, took, taken, etc., (Taylor, 2012; Plakans&Gebriel, 2012; Hatoss, et al., 2012; and Chau, et al., 2012).

In spite of that MossTalk Words is new technique; it is proved to be one of the best professional electronic tools for modeling aphasics’ pronunciations (Sambai, et al., 2012; Holt &Lalonde, 2012; Pfeifer, et al., 2012; Lawier, et al., 2012). It succeeds to satisfy both trainers and trainees. In addition to its use in modeling Aphasics’ pronunciations, this new strategy can also be used to correct their sentences, answer their questions, etc. Computer programs, “we are told (Cook &Fass, 1986, p.163),“have been developed that describe the structure of sentences, that answer questions about selected subjects, and that engage in extended dialogue with humans”.

Before World War I, psycho neurolinguistics registered some efforts to “treat aphasia” (Broadbent, 1879; and Mills, 1904). During and after the war, new born programs of rehabilitation were developed in Germany, Europe, United States of America and United Kingdom (Poppelreuter, 1915; Frazier& Ingham, 1920; Franz, 1924; Head, 1926; Isserlin, 1929; Neilsen, 1936; and Goldstein, 1942). Some of these programs are, psycho neurolinguistically speaking, effectively participated in treating thousands of aphasics over ten (10) years during and after World War II (Weisenberg& McBride, 1935; and Butfield& Zangwill, 1946). Hospitals–based programs were subsequently opened and subjects were regularly documented in the US, Germany and Russia (Backus, 1945; Sheehan, 1946; Granich, 1947; Luria, 1948; Goldstein, 1948; and Wepman, 1951). Programs produced for treating aphasics include: Illinois test of psycholinguistic abilities (ITPA), Fast ForWardprogram, and Boston naming test (BNT) (McCathy&Kirk, 1961; Hammill& Larsen, 1974; and Ysseldyke&Salria, 1974). Such programs were used by researchers who would attempt to benefit from them in their studies. They are found to increase the average words acquired by mentally handicapped children (MHC) (Bryan, 1978).

During the last few decades, investigators in the field of computer science and information systems developed some programs used as methods, strategies, or techniques for modeling people's pronunciations (Patel, et al., 2010; and Fava, et al., 2012). While "task analyses" are commonly stated as important sources of insight for system development, these methods along with their outputs vary widely (Rosenfield, et al., 2009; Johnson, 2012; and Barde, et al., 2012). For example, tracing user's physical actions needs to achieve good results. These results that occur when interacting with a computer can be helpful, but they do not tell us much about the cognitive demands placed on the user (Pandey, & Mishra, 2009; and Qassim, et al., 2013)

One of the reasons that make MossTalk Words technique a valuable strategy through which the deficits in people's pronunciation can be overcome and modeled is that all manners of applications for dialogues with pictures are imaginable (Raphael, 1972). Moreover, images in MossTalk Words can be easily selected and controlled nearly by all impaired people. Martin (1973) believes that "... the appeal of working with an interactive motion-picture terminal would be very great." (Martin, 1973: p.200)

Such viewpoints were supported and received highly support by Hockey (1988) who emphasize the role of picture as a means through which interaction can be elicited. MossTalk Words' designers and developers are commonly required to make decisions based on the assumption about user's background, knowledge, experience, and also his/her ability to learn. Some of these designers and program developers are of the view, however, that such assumption should be considered to be a link between the designer and the user. Commenting on such assumption, Johnson (1956) has rightly observed that "... these assumptions directly influence the quality of the interaction between the person and the computer." (Johnson, 1950: Introduction)

Nowadays, there is almost a consensus upon psychoneurologists that computer technique can be effectively used to model aphasics' pronunciations (Bone, et al., 2012; Caraty & Montacié, 2012; Siniscalchi, et al., 2013; and Lemon, 2013). Basically, understanding a word, a sentence, a paragraph, a clause or a phrase does not necessarily mean that someone is not able to pronounce it accurately and fluently nor does it indicate his / her capability to organize ideas in a sequence (Sakti, et al., 2013; Hanani, et al., 2013; Schuller, et al., 2013). In Broca's aphasia, for example, the patient can comprehend and understand fully, but his or her production is affected (Al Yaari, et al., 2013).

