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The Impact of Qur'anic Tajweed Rules on the Enunciation of Preschool Children's English

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Abstract

Although there is no shortage of research relating to child language acquisition (Lust, 2006,Lyon, 1996; Rauch, 2003)or research concerning the sounds of the Glorious Qur'an (Torki& Tabatabaei,2017; Zaid, 2011),studying the acquisition of correct pronunciation of English in relation to learning Tajweed rules of Qur'an is something novel and has not been previously studied. This is a gap this paper intends to fill. A similar concept was introduced by Nordin and Yunus (2020) who studied enhancement of Standard English accent in Malaysian primary school students, where 15 Khotimul Quran students were chosen alongside 15 common students to study patterns of stress, intonation and rhythm in their spoken English. The current study recruited 12 preschool children; where nine constituted the control group and three the experimental group. The reason for the misalignment in numbers regarding the two groups is due to the fact that students dropped out during the course of the sessions, and were therefore not considered in the results. The experimental group were exposed to sessions of Qur'anic recitation while the two groups, both control and experimental, took English sessions focusing on word-final assimilation of /n/ in connected speech. This paper explores the above through autosegmental theory and by studying analyses of sound files done by the software, Praat. It was found from the spectrogram data that the group undergoing Qur'anic intervention produced more instances of total assimilation; this suggests that being exposed to Qur'anic Tajweed does, in fact, influence English pronunciation.

Keywords: Tajweed- Second language acquisition- Connected speech- Assimilation- Phonology

1. Introduction

This paper investigates the acquisition of assimilation in English pronunciation by exposing a number of preschool children to rules of Tajweed and then giving them English sessions focusing on the same corresponding rules in English to determine whether and to what extent Qur'anic Tajweed impacts English pronunciation. The paper is divided into several sections including: hypothesis, research questions, review of the literature, method and materials, theoretical framework, discussion and results, and a conclusion.

2. Statement of the problem

Egyptian preschool children may face a problem regarding learning correct pronunciation of English. This problem can be tackled by exposing those children to Tajweed rules.

3. Hypothesis

Learning and practicing the correct rules of pronunciation of letters and words of the Glorious Qur'an as an Arabic text generally and with adherence to rules of Al-Tajweed specifically renders preschool children better equipped to reach perfect or near perfect pronunciation fluency in an additional language, namely English. The researcher proposes that exposing preschool children to rules of Tajweed that employ similar rules of assimilation found in English provides a preschool child with an enriched database for correct language pronunciation, thus enabling them to better enunciate English sounds and apply natural assimilation found in connected speech.

4. Research questions

- 1- To what extent does exposure to Tajweed rules render children in an experimental group better equipped to produce instances of English assimilation?
- 2- In which way will children's progress in the control group compare to that in the experimental group?

5. Review of Literature

The following section focuses on child language in general; aspects of its phonology, some concepts of acquisition and Critical Period Hypothesis. In addition, it introduces different dialects of Arabic and discusses phonological processes of assimilation of nasal /n/ in these dialects as well as in English. An introduction on aspects of the Glorious Qur'an is, then, discussed with details on features of Tajweed as well as the impact of Qur'anic reading on language learning in young children.

5.1. Acquisition of L2 phonology

Phonology is an integral part of the linguistics of any given language (Al-ghamdi, 2001). Tesar (2007) argues that language learning in itself is not difficult if you build a certain language into the system, however "Human language learning is challenging because the class of allowable languages must include all possible human languages," (p.556) and this is where the challenge arises. For example, Fikkert(2007) argues that: "Child language differs from adult language in the sense that a child's phonological system is immature, and does not allow all contrasts that the adult language exhibits, but it is not fundamentally different."(p. 541).

Phonetics can be described as the study of sounds that all human beings are capable of producing through use of their mouths, tongues, vocal cords and other organs specific to speech production. Phonology, on the other hand, is the organization of the sounds produced to be utilized in a specific language and how these sounds form systems and patterns. It allows language users to be aware of what order of sounds is correct or incorrect, what morphological representations are acceptable, and what variations in language are permissible and what are not.

McMahon (2002) suggests that children do not learn spoken language through receiving and following specific instructions, rather by listening and "building up mental generalizations" based on what they hear and copy. One's native phoneme system interrupts the process of learning a new language. Likewise, Lust (2006) suggests that infants are capable of distinguishing

different sounds of a language where phonemic contrasts of this distinction are present in the mother tongue. Similarly, adults are able to identify non-native contrasts they hear without any training. However, there is a gradual elimination process of distinctive sounds that occurs throughout the first year as infants begin to distinguish sounds particular to their native tongue. (p.177)

Jakobson (1968/1941 as cited in Rauch, 2003) claims that this phonological acquisition follows an innately determined order and Stampe (1969 as cited in Rauch, 2003) suggests that children start the learning process with innate limitations on phonetic capacity and a number of natural phonological processes to deal with those limitations. Some phonologists do not completely agree with the applicability of adult phonological theories to child data. (e.g. Menn, 1976, 1983, cited in Rauch, 2003; Waterson,1971.) They follow a more developmentally oriented research approach to account for the differences between child and adult language.

Additionally, Best (1994,p.2)suggests that in acquiring languages, humans are equipped to produce any phonetic gesture, but only use a subset of what their vocal tracts are capable of producing. Moreover, for children to understand and speak their native language, they must perceive the acoustic and articulatory properties that make up the phonological organization of their language. Children prior to the age of 5 or 6 can acquire an L2 with little or no trace of an L1 accent. She concludes from previous studies that a consensus regarding effect of adult native language perception of non-native contrasts cannot be arrived at as results are neither absolute nor permanent.

The next subsection discusses second language acquisition.

5.2. Literature on second language acquisition

Lust (2006, p.1) calls first language acquisition a "silent feat" in that first language is acquired automatically without conscious awareness. Language learning is a mystery because it is acquired internally. Children can easily acquire any of the world's languages. They acquire knowledge of a generative system which is mentally existent internally and use this system to map form to meaning and to sound.

