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A Constraint-Based Re-Analysis of Cyrenaican Libyan Arabic: A Prosodic Buffer, Morphological Consistency, Phonological Optionality, and Variable Optimality Theory Rankings in Almarj Dialect

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إعادة تحليل قائمة على القيود للهجة العربية البرقاوية: العازل العروضي، الثبات الصرفي، الإختيارية الصوتية، وترتيبات النظرية المفاضلة الطبقية المتغيرة في لهجة أهل المرج

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Abstract:
This research provides a thorough, constraint-driven morphophonological examination of Almarj dialect of Eastern Libyan Arabic (Cyrenaican Libyan Arabic; CLA), comparing its structural mechanics concepts with the phonological hypotheses developed for Western varieties, namely Misrata Libyan Arabic (MLA), as identified by Elramli (2012). This study employs Parallel and Stochastic Optimality Theory (Prince & Smolensky, 1993/2002; Boersma & Hayes, 2001) to explore local assimilatory processes, structural repair strategies, and phonetic variation throughout various morphological contexts rather than utilizing new field data. Using an in-depth re-analysis of the phonic grid, it was observed that whereas MLA addresses Obligatory Contour Principle (OCP) breaches on the coronal tier through categorical, local regressive assimilation, Almarj dialect has highly ordered structural diversity. This study tends to centre on the derivation of Form V (tafaʕʕal) and Form VI (tafāʕal) verbal patterns and their equivalent agentive nouns (ism al-fāʕil). It exhibits the notion of the prosodic buffer, which is a structural mechanism where phonemic vowel length constraints, decreases the influence of assimilation triggers, and permits the optionality to their utilisation. Finally, this study aims to discern the various constraint hierarchies that distinguish Almarj dialect, offering a new template for comprehending dialectal variation included in the Libyan Arabic continuum.

Keywords: Almarj dialect, Stochastic Optimality Theory, Optimality Theory, Obligatory Contour Principle, Agentive Nouns, Phonological Optionality, Prosodic Buffer.

الملخص:
يقدم هذا البحث دراسة تحليلية موفوفونولوجية (صرفية-صوتية) مبنية على القيود للهجة مدينة المرج (إحدى لهجات العربية البرقاوية)، مع مقارنة آلياتها البنيوية وقيودها اللغوية مع المفاهيم والفرضيات الصوتية المستخدمة في دراسة اللهجات الليبية الغربية وتحديداً اللهجة الليبية المصراتية كما حددها الرملي (2012). يستخدم هذا البحث النظرية الأمثلية المتوازية

ونظرية الأمثلية العشوائية وفقاً لطرح برينس وهايز وبويرزما وسمولينسكي، وذلك لتحليل ميكانيكية الإدغام الموضعية وإستراتيجيات الإصلاح البنيوي، والتباين الصوتي في السياقات الصرفية المختلفة، وذلك بدلاً من الإعتماد على جمع بيانات ميدانية جديدة. ومن خلال إعادة التحليل التفصيلية للشبكة الصوتية؛ أتضح أن اللهجة الليبية المصراتية تعالج مخالفة مبدأ المحيط الإلزامي من خلال الإدغام الرجعي ، فإن اللهجة المرجاوية تمتاز بمعالجة بنيوية متنوعة ودقيقة.ويركز هذا البحث بصورة أساسية على أشتقاق الأفعال وفق الوزن الخامس (تفعّل) والوزن السادس (تفاعل)، إلى جانب دراسة أسماء الفاعل المقابلة لهذه الأوزان .كما يبين البحث مفهوم العازل العروضي ،وهو آلية بنيوية تعمل بها الحركات الصوتية الطويلة كقيد يقلل تأثير العوامل المحفزة للإدغام الصوتي ، الأمر الذي يسمح بمساحة من الإختيارية في تطبيق هذه العمليات. وأخيرا، يهدف هذا البحث إلى تحديد مختلف تراتبيات القيود التي تميز اللهجة المرجاوية، الأمر الذي خلص إلى تقديم نموذجاً جديداً لفهم التنوع في اللهجات في اللغة العربية الليبية.