A very legitimate question is "What is the difference between computer and any other traditional method?" One may answer that the former is produced with technological tool while the latter is produced with ordinary tool (human) in spite of the fact that in the latter, a person also uses his/her mouth. What concerns the researchers is the quality of the produced piece of speaking and also the quality and the competency of the taught case in the question (Liu, et al., 2013; Paulik & Waibel, 2013; Zhou, et al., 2013; Ettelaie, et al., 2013; Ananthakrishnan, et al., 2013; and Heracleous, et al., 2013).

An important characteristic of MossTalk Words technique is the "usability" which according to Bennet (1984) is concerned with making systems easy to learn and easy to use and, thus, requires good visibility and affordance. The feature of "usability" in MossTalk Words program made the program widely used among psychoneurologists who use it to serve individuals with language impairments, learning disabilities and other cognitive impairments (Sridhar, et al., 2013; Prasad, et al., 2013; Tsiartas, et al., 2013; and Dines, et al., 2013). Speech-language Therapists (SLTs) also use this technique to efficiently select and deliver the appropriate therapeutic exercises to their aphasics and those who suffer from language disorders. Moreover, they track results and independent home users who would benefit from hours of practice in comprehending and

producing words, phrases and sentences (Sanders, et al., 2013; Kujala, 2013; Scherer, 2013; Scherer, et. al., 2013; Pinto-Coelho, et al., 2013; Brandner&Colombet; 2013; and Tsilfidis, et al., 2013).

What confuses psychoneurologists and SLTs is that using vowel markers accurately and fluently in aphasics' pronunciations is impossible; that is why they resort to the ordinary speech where the sound marker /ʌ/ instead of /a/, /o/ or /w/ can be used without any rules-govern. Sociolinguistically speaking, in most Arabic dialects, people often delete vowel-sounds (Al Yaari, et al., 2012). Such fact has been typically, but not exclusively, taken into account by Saudi psychoneurologists and SLTs who found it difficult sometimes to study their aphasic children properly. The same thing applies to some English dialects. Consider: "ate" is pronounced like "et" and "been" is pronounced like "bin". These results have led to a generalist view of aphasics' behaviors during the process of speaking (Ruedi& Levinson, 2000; Peck, 2001; Clark, 2003; and Harwood, 2005)

However, the evidence cited to bolster the Generalist claim requires using a suitable technique like MossTalk Words to deal with such linguistic phenomenon (vowel deletion). Anastasia, et al., (2006) investigate the use of MossTalk Words as new technique for treating aphasics' deficits in articulating speech sounds. The study examined five individuals with word retrieval impairments associated with aphasia. Results show that two had word comprehension difficulties suggesting semantic anomia, and three others with intact comprehension had impairments suggesting phonologic anomia. In a single-participant design, the researchers investigate effects of training provided via computer with MossTalk multi-mode matching exercises (spoken and written word/picture matching) paired with spoken rehearsal. Findings indicate that there were improvements in word/picture yes/no verification for trained and some untrained words associated with large effect sizes ($d > 2.5$) were evident in one of two participants when trained 1–2 times/week.

A similar study conducted by Jokel(2007) focuses on a case using MossTalk Words technique. Results demonstrate that improved naming was maintained with all lists at all testing intervals. Such outcomes underscore the feasibility of computer-based treatments for anomia in progressive disorders, demonstrate the effectiveness of an errorless approach in semantic dementia in re-training lost words, and also provide justification for training words that patients still have in their daily vocabulary (Pakhomov, et al., 2013). It should be noted here that many studies held on people suffering from pronunciation problems using MossTalk Words technique almost made success on this regards. This technique focuses on strengthening the understanding and production of single words using a simple and intuitive (but adult-oriented) interface. It becomes important for all users who would benefit from hours of practice in comprehending and producing words, phrases and sentences.

As is expected, previous research showed the importance of using MossTalk Words as an effective technique to model aphasics' pronunciations because of its tremendous benefits. This remarkable interest shed light on the role played by computer programmers, formalists, organists, and designers (Gardner, 2007). Rimrott&Heift (2008) evaluate the ability of spell checker called "Generic spell checker" to identify the mal pronunciation of German language words in the pronunciation of a case learns German as L2. This checker is compared to the word processor spelling checker. The results show that generic spell checker failed to achieve high percentage of correcting the misunderstanding in aphasics' pronunciations.