Additionally, Tomasello & Akhtar (1995) concede that children do not just learn by ostensive actions; they learn by using socio-pragmatic cues given in joint attentional focus with a mature speaker. Cargnelutti, Tomasino & Fabbro (2019) concur that very early bilinguals display left hemisphere activation for language dominance. They found that bilinguals typically recruit more brain regions involved in greater cognitive function, and that the "weaker" language required greater cognitive ability.

5.3. Early second language acquisition (ESLA) Simultaneous vs. Successive language acquisition

While simultaneous bilingualism occurs when a child acquires two languages at the same time, and one language is usually more dominant than the other, true balanced bilinguals (bilinguals who are equally competent in both languages) are something of a rarity (Yavas, 1998, p.195). Successive language acquisition, on the other hand, is when a child acquires one language, generally the mother tongue, and then starts acquiring a second language, in infancy or when he or she begins school. In this case, the native language becomes more dominant, and its effect is more prominent on the second language. Another term used is primary bilingual; where two languages are learnt together in the same context, usually in early infancy, and secondary bilingual, where one language is acquired first, then followed by another. Degree of linguistic proficiency and rate of language acquisition in L1 and L2 depends on how often and to what degree the child is exposed to both languages. (Lyon, 1996).

The following section deals with how the criterion of "age" is accounted for in the process of language acquisition and how a critical period hypothesis asserts that age is indeed a determining factor.

5.4. Age Factor in Language Acquisition

Age alone is not a factor for inability to acquire a new language. It is normal for adults in some cultures to acquire a second language with accent-free speech while children may acquire an accent. Moreover, adults may learn to make phonological distinctions of a new language. Difficulty in acquiring a second

language depends mainly on the distinctions (phonological, grammatical, etc.) found between the first and second language. Experience and age are not mutually exclusive when it comes to first and second language acquisition (Lust, 2006). The following section discusses the critical period hypothesis introduced by Lenneberg (1967).

5.5. Critical Period Hypothesis (CPH)

Lenneberg (1967) hypothesizes that language can only be acquired before a critical period or age. He states the following:

Language cannot begin to develop until a certain level of physical maturation and growth has been attained. Between the ages of two and three years language emerges by an interaction of maturation and self-programmed learning. Between the ages of three and the early teens the possibility for primary language acquisition continues to be good.... After puberty, the ability for self-organization and adjustment to the physiological demands of verbal behavior quickly declines. (p.158)

This hypothesis was put to the test on individuals acquiring a second language. Johnson and Newport (1989, p.60) argue that, in general, competence is gained with development, but that this is not the case for language acquisition where it reaches its peak before a certain "critical period." However, late learners of language are still able to comprehend and produce a first language; even if it is done with greater difficulty, it is far from impossible.

They also argue that children are perceived as superior to adults in acquiring their first language, but that as long as a first language has been acquired during childhood, the ability to acquire an additional language remains intact into adulthood. This deems children and adults equal in their ability to acquire a new language, where some may even view adults at an advantage due to their greater level of maturity and mental capacity.

Yavas (1998) claims that, to attain native-like fluency in a language, there is general consensus that phonology is the aspect of language that is the hardest to master. Children who learn a language before puberty can, and often do, acquire native-like pronunciation, unlike their parents who may acquire perfect fluency, but still have non-native pronunciation. This has led researchers to suggest that

there is a critical age period, where children before they reach the age of puberty are capable of perfecting a second language they may acquire completely. This applies significantly to phonology where children who have acquired a second language before puberty strikes have a clear advantage over their peers who begin to acquire a language after this period. Some scholars such as Long(1990) and Flege& Fletcher (1992), however, believe that the benchmark for ability to acquire native-like phonology is the age of six, and that this ability gradually declines after this time. Although it is highly likely that a child will acquire native-like pronunciation before puberty when learning a second language, other conditions (socio-effective, cognitive, input) must also be optimal and available in order to attain native-like speech.

The following section focuses on the phonological process, assimilation and how it is realized in English and Arabic.

5.6. Connected speech processes

Connected speech is characterized by being different from words pronounced in isolation where “the more casual and informal the speech register is, the more the citation forms of words may change” (Al-ameen&Levis, 2015, p.2).

Ladefoged and Johnson (2011) explain that a word presented in isolation is called the citation form where it is not subjected to vowel reduction or changes of any kind which are seen in connected speech. Assimilation is a phonological process or phonological alternation (Zsiga 2011) whereby two neighboring sounds become similar in phonetic features due to their contiguous nature, where one sound is considered the conditioning sound – it influences the other sound, and the other is the conditioned sound. The main function of assimilation is to facilitate pronunciation, maintain ease of speech and economize speech production. It aims to render speech more natural as opposed to producing “mechanical speech” which happens if word units are pronounced in isolation. Assimilation also differs according to speaking rate and style. It can be observed in rapid, connected speech, but less in careful eloquent speech (Ladefoged and Johnson, 2011).

5.7. Nasal Assimilation in English

Place assimilation of articulation is the most common type of phonological alternation; this is especially true of nasal place assimilation (McCarthy & Smith, 2003; Zsiga, 2011) and is found in many languages including English and Arabic. It is common for a nasal consonant to become homorganic with a following consonant. Zsiga (2011) remarks: "Nasals may be especially prone to assimilate because nasal resonances interfere with the formant information that conveys place of articulation" (p.19).

Assimilation may be partial (incomplete) as is the case in which one sound takes on some features of another, as explained above. Total (complete) assimilation results in gemination whereby two sounds become identical and are pronounced the same. For example, when /n/ is followed by /b/ the resulting sound is /m/ which carries some features of- but is not identical to- the original sound: this is considered partial assimilation e.g. one pen where the /n/ sound takes on features of bilabiality but not plosiveness of the /p/ sound. However, when /n/ is followed by /m/ total assimilation takes place as /n/ is sounded as /m/ e.g. *one man*. (Crystal, 2008, p.40).