الكلمات المفتاحية: لهجة مدينة المَرْج الليبية؛ نظرية الأمثلية؛ نظرية الأمثلية العشوائية؛ مبدأ المحيط الإلزامي؛ أسماء الفاعل؛ الاختيارية الصوتية؛ العازل العروضي.

Introduction: The Libyan Arabic Dialectal Continuum:

The linguistic environment of North Africa is distinguished by an intricate and geographically diverse spectrum of Arabic language varieties, with Libya maintaining a distinctive transitional location between the Mashriqi (eastern) and Maghrebi (western) dialect families. In terms of the linguistic history of Libyan Arabic (LA), its phonological and morphological systems have been classified into two categories: the Western (Tripolitanian) varieties and the Eastern (Cyrenaican) varieties (Al-Fitouri, 1976; Owens, 1984). Although previous structural and generative research offered essential knowledge for these systems, more advanced constraint-driven work have presented a better comprehension of the complexity of the morphophonological processes identified in these various varieties. of particular note, the thorough constraint-based examination of Misrata Libyan Arabic (MLA), a common dialect used in northwestern Libya, has proposed a firm basis for grasping local assimilatory processes through the implementation of Optimality Theory (OT) (Elramli, 2012)

Nonetheless, Almarj dialect, a common variety located in Cyrenaican Libyan Arabic (CLA) has morphophonological features which make it remarkably differentiate from the phonological assumptions found for the dialects existed in the centre and west of Libya, namely MLA. The varieties of Libyan Arabic are conventionally segregated into two sections sedentary (urban) and nomadic (Bedouin). Almarj dialect, positioned in the eastern part of Cyrenaincan has a close relation with the Sulaimitian Bedouin lineage (Owens, 1984). Along with the fact that, this historical and demographic environment provides creative dialect-specific methods for handling phonotactic obstacles, it additionally maintains numerous characteristics of Classical Arabic (CA). While Almarj and Misrata varieties exhibit the same linguistic background, their modern systems reveal a significant difference concerning the treatment of coronal obstruents, the categorization of guttural segments, the resolution of word-first gemination, and the domains of morphological optionality. The current research analytically carries out a rigorous investigation into Almarj dialect regarding the assimilation and its optionality. The primary concentration is particularly on the derivation of Form V (*tafaʕʕal*) and Form VI (*tafāʕal*) verbs, in addition to their related agentive nouns (*ism al- fāʕil*). In this paper, the principal part is devoted to introduce the conceptual framework of the 'prosodic buffer', which is a structural process that decreases the impact of the phonological assimilation triggers and yields structured optionality in the paradigms of Form VI (Kager, 1999). Additionally, the research reveals that Almarj dialect involves a diverse hierarchical ranking of phonological constraints based on the framework of Optimality Theory, which is notably different from the templates suggested by Elramli (2012) for MLA. This research introduces novel insights into dialectal diversity in Libyan Arabic through the integration of phonetic, morphological, and sociolinguistic findings, alongside doing an investigation of the limitations of the present theories related to the phonological optionality.

Theoretical Framework: Optimality Theory and Models of Optionality:

The current study adopts Prince and Smolensky's (1993/2002) constraint-based framework of Optimality theory (OT) for the analysis of the intricate morphophonological variation in Libyan Arabic. OT postulates that the surface structures are the result of the interaction between universal and violable constraints. This OT framework is in stark contrast to the traditional generative phonology, which is based on sequential rules application for the derivation of surface forms form underlying representations.

The framework of OT is composed of three major components:

- **Gen (Generator):** Receives a given input, or underlying morphological representation, and then creates a limitless number of output candidates.
- **Con (constraint Set):** Establish the universal standards for the evaluation of these candidates. Con contains two chief categories of constraints: Markedness constraints which make restrictions

on phonetic configurations that are complex or rare in their structure typology, and Faithfulness constraints which necessitate a resemblance between the input and the output.

- **EVAL (Evaluator):** The optimal candidate, that is the actual surface realisation, is selected on the basis of a strict ranking of the constraints within the constraint set CON, an ordered specific to the language in question. According to the principles of strict dominance, any candidate violates a higher-ranked constraint is blocked, without regard to the number of lower-ranked constraints it fulfills.