Treatment, a psychoneurologistically defined relation which extracts the filler out of the position marked by the gap. To the specifists, treatment is better achieved by intensive therapeutic

and pathological exercises than by excessive computer techniques and strategies. According to Chen (2008), computer programs “can help but with lower verbal and higher visual ability.” (Chen, 2008: p. 3) On contrary, complete dependence on the theoretical knowledge “can also help with lower visual and higher verbal ability.” (Chen, *ibid*: p. 3)

Ruth, et al., (2002), Kathaleen (2004), Fink, et al., (2005), Weiss, et al., (2007) and Gaddis (2008) are all agree that MossTalk Words is the main reason behind recovery of most subjects suffer from pronunciations' impairments. Attempting to investigate whether or not MossTalk Words could be effectively invested in the field of language rehabilitation, notably for patients with Primary Progressive Aphasia (PPA), results of Jokel, et al., (2009)'s study show that this ambition can be achieved. The study measured the ability of PPA aphasics to relearn lost words and to determine the extent of benefits derived from MossTalk Words. Results outline that the naming skill of the participants improved with the MossTalk Words. P1 required only four sessions to reach the proposed criterion of 80% (up to 100%) correct on each list. Results were variable immediately after testing, but seemingly maintained 4 weeks later which means that MossTalk Words program should be considered as a good strategy in modeling aphasics' pronunciations which will lead to further studies and investigations.

In view of the above mentioned studies, it can be seen how learnable is MossTalk Words to be used not only for once or twice, but for so many times as a suitable tool for treating such subjects. These results were supported later by the findings of Bourgeois (2010)'s study who concludes that participation in the program led to improved naming performance among the participants. Again, Jokel, et al., (2009) offer some evidence of using MossTalk Words in progressive aphasia. Such evidence were not convincing enough to other researchers like Bourgeois (2011) who made a fairly sharp rejoinder against the findings of Jokel, et al., (2011). But his assertion was later rebutted by Jokel and his colleagues who claim that those marking were irrelevant.

Despite the findings indicating that using MossTalk Words Technique help model aphasics' speech sounds in many countries, issues still seem un-clarified as to what extent the program is helpful for Arab Broca's aphasics who gain a basic understanding of English as Foreign Language (EFL). The present study therefore aims to offer an insight into these issues, by investigating Some Saudi EFL aphasics who used this program to model their pronunciations. Again, the current paper attempts to elucidate the way how to overcome aphasia of Arabic aphasic patients by modeling their pronunciations to the generation of spontaneous speech using MossTalk Words technique. However, some implications of the presence of planning units in everyday speech for the regulation of better treatment are also explored.

1.1 Aims of the Study

The principal aims of this study are as follows:

1. The use of MossTalk Words as a computer-based treatment to model aphasics' pronunciation, to what extent it is helpful for Arab aphasics in comparison with other programs of the same nature?
2. Compared with other programs, who benefits more from MossTalk Words technique: BAs or aphasics with SD?
3. Can practicing well known pictures by Arab Broca's aphasics and those with semantic dementia help in a way or another maintains their words? Is there a role played by the society in retaining aphasics' lost vocabularies? Yet, is this role separable psycho neurologically into a major and a minor?

1.2 Methodology

Two Arab subjects with Broca's aphasia (53 years old) and semantic dementia (57 years old) completed a 2 year treatment program with MossTalk Words. The two patients have enough background of English that they could have interacted with the English version of the program. Therapeutic sessions also include intensive exercises on well-known pictures. A total of 100 well-known pictures were weekly given to the two subjects under investigation. Both subjects were tested by one of the researchers every six months (4 sessions) for two years. These pictures include 10 personal pictures (subjects' picture plus pictures for his family, relatives and friends), 10 pictures of most famous people, 10 pictures of most reputable places in the world, 10 pictures of fruits and vegetables, 10 pictures of animals, 10 pictures of body's parts, 10 pictures of food and drinks, 10 pictures of electronic devices, 10 pictures of transportation means, 10 pictures of natural views and sites, 10 pictures for school items, 10 pictures shapes and colors, and 10 pictures for birds and insects. Families and relatives in addition to friends of the two subjects at hand participated effectively in the therapeutic program. The core of their roles was to encourage the subjects and motivate them to interact with open conversations and social activities. Community sessions occurred 5 times a week and lasted for 3 hours. Time was divided into three parts: the first hour for MossTalk Words, the second for practicing pictures' naming, and the third was dedicated for practicing the social activities with relatives and friends of the subjects. It should be pointed out here that all official documents including consent letters and permissions were obtained from related parties.