5.8. Literature on Arabic and the Glorious Qur'an

Arabic is one of the South-Central Semitic languages which belong to the Afro-Asiatic language family. It is spoken by approximately 420 million people worldwide (Ridout, 2018). With regard to its phonology, it is characterized by having a limited vowel system and a rich inventory of guttural consonants (Watson, 2002, p.1). According to ([Classical Arabic vs. \(Modern\) Standard Arabic](#), 2012), Classical Arabic is a descriptive term, while Standard Arabic is a prescriptive term of the language. It is stated however, that Modern Standard Arabic, is a misnomer as there was no development from an older version of Arabic nor was there a modern standardization of the language. The word "classical" is used with reference to time rather than form or structure. Moreover, although Arabic did go through evolution, there are ambiguities regarding Classical Arabic dialects and the different dialects of the Arab world today. In regard to the Qur'an being classified as Standard or Classical Arabic, it is said that: "Indeed, Classical Arabic isn't limited to the Quran, nor for that matter,

is the Quran limited to Standard Arabic”(Classical Arabic vs. (Modern) Standard Arabic, 2012.) Al-Hashmi (2004) defines Qur’anic Arabic as the highest register of Classical Arabic. Classical Arabic is believed to be derived from the language of the western Hijazi tribe of Quraysh (Watson, 2002, p.8).

Arabic is characterized by diglossia, where two forms of Arabic in any Arabic speech community are observed. Colloquial Arabic or Spoken Vernacular Arabic (SVA) is the informal form of Arabic spoken by any given Arabic country. There are many dialects under the umbrella of SVA: Levantine Arabic, Moroccan Arabic, Egyptian Arabic, etc. Different dialects are also found within the same country depending on region, gender, age, education, ethnicity and so on. (Watson, 2002, p.9)

Upon embarking on learning to correctly read and understand the Qur’an, one must be aware of the different rules required to reading the Qur’an correctly; these are named Tajweed rules and involve several phonological processes. The meanings also involved in understanding the Qur’an must be studied from the texts of trained scholars who have accumulated extensive knowledge of the Qur’an at the hands of earlier qualified scholars and so on. Qur’anic Arabic is different from both Modern Standard Arabic (MSA) and Spoken Vernacular Arabic (SVA). It is currently specific only to reading of the Glorious Qur’an.

The formal rules which are used to establish correct reading of the Qur’an are named rules of Tajweed, and they constitute *‘ilmu-t-tajweed* or science of Tajweed. The word tajweed تجويد itself in Arabic means to refine and improve the quality of reading. The word comes from the root /jwd/ that gives the meaning of refinement and beautification (Quotah, 1995). These text-specific rules do not apply to other dialects of Arabic nor are they obligatory except with regard to reading of the Qur’an; thus, they may be considered outside the domain of modern phonology. Quotah (1995) says that Tajweed “stresses the importance of enunciating each phoneme from its point of articulation, and rules and processes governed by Tajweed include nasality, assimilation, extra-long vowels (madd), pharyngealization, vowel epenthesis, pauses and a certain sense of rhythm. Most of the phonological processes of Tajweed are specific to Quranic recitation, though a few exist in spoken Arabic.” (p.9)

5.9. Tajweed rules and assimilation in the Glorious Qur'an

Assimilation is found in many instances in the glorious Qur'an. It makes for easy fluid-like reading where merging helps in maintaining harmony when reciting verses. It also aims to facilitate articulation by utilising the organs of speech optimally while exerting as little effort as possible. While assimilation in some languages including English is not mandatory, in the case of Qur'anic Arabic, assimilation dictated by rules of Tajweed is compulsory in order to achieve correct recitation. Although many examples of assimilation in the Qur'an exist, this study is mainly interested in two of the "nuun" rules and in studying how they are similar to assimilation rules which act as their counterpart in English.

Assimilation in Arabic is more complex than in English although both languages retain many of the similarities found in assimilation. Cases of *idghamnaqiswakamil* (ادغام ناقص وكاملا) and *idghammutamathilayn or mithlayn* (ادغام متمثلين او مثليين) found in Arabic namely, major and minor assimilation is not found in English, although total and partial assimilation is present in both languages (Aly, 2012).

It is important to distinguish the different nuun /n/ sounds present in the Qur'an, and then identify how they merge with the consonants they precede. Equally important is the manner of articulation of the different nuun sounds and how they are executed. Among the nuun sounds is a quiescent nuun (nuunsakena (نون ساكنة) which means there is no vowel action upon it i.e. unvowelized.

5.9.1. Assimilation/blending/merging/ gemination/ idgham (ادغام):

There is *idgham kamil* (total or complete assimilation) and *idgham naqis* (incomplete assimilation). Scholars agree that the sounds (l, r, n, m) completely merge to preceding /n/ where no trace of the n sound can be detected. They are also in agreement that when an /n/ sound merges to a following (y, w) the merging is not complete and a ghunna is left over from the nuun (Czserepinski, 2000).

This idgham is further divided into two categories: *idgham bi ghunna* (ادغام بدون غنة) (idgham with nasality present) and *idgham bidun ghunna* (ادغام بدون غنة).

without perceived nasality)(Al-Hashmi, 2004).When /n/ assimilates to /b/ as in /min bayna/ من بين, iqlab occurs where the /b/ sound becomes an /m/ and the end pronunciation is /mimbayna/. Total assimilation also occurs with /m/ following /n/ in /min ma/ من ما produced as /mimma/. There are many other rules of assimilation of regressive /n/ present in the Qur'an, but the previous two are the focus of this paper.

6. Theoretical Framework: Autosegmental Theory

Goldsmith (1976) discusses a new multi-linear approach which explores how sound features are linked together on different tiers. This approach is named *Autosegmental Theory*. Auto- because each feature is independent in its own right and presented on its own individual tier or level without having to depend on neighboring segments. A segment as defined by Van de Weijer (2006, p.626) is “the abstract (or mental) representation of a sound that is postulated in phonology”. The word *segment* is used in the sense that it is “... the minimal unit of phonological representation.” (Goldsmith, 1990, p.10.) McCarthy (1982) states that the theory is autosegmental because it acknowledges that different classes of features can appear on different levels, i.e. tiers while each level remains unspecified with regard to features on the other levels.