In standard parallel OT, Prince and Smolensky (1993/2002) states that an individual optimal output for a certain input is necessarily yielded by a single fixed constraint hierarchy, permitting for no true optionality or free variation. Yet, in particular, Form VI verbs and their agentive noun in Almarj dialect demonstrate wide-ranging and systematic optionality. To provide an explanation for this pattern, the current examination considers as expansions of OT for the purpose of addressing sociolinguistic and grammatical variation.

Three important models of OT optionality are connected to the current analysis:

1. **Multiple Grammars Theory:** Kiparksy (1993) indicated that this model postulates that in accordance with social context or stylistic register, a speaker has the ability to alternate between two or more different, completely ordered constraint hierarchies. Despite the functional simplicity of this theory, it could generate an excessive number of potential variations and regards variation as a general alternating system over a comprehensive grammatical feature.
2. **Partially Ordered Grammar:** Anttila (1997) proposes that this model posits that within individual grammar, specific constraints might remain unranked in respect to one another. In the production of particular utterance, the unranked constraints are arranged in a random order, forming a linear ordering, and this process leads to variation. Hence, the frequency with which a certain candidate is in connection with the number of potential orderings that satisfy it.
3. **Stochastic Optimality Theory (StOT):** Boersma (1997) established this theory and then Boersma and Hayes (2001) expanded it. StOT does not rely on employing firm ordinal orderings. Instead, it specifies numerical values to constraints on a constant scale. Throughout the process of evaluation, the value of each constraint obtains a little volume of randomised “probabilistic noise”. In cases where two constraints bear highly comparable value, their functional ordering might switch according to the noise occurs during generating a specific utterance. This mechanism permits the grammar to model not just the phenomenon of optionality, yet additionally frequency distinctions and the impacts of sociolinguistic factors, including the influence of speech register as illustrated by Dalton-Puffer (1999) in respect to morphological performance. The examination of prosodic buffer in the Cyrenaican dialect centers fundamentally on the mentioned variable-ordering patterns to account for the mechanism of achieving a balance between articulatory simplicity and morphological transparency.

Phonemic Inventory and the Expansion of the Coronal Trigger Set:

According to Elramli’s (2012) investigation of the Cyrenaican dialect specifically Almarj dialect and the Tripolitanian Misrata dialect, a major difference was observed in their phonemic inventories, which resides in the production process of palatal and interdental consonants. These mentioned phonetic distinctions actively influence to remodel the phonological environment through identifying the kind of phonemic units that activate the Obligatory Contour Principle (OCP) during concatenative morphological processes (McCarthy, 1986).

1. **The Preservation of Interdental Fricatives:** According to Elramli (2012), Almarj dialect is marked by a larger selection of coronal obstruent in comparison to Mistata Libyan Arabic dialect (MLA). This is attributed to the fact that it strictly preserves three interdental fricative sounds, namely, the voiceless /θ/, the voiced /ð/, and the voiced emphatic /ðˤ/ (Owens, 1984). While in western varieties, involving Misrata dialect, these interdental fricative sounds have mainly transformed into the equivalent dental stop sounds /t/, /d/, and /dˤ/, leading to a simplification of the phonemic inventory. The obligatory Contour Principle (OCP) could be applied on the coronal tier, in case a much larger environment is provided by the reservation of the abovementioned sounds (McCarthy, 1986). The grammar of Almarj dialect necessitates thorough regressive assimilation process in order to guarantee melodic agreement between contiguous segments when a coronal prefix, including detransitivizing /t-/ or the definite article /l-/, is connected with noun bases or verb roots starting with these consonants /θ/, /ð/, or /ðˤ/. The broader number of triggers indicates that the markedness constraint against neighboring coronal segments ("OCP” _ ["coronal”]) occurs with great frequency in (CLA) varieties than in MLA dialect. The current divergence assists in accounting for the larger prevalence of assimilation in the Cyrenaican varieties.
2. **Regional Variation in “Lunar” Sounds:** Besides the coronal inventory, the phonetic realisation of the voiceless uvular stop's consonant /q/, historically defined as a “lunar” sound, which normally