2. ANALYSIS

2.1 MossTalk Words & other programs: Contribution to Arab BAs and SD aphasics

Though there have been a number of past attempts to account for aphasic programs for Arab BAs, MossTalk Words program remain dominant. The procedures of the program determine that well known pictures are given to aphasics in general and those suffering from Broca's aphasia and word naming problems in particular. The purpose is to identify whether or not these aphasics can recognize pictures, thereby name them. Since the two subjects under investigation can speak English, they could cope with the idea of the program. While BA's case registered 83%, 85%, 87%, and 90% in the four sessions, the case with SD registered 68%, 77%, 81% and 85%. Based on their scores, the two subjects under investigation were moved to another difficult stage where they link the voice with the picture and related pictures to each other. In this stage, the case with BA registered a total score of 95%, while SD aphasic patient scored 70%.

The principles of errorless learning are incorporated into the treatment protocol by utilizing description cues included in the MossTalk Words pictures. Each picture was presented on the computer screen and accompanied either with a word to describe it or with a list of picture grouping where this picture belongs to. Both BA aphasic and SD aphasic were instructed to respond only if they are sure of the correct answer. Regardless of their response, a spoken word was always provided SLT and both subjects were asked to repeat it. The software allows for random presentation of pictures and that is what makes it flexible. Multiple baselines were obtained with the use of drawings from MossTalk Words program administered for naming. Having tested by MossTalk Words program, the scores of the subjects' performance in the test were psycholinguistically analyzed in light of statistical plan made by the program designers.

Each picture is presented on the computer screen and accompanied with a spoken description (e.g., a picture of a bat is accompanied by: "a small animal like a mouse with wings that flies around at night"). Each of the two clients at hand was instructed to respond only if he was sure of the correct name. Regardless of his response, a spoken word was provided and he was asked to

repeat it. The software allowed for random presentation of pictures. Once the subject had attained 80% accuracy on two consecutive presentations of a list or had participated in 12 sessions (whichever occurred first), treatment of that list was terminated and treatment of the subsequent list commenced.

Although MossTalk Words program is undoubtedly one of the universal programs that treat aphasics' pronunciations, notably BAs and SD aphasics, there are some other software programs, techniques and strategies that are involved in such treatment. Each of these treatment methods has its own distinctive features that distinguish it from other means of the same nature. Certainly, this does not in any way mean that one of these means has no default or that other methods are disadvantageous or even illegal. It simply means that each of these techniques tackles the issue from certain angle and that one of them could be better than another/ others.

Natural language avails us of dependency relations other than pronunciation tests, which is where we start. To appreciate therapeutic distinctions that exist between different programs, one should consider Philadelphia naming test. (PNT). PNT is one of these techniques that deal with the pronunciation of SD aphasics. It treats the frequency and syllables of SD aphasics. Coding is one of the characteristics of this technique. The case's performance is classified on the basis of two levels: phonological level and semantic level. While the former includes syllables' forms, and phonemes' positions, the latter deals with issues related to semantic error along with the subject's response that bears a semantic or associated relationship (phonological and semantic) to the target. Important semantic and processing differences between BAs and SD aphasics could require distinct computational mechanisms that embed separate therapeutic resources. Semantically, pyramids and palm trees test is another test that deals with the semantic knowledge of aphasics with SD. The idea of the test is based on accessing meaning to target pictures and vocabulary items. Such technique can easily tell whether or not the case under investigation is able to name pictures or at least point to them using sign language. The technique allows psychoneurologists to decide whether or not the case has problems related to semantic knowledge or difficulties in access to semantics.

Inspired by the fact that BAs are better at singing lyrics than speaking the same words, some researchers developed melodic intonation therapy (MIT) technique. The technique proved its potentiality to unmask language-capable regions in unaffected right hemisphere. It is also well suited for patients with large left-hemisphere lesions. This technique is also found to improve propositional pronunciation that generalized to unpracticed words and phrases (Schlaug, et al., 2008). Given on-line studies show that functional communication therapy is one of the best therapeutic technique (Aten, et al., 1982). The technique fits BAs that SLTs use it to ameliorate communicative abilities in daily living to improve the fluency of BAs. The technique demonstrates significant improvement in post-treatment performance. It also indicates that the positive change in the scores of communicative abilities in daily living that is found to be maintained.