Generative phonology was a ground-breaking concept when first introduced and remained pivotal to phonological representation for some time. However, it soon proved to be insufficient in explaining different phonological aspects. Its history may be divided into two phases: the first of which was concerned with the rule system that linked phonological structures to phonetic ones; this is termed the *derivational* aspect and it is concerned with formulation of phonological rules, rule application, rule ordering and interaction with morphological rules. The second aspect- the *representational* one- focuses on the structure of phonological representations at each level of the derivation (Hulst& Smith, 1984).

Goldsmith (1976) characterizes traditional linguistic representation by what he calls the “Absolute Slicing Hypothesis” which attempts to place phonological

representation of segments in a linear sequence by slicing acoustic features of a word into vertical columns, where each sound is represented by the set of rules defining it. The slices or segments are defined as unordered sets of specified features which specifically characterize functions from points in time to the condition of the articulatory organs or the acoustic properties of sounds (Gussenhoven & Jacobs, 2017; Hulst & Smith, 1984.) This hypothesis fails to meet the demand for interpretation of some features such as pitch in English and nasalization in Guarani, for example (Goldsmith, 1976.) This necessitated the development of a novel approach to phonological analysis.

The object of Autosegmental theory is to investigate how and which properties are passed on from one segment to another (Van de Weijer, 2006). Autosegmentalism is "the notion that distinctive features, rather than segments, are the atoms of phonological representation". (McCarthy 2001, p. 11393). It is also a claim about how language is represented by humans' minds.

Autosegmental representation is done through charts with *association lines* between segments on each tier (Goldsmith, 1990). Each tier represents a sequence of gestures or acoustic transitions. Hulst & Smith (1984) compare this phonological representation to a musical score where the tune is on one line and the text is on another.

Unbroken association lines indicate associations that already exist, while a dashed or dotted line in an autosegmental rule indicates part of the structural change. Similarly, an 'x' through an association line will indicate that the association line is to be deleted by the rule. A simple circle around a segment means that it is not associated to any segment on the facing tier. (Goldsmith, 1990, p.17)

A tier which ties all features together is known as the *skeletal* or *CV-tier*. This is considered the main tier which lines up consonants and vowels. The elements present on this core tier are called V-slots or C-slots which vowels and consonants must associate with in order to be realized. This tier is a principle one which serves all other tiers in representing the phonological organization of the entire structure. The skeletal tier also shows how segments may associate to one or more units- equivalent to syllables- on the tier, i.e. a short consonant or vowel will associate to one unit, whereas a long one will associate to two.

The tier defining the quality of consonants and vowels present on the skeletal tier may be referred to as the *phonemic tier* or *melody tier*. This tier contains most of the defining features of place and manner of articulation (Lieber, 1987). These segments, not being present on the skeletal tier itself but an independent one, are termed *autosegments*. The skeletal tier along with the phonemic tier constitute the “phonological core” (Halle & Vergnaud, 1980, as cited in Lieber, 1987).

Goldsmith (1990) states that the entire goal of autosegmental analysis is the reduction of natural phonological processes by way of deletion and reassociation of elements. Another point to take note of is unlinked or *floating* autosegments, which are autosegments that are not linked to any slot in the core; if it is tonal it will be linked to the nearest vowel, but in the case of harmony it will be deleted (Halle and Vergnaud, 1981). Goldsmith (1976) ascertains that the greater the number of tiers in a stage of derivation, the more “superficial” that stage is.

Clements & Keyser (1983) argue that the minimum number of tiers in an autosegmental representation is two: where one consists of segments termed “autosegments” and the other segments termed “anchors” which are linked together under Association Conventions which are a finite number of parallel tiers associated with one another but exhibiting independence at the same time. These connections are governed by principles termed Association Conventions responsible for linking tiers in non-rule governed situations. (Pulleyblank, 1986).

The class of anchors may be determinable by the following statements:

- 1) Tonal autosegments are anchored to V-elements or σ - elements of syllable structure.
- 2) Vowel harmony autosegments are anchored to vowels.
- 3) Nonconsonants are anchored to V-elements of syllable structure.
- 4) Consonants are anchored to C-elements of syllable structure.

(pp.62-63)

Lines associating segments on two tiers may not cross. This constraint is the only universal uncontroversial aspect of autosegmental representations; it is inviolable because the order of autosegments on a particular tier would change with regard to other tiers (Gussenhoven & Jacobs, 2017).

The researcher investigated several phonological theories in search of the optimum theory to use in the research at hand. Autosegmental phonology was chosen because, although it was originally developed to target the study of tone languages and suprasegmental features, it was later extended to apply to other features of language such as harmony and assimilation. Since the focus in this thesis is on assimilation rules in Arabic and English, the theory achieves this goal appropriately and is quite fitting for this purpose. Another positive aspect of autosegmental theory is that it is simple and straightforward enough to comprehend with ease but also possesses enough complexity with its orchestration to account for all aspects dealt with in detail.

To the knowledge of the researcher this theory has not been applied in the manner this paper ventures to explore. However, many studies incorporating non-linear phonology have been done, and child language has been the target of such studies (see Bremen,1990; Stemberger, 1988). The goal here is to acknowledge children's formation and usage of assimilation processes in both English and Qur'anic Arabic and compare the accuracy of the output in alliance with autosegmental analysis. Autosegmental theory was chosen for this study because it clearly explains aspects of assimilation in a clear, concise and straightforward manner.

7. Methodology

The aim of this study is to determine whether and in which way Tajweed rules of the Glorious Qur'an have an impact on learners of English as a second language, particularly proficiency of pronunciation. The study employs a quantitative approach where collection of data and analysis are done on a small sample of the population.