fails to condition the assimilation of the prefixes or definite article, is additionally distinguished throughout the two dialect areas. Elramli (2012) states that the /q/ sound is frequently generated as the /g/ sound in both Almarj and Misrata varieties. Nonetheless, in specific terms and in formal interactions, the use of [ʔ] sound, borrowed from Modern standard Arabic, is also permitted in MLA dialect. Regarding Almarj dialect, On the contrary, this glottal articulation of the [ʔ] sound is completely non-existent in the phonological system of everyday use of native speakers, except of borrowed words of MSA (Owens, 1984).

The phoneme/q/ of Classical Arabic (CA) is produced as /g/ in Almarj dialect, it follows distinct paths in morphological processes. The derivational mechanism of /g/ phoneme form /q/ normally preserves the non-assimilatory feature of a''lunar'' sound. Table 1 demonstrates non-Assimilated and Assimilated Forms of Form VI Verbs.

Table (1). Non-Assimilated and Assimilated Forms of Form VI Verbs.

Phonological Feature	Misrata Dialect (MLA/Elramli)	Almarj Dialect (CLA/ Baseline)	Morphological Consequence in Almarj
Interdental Fricatives (/θ/, /ð/, /ð ˤ/	Merged into dental stops (/t/, /d/, /dˤ/)	Strictly preserved as autonomous phonemes	Greatly expands the OCP trigger set on the coronal tier, increasing assimilation frequency.
Realization of historical /qāf/	Voiced velar [g] or glottal stop [ʔ]	Uniformly realized as voiced velar [g]	Maintains historical “lunar” non-assimilatory status.
Syllable Coda Clusters	Variable adherence to sonority sequencing.	Strict adherence to sonority sequencing principle.	Mandates complex structural repair strategies.

Basic Assimilation Patterns: Lateral and Nasal Constraints:

It is required to explore the fundamental assimilation processes of lateral and nasal in order to provide a foundation for comprehending the complex verbal morphophonology of Almarj dialect. Examining MLA emphasizes the essential function performed by the OCP in inducing these basic processes (Elramil 2012). For the purpose of OCP violations avoidance, the /l/ phoneme in both the definite article /ʔil-/ and the detransitivizing prefix /t-/ undergoes complete assimilation to the subsequent coronal segment.

1. Lateral Assimilation and Morpheme Boundaries:

Both dialects of Almarj and MLA share the characteristics of the obligatory assimilation of the /l/ segment in the definite article when followed by sounds classified as ''sun letters''. Nevertheless, a significant difference emerges between the two dialects in the assimilation process of the preposition /ʔil-/ (meaning “for” or “to”). According to Elramli (2012), In MLA dialect, this proposition could be subjected to complete assimilation in case it precedes coronal sonorants including /n/, /l/, and /r/. For instance, the combination /ʔil-/ + /nab/ is realised as [ʔinnab]. Regarding Almarj dialect, the assimilation of this preposition is significantly affected by the social environment and the style of speaking. Although this process of prepositional assimilation might appear in rapid or casual interaction, speakers of Almarj dialect normally avoid it in formal communication to preserve morpheme boundaries transparent. This disparity reveals an underlying tension between the simplicity of pronunciation, which enhances assimilation, and the lexical integrity, which assists in maintaining meaning (McCarthy, 1986). Within the framework of Optimality Theory (OT), this pattern postulates that, in particular syntactic constructions, faithfulness can be ranked higher than markedness, thereby prohibiting assimilation (Prince & Smolensky, 2002). This fluidity in constraint ranking can be modelled through applying Stochastic OT. Almarj dialect exhibits higher variation on the basis of the morphosyntactic role of the affix and the context of utterance (Boersma & Hayes, 2001).

2. Nasal Place Assimilation and Cross-Boundary Processes:

Elramli (2012) demonstrates that assimilation process of nasal sounds varies across Libyan varieties. In MLA, the /n/ sound involves a shift in its place of articulation to the form of [m], [ŋ], or [ɱ] when it is followed by obstruents including /b/, /k/, /g/, and /f/, which results in partial assimilation. In addition, when the /n/ sound is positioned before sonorants such as /l/, /r/, or /m/, total assimilation is triggered across word boundaries, yielding geminated forms. For instance, /min rak/ (“who saw you?”) develops into [mɪrāk].