Such therapeutic techniques are curtailed by considering that in order to have reactivation, there must be storage and that only production cues allow for comprehensive reactivation. The above differences between the two abilities (that are linguistic in nature) lead psychoneurologists and other people in the field to introduce Mapping for both BAs and SD aphasics (Schwartz, et al., 1994). The good thing about this technique is that it deals with not only the production, but also the comprehension. SLTs normally use to train aphasics' verbs, sentence's agents and patients in a combined written spoken format. Psycho neurologists find it very useful for BAs than for those of SD. Formal linguistic properties of sentences are considered in the development of treatment of underlying forms. Psychoneurologists recommend such technique for BAs (it

improves their sentences) although SD aphasics could also benefit from it (Thompson&Sapiro, 2005).

Likewise, the aphasics' pronunciation performance distinguished between these programs and techniques allow psycho neurologists to develop Computer-aided Visual Communication system for both BAs and SD aphasics (Steele, et al., 1989). This strategy helps improve aphasics' learning, generalization, and retention patterns, and highlight areas of performance difficulties. One more technique is generalization training procedure which is found to be very useful for BAs. According to psycho neurologists, this technique reveals significant improvement on the parameters of talkativeness, inquisitiveness, and conversational success (Doyle, et al., 1989). Such therapeutic outcomes are inconsistent with psycho neurologists' views, which assume common therapeutic strategies for modeling aphasics' pronunciations. They are, moreover, bolstered by findings from other techniques used for the same purpose

While the above mentioned results are suggestive, they are not conclusive which means that an effective therapeutic program is needed. Computer script training program is another technique recommended by psycho neurologists for BAs and SD aphasics (Cherney, et al., 2008). This technique demonstrates effective intervention for both BAs and SD aphasics, notably those who suffer from chronic aphasia. In fact, the manipulation in itself can affect strategies used in the various conditions as well as other task-related variables. As a result, psycho neurologists suggest community-based programs that can be used as a therapeutic strategy for both chronic and acute BAs (Aftonomos, et al., 1999). The purpose of such programs is to "help" aphasic patients overcome their aphasia and be able to model and ameliorate their pronunciation. Through these programs, BAs and SD aphasics are given the opportunity to realize their abilities and potentiality. It is for this reason that psycho neurologists and SLTs are strongly recommend them for better results of aphasics' therapeutic sessions. In terms of pronunciation program studies, a therapeutic program requires the use of HELPSS as a new technique of treatment that can be used for BAs. (Helm-Estabrooks & Gail Ramsberger, 1986). The technique is proved to be significant, notably for verbal expression

It is almost universally agreed that the linguistic production function of some language regions of the brain is related to semantic complexity. Less clear is the definition of this functional notion, even though its elucidation is crucial for understanding of these brain regions' functions. Semantic feature analysis [SFA] as well as a forward chaining technique as in response elaboration training [RET] is another new technique that is designed to direct these functions towards effective therapeutic results. Again, the technique is designed to activate SD network without inhibiting related or creative responses. (Conley & Coelho, 2003). SFA-RET treatment is also found to be useful, notably in improving naming of the treatment pictures as well as the untreated control pictures.

A Syntax Stimulation Program (SSP) is based on the observation that a stimulus property, once repeated, yields a suppressed signal, and so helps to identify such properties that a particular brain region processes. The technique is found to be very helpful, notably for BAs. The idea of the program requires elicitation of eight different sentence constructions at two levels of difficulty using a story completion technique. The patient received pre-, mid- and post-treatment testing with the Northwestern syntax screening test (NSST) and the cookie theft picture description of the Boston diagnostic aphasia examination (BDAE). The pronunciation of BAs becomes fast, especially in spontaneous conversation. According to Helm-Estabrooks, et al., (1981), the SSP appears to have therapeutic merit in training syntactic skills in presumably stable agrammatic patients.

Electromagnetic articulography (EMA) was explored as a means of remediating [s]/[ʃ] articulation deficits in the pronunciation of BAs (Katz, 1999). One of the advantages of this program is that it allows a wide range of utterances to be recoded in one session. Subjects under investigation could monitor the movement of their vocal apparatus which help them improve the best way of articulating sounds. Strictly, these results provide critical support for the claim that not all techniques are useful. Using a double-blind, placebo-controlled, crossover design, Gupta, et al., (1995) demonstrate that this strategy is not useful for BAs. According to the team, the new technique did not significantly improve the patients' pronunciation fluency, language content, overall degree of aphasia severity, or nonverbal cognitive abilities. Based on these results, the new design is not recommended as mono-therapy for the treatment of chronic non-fluent aphasia.