The researcher conducted an experiment on a group of preschool children (between the ages of 4;9 and 6;3); the experiment was designed to take place over one week structured as an English course (in addition to Qur'an sessions for an experimental group for the same number of sessions), with the researcher functioning as primary instructor alongside a co-instructor who was present essentially to maintain control in the classroom. A total of four classes were conducted in the course, with four sessions exposing one group of children (the experimental group, group A) to two Tajweed rules of the Glorious Qur'an and

another group (including all the children, group B) participating in an English course which focused on applying two assimilation rules corresponding to the Tajweed rules taken in the Qur'an sessions. The pre-test was given a few days before the first session and the post-test was delivered a few days after the final session.

7.1. Instruments used

A Sony DSC-HX90 Compact camera with 30x Optical Zoom was used in the recording of all the sessions. The researcher also used Praat, which is a free software specializing in linguistic analysis of languages, to determine spectrographic details of sounds.

7.2. Data collection

Data were collected over the period of the sessions, and each time, two separate courses were given (Tajweed and English). The setting of the experiment was a local day-care centre in Maadi, Cairo and the rooms in which the experiment was conducted imitated- to a great extent- the setting of a classroom. Elicitation techniques were used in data collection as well as recording of video sessions for the workshops.

7.3. Participants

The researcher relied on convenience sampling when recruiting people to participate in the study. **Convenience** sampling is defined as selecting people who are available or convenient for a project, usually those who are accessible and/or live close by. This type of sampling is considered **non-random** sampling (VanderStoep & Johnston, 2009, p.27). Participants of the study were preschool children who attended the same school as the researcher's son. The researcher posted a request on the school's WhatsApp group for children of the preschool age to participate in an English conversation course free of charge for a duration of one week in the summer holidays, as well as a recitation course for Glorious Qur'an for those who were interested. She gave a brief introduction to the parents about the nature of the courses and explained that they were being done for the purpose of linguistic research.

This study was carried out in a Quasi-experimental design: two courses were designed with two groups, where one group acted as the experimental group, and the other the control group. The researcher initially recruited 24 children to participate in the study; 12 participated in the course for reciting Tajweed rules (the independent variable), whereas all 24 participated in the English course. Pictorial stimuli and video material were the main sources of input for deliverance of the material. With the progression of the courses, more and more children dropped out due to individual circumstances or sickness resulting in an unexpected decrease in number. The final number of children who attended regularly was 12 overall, with three children attending regularly in the Tajweed and 12 in the English. Only two children attended 100% of the course. This decrease in number and disorganized participation resulted in a somewhat controversial outcome. Additionally, due to the limited timeframe of the course, the data collected were lacking in some measure.

The groups were subjected to both a pre-test and post-test in the English language with focus on application of assimilation rules in connected phrases/sentences. At the end all participants were evaluated on proficiency of execution of assimilation rules in English with reference to who had been exposed to the experimental intervention and who hadn't. An application form including the written consent was filled out indicating name and age of each participant as well as information indicating whether the child had taken Qur'an lessons before, and if so, for how long. Parents were asked to clarify whether their child would be attending only the English course or would participate in both courses.

7.4. Procedure

As previously stated, a pre-test and a post-test were designed to explore whether and in which ways the presentation of Qur'anic intervention would aid the acquisition of English language pronunciation. A few selected images were shown to the participants who were encouraged to explain and iterate what they saw in two-word units. Regarding the Qur'an sessions, Qur'an was recited in an ostensive context without knowledge or clarification of any of the meanings involved. Each session was dedicated to focusing on one particular rule of assimilation in Tajweed. In course two, i.e. the English session that followed each Qur'an session, a corresponding rule of assimilation in the English language was focused on and

practiced by both group A and B to see how the experimental group were impacted from their Qur'anic session.

Qur'anic recitation depended solely on auditory input with multiple instances of repetition to ensure that the Tajweed rule the researcher wanted to focus on was well and truly "drilled" into the children's minds. As well as listening, the children were prompted to repeat the different verses, i.e. *ayat* آيات more than once with the researcher ensuring that correct pronunciation of the rules was established. In no way were the participants aware that this was an experiment; they were only aware that they were receiving a "Qur'an session" and an "English course".

The Qur'anic recitation was carried out by playing recorded readings by Sheikh Mohamed Siddiq El-minshawy- a late Egyptian Qur'anic reciter who to this day remains one of the most frequently played Qur'anic reciters on Egyptian radio. The experiment was conducted through use of a children's program for teaching Qur'an named Almuallim assagheer (the young teacher) wherein the sheikh would recite an ayah, and a computerized version of his voice, which made it sound like a child's, would repeat the ayah. Children learning Qur'an are encouraged to use such programs as they get the chance to first listen and then repeat with the second voice; each ayah – or part of it if it's too long- is recited individually for ease of pronunciation. The researcher's role in this part of the experiment was mainly to monitor, administer control, and ensure that the Tajweed rule, pronunciation of letters and diacritics were well established and executed correctly.

Every session of the experiment began with the Qur'an course which was attended by only a fixed number of participants who comprised the experimental group. Each session averaged a total of 45 minutes with frequent breaks to decrease any sensation of boredom experienced by the children. Only one Tajweed rule was introduced per session (which sometimes extended to the following session) and studied accordingly. This process included several steps:

- 1) Recitation of relevant ayahs in predetermined chapters i.e. *surahs* سور by the whole group of children
- 2) Individual recitation of selected ayahs including the rule.
- 3) Recitation of selected ayahs expressing the rule from memory.
- 4) Repeating until rule was grounded.

Examples with instances of assimilation were first extracted from the output of these courses, then analyzed with Praat software (Boersma&Weenink, 2021) and represented using Autosegmental phonological representation. Praat is a free software which specializes in linguistic analysis of languages. After conducting the courses and videotaping the sessions, the researcher edited and cut the videos in order to extract portions including only assimilated text in manageable time fragments; these fragments were converted into WAV files by the Any Video Converter Ultimate tool. Each segment was given a name consisting of the speaker and spoken context. Each sound file was, then, manually transcribed into a text file.