With respect to Almarj dialect, it possesses an analogous total assimilation throughout word boundaries. Yet, it is different in its handling mechanism of consonant clusters within words (Owens ,1980; 1984). According to Elramli's examination, such underlying clusters are occasionally tolerated in Almarj dialect, most notably when using newly borrowed terms and recently formed expressions. This

is in contrast to MLA, where the occurrence of the /n/sound succeeded by a sonorant consonant within a single word is typically prohibited. In Almarj dialect, these consonant clusters are repaired either through metathesis or the insertion of the target vowel (epenthesis) thereby maintaining compliance with Sonority Sequencing Principle (SSP), which determines that the necessity of an increase in sonority towards the nucleus of the syllable and a decrease in sonority towards the margins of the syllable (Owens, 1980).

The current pattern signifies that sonority constraints ("SON-SEQ") appear to be more stringent in CLA, as opposed to MLA, which might permit specific violations or follow distinct repair mechanisms. Almarj exhibits significantly formed syllabic structures, regardless of whether this process involves altering the linear order of segments and becoming in violation with a faithfulness constraint (Prince & Smolensky, 2002).

The Morphophonology of Form V: A Stepwise Derivation in Almarj:

The derivation of Form V is regarded as a key aspect of morphophonological distinction between Almarj dialect and its western counterparts in Libya that was the subject of previous analyses within the framework of OT. This form is constructed through the addition of the prefix /tə-/ to a Form II base and normally represents reflexive, middle voice, or gradual actions (Al-Fitouri, 1976; Owens, 1984). For instance, the transitive Form II /ḥarrak/, which signifies ‘‘he moved something’’ is in contrast to the intransitive Form V /təḥarrak/ which indicates ‘‘it moved by itself’’ (Owens, 1984).

1. Triggers and Mechanisms of Obligatory Assimilation:

In Almarj variety, Form V is subject to a distinctive morphophonological procedure when the first radical consonant, derived from Form II base, constitutes a coronal obstruent or the segment /g/, behaving equivalently (Owens, 1984). In such cases, the voiceless coronal consonant stop /t/, which denotes the prefix-terminal and is positioned before an additional coronal obstruent, triggers an obligatory three-phase repair process.

A. Total Regressive Assimilation: The prefix/t-/ experiences complete assimilation to the subsequent radical segment, bearing its features in terms of place and manner of articulation, and voicing (Prince & Smolensky, 1993/2002). For instance, the combination process of /t-/ and /samma/ results in the emergence of ungrammatically improper intermediate form *[sə.samma].

B. Compensatory gemination: In avoidance of the complete deletion of the prefix and the absence of its morphological signal, the grammatical structure retains the prosodic weight (mora) of that prefix through integrating the assimilated segment with the subsequent radical, forming a single long geminate consonant. Consequently, the intermediate *[sə.samma] is realised as *[sːamma], which maintains the prosodic contribution of the prefix and also fulfills the required prosodic faithfulness constraint (Prince & Smolensky, 1993/2002).

C. Prothesis and resyllabification: CLA disallows word-initial consonant clusters, which involve geminates (*"COMPLEX-ONSET"). Therefore, the illicit structure *#Cː- is resolved through the insertion of a short phonetic vowel, normally [ɪ] or [ə] in word-initial position. This permits the geminate to surface in a phonetically acceptable intervocalic position. Thus, the resulting realisation form emerges as [ɪs. ˈsam.ma] (indicating "he was named") (Owens, 1980).