2.2 The role of pictures and community in maintaining words of people with Broca's aphasia and semantic dementia

Scientific wise, human mind has several inputs and can accept information from several types of forms including computers, especially after they have proved their ability to be used as means of solutions for some problems that face human beings. However, human media of communication takes different forms including T.V screens, multi-screen presentations, still color pictures, sound recording, printed narrative, diagrams, charts, shapes, photographs, pictures, tabulations, symbols, templates, graphs, etc.

Since Word-finding difficulties are central to aphasics, the researchers made use of well-known pictures to be recognized and named by the subjects under question. Pictures can be differently used for aphasics i.e., they take different patterns and forms. Single-word performance (also known as confrontation naming) can be used to treat lexical retrieval impairments. Naming is, in part, determined by the convergence of associations and pictures are described as one of the best solutions for both BAs and aphasics with SD. Psycho neurolinguistically, pictures are found to be very useful for both BAs and aphasics with SD who responded to phonemic cues given by SPTs. These pictures can be compared with auditory cues (Auditory word-to-picture matching, visual word-to-picture matching).

Furthermore, pictures can function as specific and theoretically motivated treatment methods which, in turn, can cause significant improvement in the word retrieval ability of patients with chronic aphasia including dyslexics and non-dyslexics, Wernicke's aphasics, conduction aphasics, frontal anomics and posterior anomics. In order to examine picture naming errors in more depth, an object name recognition test assessed each subject's vocabulary knowledge of those names which they were unable to spontaneously label in the picture naming task introduced by SLTs.

Picture naming tasks aim at eliciting the ability of aphasic patients to produce words from the grammatical classes of nouns and verbs. As time passes, these tasks developed model of the normal mental lexicon which stresses the importance of integrating perceptual and functional information in the act of naming, and equally stresses the inherent vagueness of conceptual categories based on such information. However, the results of picture-naming task for both subjects at hand can be explained in view of Table 1 and Table 2. Consider:

As it is seen in Table 1, BAs' performance is improved as time passes which means that the role of the community members was effective. Compared with his first sessions, the subject at hand made a significant progress, notably in the fourth and fifth sessions. Of course, general performance can be clearly identified with reference to that of the second subject under question. Consider:

Table 1. *BAs' performance in picture-naming task*

Target Picture No. of visits	Personal pictures			
	1-4	0	3	5
	Most famous people			
1-4	1	2	3	3
	Most world reputable places			
1-4	0	1	5	5
	Food & drinks			
1-4	1	2	4	4
	Electronic devices			
1-4	1	3	3	4
	Transportation means			
1-4	0	4	4	5
	Natural views & sites			
1-4	2	3	4	5
	School items			
1-4	2	4	4	5
	Shapes & colors			
1-4	1	3	4	5
	Birds & insects			
1-4	2	4	5	5
Total scores per 4 visits	10	29	41	46
Total scores of all visits	126			
General Mean	3.15			
Hypothetical Mean	31.5			

Table 2 explains the performance of SD subject. Like BAs, the progress occurred in the last two sessions. In comparison to BAs' scores, SD aphasic patient has registered less progress than that of made by BAs. This can be clearly observed in both general mean and hypothetical mean of the two subjects (3.15, 1.7, 31.5, and 17.75 respectively). Interestingly, therapeutic-studies that varied in treating BAs and aphasics with SD suggest that a community role is necessary: nearly all recent reanalysis of available published literature on the subject have come to unanimity upon such technique. Despite considerable strategies used for modeling aphasics' pronunciation, notably the pronunciations of both BAs and aphasics with SD, no one can deny the major role played by aphasics' relatives in aphasics' recovery. Leisure activities, familial conversations, inter and intra personal relationships between the subjects under investigation and their relatives and friends are some aspects of this pivotal role. In addition, the coping behavior adopted by the aphasic subjects under question and their friends alike was associated with means of maintaining communication and relationships, although some behavior served to stifle communication.