Furthermore, the researcher used the Penn Phonetics Lab Forced Aligner program, (P2FA: Yuan and Liberman 2008) where the WAV files were down-scaled from 48000 Hz to 11025 Hz using the Audacity software (Audacity Team (2021) Audacity®. Version 2.4.1. Audio editor and recorder) in order to be correctly accepted by the aligner. The aligner combines an audio file with its transcribed text file to generate a text grid file that is recognized by Praat. The researcher then input sound files and their corresponding text grid files into Praat in order to identify individual sounds and word boundaries of adjacent words and to determine the degree of regressive assimilation in assimilable environments; to identify whether there was no, partial, or total assimilation. This was done by measuring the formant frequencies of vowels occurring before the alveolar consonant or the formant transitions preceding the assimilated consonant.

8. Assimilation rules in Tajweed and English

The study focuses on two different Tajweed rules pertaining to assimilation in Qur'an as well as those having a respective role in English. The rules adopted are as follows:

<u>Tajweed</u>	<u>English</u>
Assimilation->Idgham with /m/ الإدغام بالميم	Assimilation of /n/ to /m/
Assimilation/Change->Iqlab الاقلاب	Assimilation of /n/ to /b/

Examples from Qur'anic verses and the English language conveying the above rules are found in the following table (2):

<u>Tajweed rules' examples</u>	<u>English assimilation examples</u>
<p>1) a) -ولا أنا عابد ما عبدتم ayah 4, Al-kafirun</p> <p>b) -في جيدها حبل من مسد ayah 5, Al-masad</p> <p>c) -فجعلهم كعصف مأكول ayah 5, Al-feel</p> <p>d) -في عمد ممددة ayah 9, Al humaza</p> <p>e) -رسول من الله يتلو صحفا مطهرة ayah 2, Al-bayinah</p>	<p>1) brown mouse- green mobile phone- ten mirrors- on my head- one moon- seven men- one minion, in my bag etc.</p>
<p>2) a) - يخرج من بين الصلب والترائب ayah 7, At-tariq</p> <p>b) -وجاء يومئذ بجهنم ayah 23, Al-fajr</p> <p>c) -وأنت حل بهذا البلد ayah 2, Al-balad</p> <p>d) قدمم عليهم ربهم بذنبيهم / إذ انبعث أشقاها ayahs 12/14, Ash-shams</p> <p>e) -وأما من بخل واستغنى ayah 8, Al-layl</p> <p>f) -لنسفعا بالناصية ayah 15, Al-alaq</p> <p>g) -إلا من بعد ما جاءتهم البينة ayah 4, Al-bayinah</p> <p>h) -كلا لينبذن في الحطمة ayah 4, Al-humaza</p>	<p>2) One bag- Seven bicycles- crown belongs- green ball- brown pencil- frozen banana- clean bed- open book, etc</p>

The English course designed in this study focuses on regressive assimilation of nasal /n/ sound. This was studied by presenting examples applying the rule and then analyzing examples of English produced by output from the children participants. Each session involved the researcher focusing on correct

pronunciation of the sound under focus and then connecting an adjective, colour or number ending in /n/ to another word beginning with that sound to account for assimilation across word boundaries. Likewise, singular words including internal assimilation of regressive /n/ were also presented via songs and excerpts from the internet. It is worthy to note that the children had not yet learned reading at a competent level, so all of the cues presented were either visual or auditory. The researcher employed several techniques to ascertain that the children participants would produce the forms she wanted. One technique was through the use of word games that included selecting different cards with pictures printed on them and saying the words together several times to ensure that the assimilation was realized. Another example of word games was by doing word puzzles, where the child would search for a particular word which would be connected to another and be read together to state the rule. Another technique was listening to songs and having them repeat the song back. Sentences such as "In my bag, there is..." were used along with different items that the child would select to focus on the rule being studied. These are a few examples of all of the techniques employed. Each child would get a chance to practice the required rule, as well as sometimes working in pairs, or as a whole group.

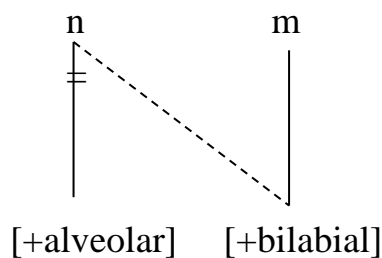
9. Discussion

9.1. Autosegmental representation

The rules of assimilation can be appropriately represented by autosegmental graphs. In the following, two types of autosegmental representation are proposed; one for Qur'anic Tajweed rules and one for spoken English.

Qur'anic Tajweed:

- 1- Total assimilation of /n/ to /m/ when /n/ is followed by /m/; where alveolar /n/ takes on place features of bilabial /m

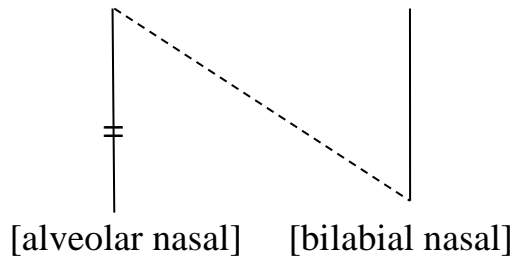


2- Assimilation/Change->الإقلاب: This is an example of homorganic nasal assimilation where alveolar /n/ changes into bilabial /m/ when preceded by /b/ where /n/ takes on bilabial features of the following /b/ but retains features of nasality thereby becoming /m/.

example: min bayn من بين -> mim bayn

CV tier m i n b a y n

Melodic tier [alveolar nasal] [bilabial plosive]



English:

Assimilation of /n/ to /m/

As is the case with Qur'anic Arabic, /n/ can assimilate completely to /m/ in English taking on a bilabial place of articulation. This can be seen in the example, brown mouse.

brow n m ouse

=

[+bilabial]

Assimilation of /n/ to /b/ and /p/

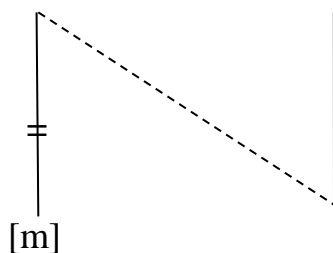
As there is no /p/ sound in Arabic except as an allophone of /b/ in some environments, this part of the rule is not applicable for comparison in this case.