This process is significantly different form patterns defined for MLA. Earlier analyses based on OT account for instances in which the insertion of a vowel between the prefix and stem inhibits the occurrence of assimilation. Yet, they additionally recognize the OCP as a key factor in the realisation of assimilation of intransitive prefixes, generating transparent form such as [tizraʕ] indicates "you sow". In Almarj variety, the process of assimilation is performed prior to the repair of any consequent structural violation in the syllable. The prefix initially assimilates to the stem consonant, yielding a word-initial geminate consonant configuration, which is structurally ill-formed. This operation is addressed by inserting a vowel (prothesis) in syllable-initial position. Hence, as opposed to the highly straightforward pattern observed MLA variety, Almarj needs to follow two sequential procedures: assimilation succeeded by word-initial prothesis (Owens, 1984).

2. Evaluating Form V in Optimality Theory:

In Almarj dialect, Form V has a unique morphological behavior that can be described by specific ranking OT constraints (Prince & Smolensky, 1993/2002). These constraints are outlined as follows (Kager, 1999):

- *** COMPLEX(Onset):** Complex onsets are prohibited in Almarj dialect including word-initial geminates (Owens, 1980).
- **AGREE(Place):** Almarj grammar mandates that adjacent consonants must share the same features of the place of articulation (McCarthy, 1986).
- **MAX-μ:** All input moras must be reserved in the final realization(output) (Prince & Smolensky, 1993/2002).

  (To prevent the deletion of the prefix’ moraic weight)

- **DEP-V:** Every vowel in surface realization must correspond to a vowel in the input (Prince & Smolensky, 1993/2002).
  (Vowel insertion and prothesis is prohibited)
- **IDENT (Voice):** Segments of both input and output must share the same voicing features (Prince & Smolensky, 1993/2002).

Within Almarj dialect, the invariant Form V's ranking is structured **as follows:**

* COMPLEX(Onset) **»** AGREE(Place) **»** MAX-μ **»** DEP-V **»** IDENT (Voice)

The tableau 2 bellow formally demonstrates the interaction between the constraints in Almarj dialect.

Table (2): Evaluation of Form V with Underling Input /tə-samma/ in Almarj dialect

Input:/tə-samma/	*COMPLEX(Onset)	AGREE(Place)	MAX-μ	DEP-V	IDENT (Voice)
a. √ [ɪs.'samma]				*	*
b. [tə-samma]		*!			
c. *[s:amma]	*!				*
d. *[samma]			*!		*

According to tableau 2**,** *COMPLEX(Onset) and AGREE(Place) are undominated, therefore, candidate (b) ([tə-samma]) cannot surface as the faithful candidate because it incurs a fatal violation of agreement constraints. Candidate (c) */s:amma/ is assimilated, however, it is not prothesized make it falling in violation of the complex onset constraints (Prince & Smolensky, 1993/2002). Candidate (d) *[samma] violates the third ranked constraint MAX-μ and it has no trace of the agentive noun prefix, therefore, candidate (d) is eliminated. Arguably, candidate (c) violates only lower ranked constraints DEP-V to license the insertion of the prothetic vowel [ɪ], adding a new syllable to allow onset gemination, resulting in the optimal output (candidate a) [ɪs.'samma]. In contrast, MLA grammar ranks DEP-V higher that make it difficult to be violated, therefore, prothesis cannot be licensed. This force MLA to allow alternative repair strategies or permits lesser OCP violations (Elramli, 2012).

3. The sonorant Exception and Sonority Hierarchies:

In Almarj dialect, the derivation of Form V provides a critical nuance, which is the deferent behaviour of the coronal sonorants (/n/, /l/, /r/). Unlike their coronal obstruent counterpart, coronal sonorants entirely fail to trigger/t-/ prefix assimilation in CLA (Owens, 1984). As a result, a Form V verb such as / tənaKal/ ("he changed his mind") does not exhibit assimilation on the surface realization of the verb.

This sonorant exception is grounded on phonological principles and emphasizes the crucial role of sonority hierarchies in Almarj dialect. Since sonorants have more vowel-like qualities and maintain continues airflow, a sequence such as /tə + n/ does not create critical articulatory tension, aerodynamic constraint, or perceptual opacity that caused by obstruent-obstruent sequence as / tə + t/ or / tə + s/. Consequently, the higher sonority of /n,l,r/ enables the voiceless stop / t / to preserve its original segmental features in a stable / tə.CV/ syllable, avoiding the severe violation of OCP principles (Owens, 1984; Kager, 1999; Prince & Smolensky, 1993/2002).