Again, community represented by the subjects' relatives and friends made changes from baseline on the subjects' quality of both life measure and communication measure. The changes on the coping with caring are also significant in the process of therapy. The same thing applies to the direction of change which is also positive. Qualitative interviews between all parties and positive interaction revealed similar pattern of benefit in terms of increased levels of self-confidence and changes in lifestyle and levels of independence. Evidently, this therapeutic approach has an impact on quality of life and communication for aphasic patients and their relatives and friends.

Table 2. *SD aphasic's performance in picture-naming task*

Target Picture No. of visits	Personal pictures			
	1-4	0	0	2
	<i>Most famous people</i>			
1-4	0	1	2	2
	<i>Most world reputable places</i>			
1-4	0	1	3	3
	<i>Food & drinks</i>			
1-4	1	1	2	3
	<i>Electronic devices</i>			
1-4	0	1	3	4
	<i>Transportation means</i>			
1-4	1	1	2	3
	<i>Natural views & sites</i>			
1-4	1	2	3	3
	<i>School items</i>			
1-4	1	1	2	4
	<i>Shapes & colors</i>			
1-4	2	2	2	3
	<i>Birds & insects</i>			
1-4	0	0	3	4
<i>Total scores per 4 visits</i>	6	10	24	31
<i>Total scores of all visits</i>	71			
<i>General Mean</i>	1.7			
<i>Hypothetical Mean</i>	17.75			

There were some problems and difficulties that both subjects under investigation and their relatives met during the interviews. Both parties were confronted with communication problems. Together with the patient, the family has to deal with the fact that the role of relatives is useful. This role requires attending speech therapy held in the hospital of rehabilitation..Armed with patients, the relatives and friends of the subjects realized that they have to deal with simple as well as serious difficulties that can occur any time in the everyday life of the subjects at hand. SLTs also informed them that BAs and SD aphasic are much more troubled by their communication problems than those of the family. The latter are more concerned with the problems accompanying aphasia. In expressing wishes, both the patient and the relatives give priority to the hope that the patient will recover the capacity to speak. SLTs believe that improvement in the subjects' pronunciations was enhanced by relatives' cooperation. According to psycho neurologists and SLTs, the subjects' therapeutic sessions would not have been completed without such cooperative work.

3. CONCLUSIONS

Therapeutic programs (as means of recovery) were developed in response to the increase number of BAs and SD aphasics (Shewan&Kertesz, 1984). This research had once prevailed as a theory that can satisfactorily explain various linguistic phenomena. Indeed, the study introduces new insight to aphasics' studies in the Arab world. Several psycho neurolinguistic studies have revealed this cognitive interaction between MossTalk Words technique and Broca's aphasics, but no study investigated the use of this therapeutic program in studying Arab BAs and aphasics with

SD. To date, no psycho neurolinguistic study has attempted to unpack the 2 dimensions (BAs and SD aphasics) of the contrastive analysis we discussed. Therapeutic programs have only examined one dimension for specific language (the language that the program was designed for). While not problem free, this work hints at the possibility of a psycho neurolinguistic distinction among different therapeutic programs and techniques that can be used for the same purposes. Such a result, if obtained, would be of major theoretical significance, as it would lead to a more refined theory of modeling aphasics' pronunciations, and to a more detailed view of its psycho neurolinguistic underpinnings.

Again, no psycho neurolinguistic study has attempted to compare the performance of two different patients with different types of aphasia using the same therapeutic strategy they have both used, by pitting them against one another. Against this background, we made use of MossTalk Words technique to see its effects on modeling the pronunciations of both BAs and SD aphasic. In it, we provide a novel perspective on the psycho neurolinguistic representation of phonology and semantics, by tearing apart the two factors of complexities. The idea here is to test the uniformity of the cerebral representation of phonological and semantic complexity through adaptation. Scores showed that while the former subject (BAs) registered 90%, the latter (SD aphasic) registered 85% in the stage of picture recognition. Likewise, in the stage of linking the voice with the picture, the former scored 95% while the latter scored 70%. Psycho neurolinguistically speaking, a distinction ought to be made between MossTak Words program and other programs of the same nature to see to what extent it is distinctive. Table 3 summarizes features of MossTalk Words program in comparison with other strategies. Consider:

Table 3. *Features of MossTalk Words program in comparison with other strategies*