However, an example with /b/ is stated:

example: green bag

gree n b ag

[alveolar nasal] [bilabial plosive]



When analyzing the data, what the researcher initially intended to do was analyze acoustic data presented in the spectrograms of the different recordings. However, realistically speaking this was not always possible due to a number of factors; the main ones being the inconvenient environment of the majority of the audio recordings with external noise factors and unclarity of the spoken speech involved. This led to obscure representation of sound units in many of the audio files. This in turn directed the researcher to rely upon formant transition cues in the sound files which represented this clearly, as well as resorting to personal assessment of the sounds she heard when transition cues were arbitrary and had no defined pattern.

10. Results

Of the 12 children recruited in the study, only three made up the experimental group (due to the high number of dropout participants.) These received sessions in Qur'anic recitation and Tajweed rules in addition to English sessions. It is worthy to note that not every child produced an output on every single occasion; with some not participating in the sessions due to shyness or absence on that day, however, participation in a pre-test and post-test was mandatory for all the children (not including the child, Sedwho was very shy in the pre-test and refused to say the example for assimilation of /n/ to/m/, but later cooperated as the sessions progressed). This was an evaluation for their development as they were exposed to the rule on more than one occasion even if they had not attempted to participate during the sessions themselves. The letters n, p and t correspond to no, partial and total assimilation, respectively. The following section clarifies the differences found in the output of each group: each of the two rules are represented with respect to the control group first, and then with the experimental group as follows:

Rule (1): Assimilation of /n/ to /m/:

1- Control group:

	In my	Can make	On my	19 monkeys	16 minion	13 men	9 moon	14 moon
Abd	p							
AdH	t	t						
Amr	-	-	-	-	-	-	-	-
Arw	n		P	p				
Ays	t/p	n	N					
Jud	n	p	P		p			
Ret	p					p/t		
SaK		t	N				n	
Sed	n	t	N					p

(Table 1, assimilation of /n/ to /m/ in session for control group)

	Pre-test	Post-test
Abd	On my(n) brown mouse(n)	10 monkeys(n) in my(n)
AdH	Brown monkey(p/t)	10 monkeys(t) in my(t)
Amr	On my(n) brown mouse(p)	10 monkeys(t) in my(n)
Arw	On my(n) brown mouse(n)	10 monkeys(t) in my(n)
Ays	On my(n) brown mouse(n)	10 monkeys(n) in my(p)
Jud	On my(p) brown mouse(p)	10 monkeys(t) in my(p)
Ret	On my(n) brown mouse(n)	10 monkeys(n) in my(n)
SaK	Brown mouse(p)	10 monkeys(p) in my(n)
Sed	-	10 monkeys(n) in my(n)

(Table 2, assimilation of /n/ to /m/ in pre-test and post-test for control group)

2- Experimental group:

	In my	Can make	On my	13 monkeys	One monkey
AdM	n/p	t/n/t	P	n	
Kar	t/p	n	T		p
SaH	-	-	-	-	-

(Table 3, assimilation of /n/ to /m/ in session for experimental group)

	Pre-test	Post-test
AdM	On my(p) brown mouse(t)	10 monkeys(t) In my(t)
Kar	Brown mouse(n)	10 monkeys(n) in my(n)
SaH	Brown mouse(n)	10 monkeys(p) in my(n)

(Table 4, assimilation of /n/ to /m/ in pre-test and post-test for experimental group)

From the above tables, we can conclude that for rule (1), eight of the nine participants of the control group produced 24 instances from eight tokens. No assimilation was observed for eight instances, partial assimilation for ten and six for total assimilation. Eight out of nine children participated in the pre-test with the following results: nine no assimilation, five partial, and one total. The posttest results are as follows: ten no assimilation, three partial assimilation, and five total assimilation.

As for the experimental group, two of the three participants produced 12 examples from five tokens as follows: four no assimilation, four partial, and four total. In the pre-test all three produced 2 instances of no assimilation, one partial, and one total. The post-test delivered three no assimilation, one partial, and two total.

Rule (2): Assimilation of /n/ to /b/:

1- Control group

	10 birds	Tin belongs	Brown bag	Green bed	7 boys	Green bird	9 boys	7 block
Abd	n							
AdH		p	T					
Amr				n				
Arw	n							
Ays					n			
Jud						n	n	
Ret								n
SaK	-	-	-	-	-	-	-	-
Sed	-	-	-	-	-	-	-	-

(Table 5, assimilation of /n/ to /b/ in session for control group)

	Pre-test	Post-test
Abd	10 books(n)	Brown bag(n)
AdH	10 books(t)	Brown bag(n)
Amr	10 books(n)	Brown bag(n)
Arw	10 books(n)	Brown bag(n)
Ays	10 books(p)	Brown bag(n)
Jud	10 books(p)	Brown bag(t)
Ret	10 books(n)	Brown bag(p)
SaK	10 books(n)	Brown bag(n)
Sed	10 books(n)	Brown bag(n)

(Table 6, assimilation of /n/ to /b/ in pre-test and post-test for control group)

2- Experimental group:

	Bonbon	7 Bracelets	Green bed	One Box	Moon belongs	16 bunnies	7 boys	Brown Bag	Frozen banana	Golden Bowl	9 butterflies
AdM	t	n	t	N							
Kar					n	t	n	t	n	p	
SaH											t

(Table 7, assimilation of /n/ to /b/ in session for experimental group)

	Pre-test	Post-test
AdM	10 books(n)	Brown bag(t)
Kar	10 books(p)	Brown bag(t)
SaH	10 books(n)	Brown bag(p)

(Table 8, assimilation of /n/ to /b/ in pre-test and post-test for experimental group)

For rule (2), regarding the control group, eight tokens were articulated nine times from seven of the nine participants. No assimilation was observed in seven instances. Partial assimilation was calculated once as was total assimilation. In the pre-test, all nine children produced one example as follows: six no assimilation, two partial, and one total. In the post-test there were seven instances of no assimilation, one of partial, and one of total.

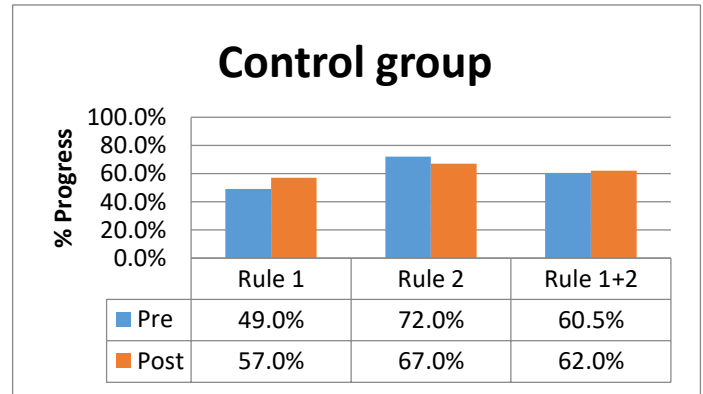
The experimental group participated with 11 tokens repeated one time per token: five instances of no assimilation were recorded, one with partial, and five with total. In the pre-test, two instances of no assimilation were observed and one partial. The post-test showed one case of partial assimilation and two of total.

Although the progress and output of the children within the courses was recorded, it is the pre-test and post-test which were taken into consideration when accounting for the overall progress of the two groups. To determine the progress of each group, and to establish if in fact there was improvement from the pre-test, the researcher calculated the number of instances uttered by each group for each rule in the pre-test and post-test. A value was given to each instance: for no assimilation, $n=1$, for partial assimilation, $p=2$, for total assimilation, $t=3$. Each instance was given its corresponding value and the sum was divided by the maximum number that could be possibly achieved.

Example for rule (1), control group in pre-test: $9*1+5*2+1*3/15*3=49\%$

The data for the control group is displayed in the following table and graph:

		Pre	Post
Control group	Rule 1	49.0%	57.0%
	Rule 2	72.0%	67.0%
	Rule 1+2	60.5%	62.0%

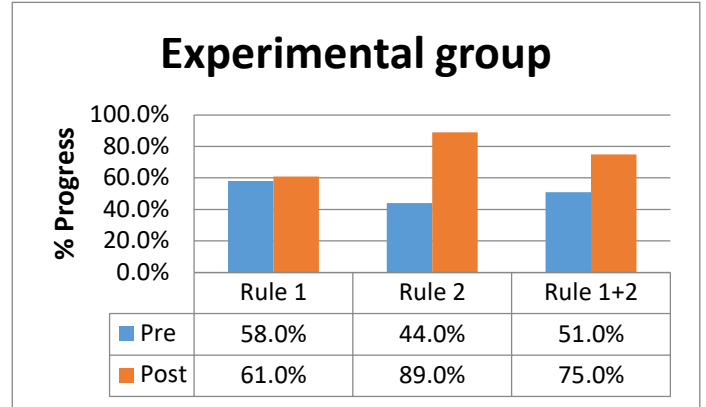


(Table 9, control group results)

The column, Rule (1)+(2) displays the average output of the group for both the pre- and post-tests.

The data for the experimental group is displayed in the following table and graph:

		Pre	Post
Experimental group	Rule 1	58.0%	61.0%
	Rule 2	44.0%	89.0%
	Rule 1+2	51.0%	75.0%



(Table 10, experimental group results)

11. nclusCoion

The results indicate that there was an overall progress in applying assimilation for both groups; 1.5% for the control group and 24% for the experimental group. This indicates that exposure to Tajweed rules may impact a child's brain unconsciously and lead to application and implementation of assimilation rules in English. Although the phonological process of assimilation in English is not mandatory as it is in the recitation of Tajweed, it is nevertheless a natural part of spontaneous speech and aids in fluid fluent speech production which could help in the acquisition of correct pronunciation and ultimately facilitate second language acquisition. However, it is noteworthy to mention that the participants, whether in the experimental or control groups, were not exclusively consumed by the study or confined to a lab. Concurrently, they were exposed to other factors in their natural surroundings, for example, listening to lullabies or songs in their everyday life which may have affected their performance one way or another.

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أثر القواعد الصوتية لقراءة القرآن علي نطق الأطفال في مرحلة ما قبل الدراسة للغة الإنجليزية

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المستخلص:

تتناول هذه الدراسة طريقة جديدة في دراسة اكتساب اللغة لدى الأطفال حيث أنها تتناول الإكتساب اللغوي للنطق بالمقارنة إلي مدي تأثير مجموعة من الأطفال بدراسة بعض القواعد الصوتية لقراءة القرآن (Torki & Tabatabaei, 2017; Zaid, 2011). لقد قامت الدراسة باستعانة مشاركة 12 طفلا في مرحلة ما قبل الدراسة حيث أن كون تسع أطفال منهم مجموعة التحكم وثلاثة المجموعة التجريبية. وتعرضت المجموعة التجريبية إلي قراءات قرآنية مختارة بها بعض قواعد التجويد التي تخص النون الساكنة في المواضع النهائية للكلمة . كما أن تعرضت كلتا المجموعتين إلي حصص لغة إنجليزية تركز علي إدغام حرف ال /n/ في المواضع النهائية للكلمة مع الحرف الأول من الكلمة الجديدة في الخطاب المتصل. كما يحلل هذا البحث هذه الظاهرة من خلال نظرية القطعية الآلية (autosegmental theory) ومن خلال تحليل الأصوات مستخدما برنامج Praat وقد وجدت الدراسة أدلة سبكتروغرامية تشير إلي أن المجموعة التي تعرضت إلي سماع تلاوة القرآن بقواعد التجويد قامت بإخراج أمثلة إدغام أكثر من المجموعة الأخرى مما يشير إلي أن التعرض لقواعد التجويد يؤثر فعليا على النطق في اللغة الإنجليزية.

الكلمات الدالة: التجويد، اكتساب اللغة الثانية، الخطاب المتصل، الإدغام، الفنولوجيا