<i>Program or technique</i>	<i>Uses</i>	<i>Notes</i>
MossTalk Words	BAs + SD aphasics	
PNT	SD aphasics	It is used more as a test than as a therapeutic treatment.
Pyramids and palm Trees Test	SD aphasics	It is used more as a test than as a therapeutic treatment.
MIT	BAs	
Functional Communication Therapy	BAs	
Mapping Therapy	BAs+ SD aphasics	
Treatment of Underlying Forms	BAs	
Computer-aided Visual Communication system	BAs	
Computer script training program	BAs+ SD aphasics	
Community-based program	BAs	Both chronic and acute cases
HELPSS	BAs	
SFA-RET	SD aphasics	
SSP	BAs	
EMA	BAs	

As it is illustrated in Table 3, only three programs can be used as means to treat both BAs and SD aphasics. Concerning the society role in the process of recovery for both subjects under question, results show that the progress in the subjects' performance in the last two sessions was due to that role. There has also been a great deal of interest in using community as a marker for treatment tract integrity, for example, for pronunciation diagnosis, tracking therapeutic progression finding methods for modeling pronunciation, studying normal aging, and as complementary information

to investigating normal articulatory apparatus function. Results outline that community role was the highest in BAs' performance (Table 1) and lower in SD aphasics' performance (Table 2).

However, most recent work has been interested in spatially localizing major changes in the participants' performance by giving the percentage of the participants' progress in view of his performance before starting therapeutic programs. Many studies have, to this end, followed similar approaches to diagnostic and therapeutic procedures. In the current study, researchers continue to doubt the general interpretability of the results from this therapeutic technique, primarily because there can be ambiguity as to whether apparent changes in the performance of the two subjects at hand are really due to change using MossTalk Words as new therapeutic technique to be used for Arab BAs and SD aphasics or simply due to the role of society members including the subjects' families, relatives and friends, though it does seem that through careful application and validation, structural therapeutic strategies using MossTalkWors or any other program or technique can draw valid conclusions. Taken together, the potential role of the community has been fully investigated. In particular, this role raises a remarkable progress in the two subjects' general performance and the following diagram illustrates that role properly. Consider:

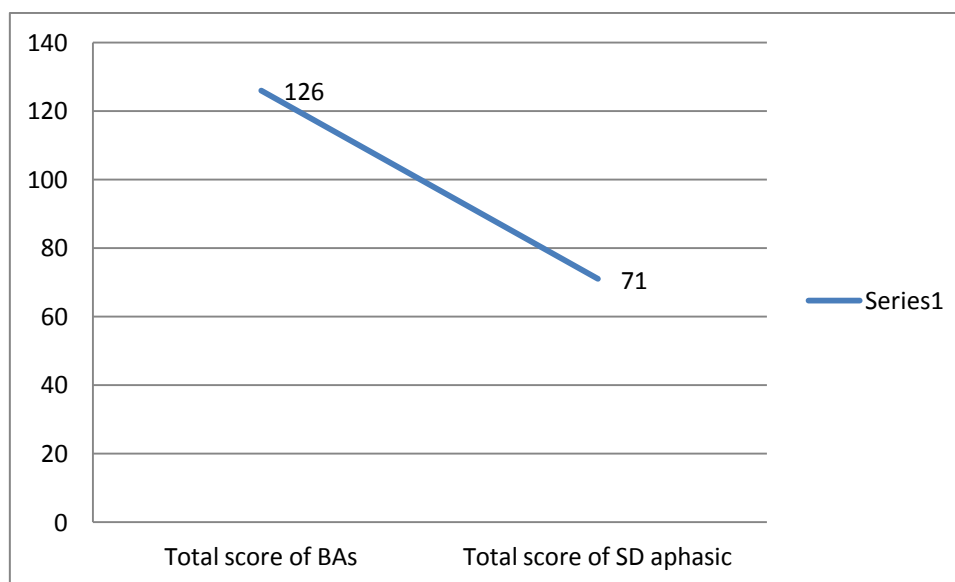


Figure 1. *The role of society in improving the two subjects' performance*

As can be seen in Figure 1, the role of the community was more effective on BAs than on SD aphasic. It has long been postulated that community role is necessary in the process of aphasics' treatment due to that human being is influenced by events and actions around him. Positive interactions that we have observed in both subjects under investigation were most often caused by the role of families, relatives, and friends. The researchers therefore strongly recommend investing the role of society and considering that role as a major part in all therapeutic sessions of BAs, SD aphasics or both.

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