Interestingly, this robust deferential phonological behaviour of sonorants and obstruents parallel with Elramli (2012) findings as the same phenomena was also observed in MLA, where the voice assimilation of the imperfective /t-/ prefix is impeded by guttural consonants which is functioning as sonorants (McCarthy, 1986). Therefore, it can be stated that both CLA and MLA depend on sonority level to regulate assimilation and whether to trigger assimilation or block it. However, Almarj dialect distinguishes itself from MLA by the application of this principle to the coronal tier in derivational morphology, permitting sonorants to systematically violate the highly ranked constraint (AGREE(Place)) (Kager, 1999; Prince & Smolensky, 1993/2002).

Form VI derivation: the prosodic buffer and assimilation optionality:

The derivation of Form VI verbs (tafaʕʕal) in Almarj dialect can provide strong evidence against the assumption of the uniformity of the Libyan dialect. In contrast to the categorical mandatory assimilation demonstrated in Form V, Form VI verb exhibits a highly strategic systemic optionality that defies rigid generative frameworks (Anttila, 1997; Boersma, 1997).

Morphologically, Form VI is derived by adding the prefix /tə-/ to Form III base (*fāʕal*). From semantic standpoint, this derivation functions to express reciprocal interaction among multiple agents (e.g., /təfāhɑm/ "they understood each other") or pretending to do something (e.g., /təmārɑd/ "he pretended to be sick").

1. The function of the prosodic buffer:

Form V and Form VI are architecturally different, and they have distinct assimilatory behavoiur. This disparate behaviour is driven by Form V and Form VI syllabic templates, where their prosodic templates produce highly divergent degrees of articulatory tension. The architectural sequence following prefixation in Form V is /tə-$C_1aC_2C_2aC_3$/. The prefix / tə-/ is immediately adjacent to the initial radical

C_1, and C_1 is followed by a short vowel and a heavy geminate C_2C_2, resulting in causing an extreme articulatory crowding. Consequently, the narrow space and the crowding of consonantal gestures force regressive assimilation (Owens, 1980).

In contrast, Form VI follows the syllabic template sequence /tə-$C_1āC_2aC_3$/, which is distinguished from Form V by having a long vowel /*ā*/ immediately adjacent to the initial radical C_1. In Almarj dialect, the long vowel /*ā*/ serves as a structural prosodic buffer. Phonetically, the long vowel /*ā*/ creates a heavy syllabic nucleus due to its sustained duration and the strong articulatory trajectory. This nucleus (as prosodic buffer) provides a space between consonantal gestures, spacing out C_1 from the following segment, therefore, the prosodic buffer allows the speaker to maintain the prefix / tə-/ without forcing assimilation.

In Form VI, rhythmic pressure and temporal pressure of speech are mainly absorbed by the long vowel, creating a neutral environment in which the assimilation of the prefix / tə-/ is not mandatory. Therefore, Almarj dialect license both forms of FormVI verbs (assimilated and non-assimilated forms), and both forms roots that start with coronal initial segments are grammatically accepted by the dialect native speakers (Anttila, 1997; Boersma, 1997).

Table (3): Semantic Meanings and Non-Assimilated and Assimilated Surface Forms of Form VI Verbs in the Almari Dialect.

Root	Form VI Semantic Meaning	Non-Assimilated Surface Form	Assimilated Surface Form + Prothesis
{s-ʕ-d}	“To help the other one”	[tə.’sā.ʕad]	[ɪs.’sā.ʕad]
{ð-k-r}	“To remind the other one”	[tə.’ðā.kar]	[ɪð.’ðā.kar]
{ṣ-l-ḥ}	“To be reconciled mutually”	[tə.’ṣā.la ḥ]	[ɪṣ.’ṣā.la ḥ]

2. Structured heterogeneity in Almarj dialect:

In Almarj dialect, the optionality exhibited by Form VI verbs is not an arbitrary phonological phenomenon; however, this optionality can be attributed to structural heterogeneity. Form VI verbs must select between two forms, the optionally assimilated form as in [ɪs.’sā.ʕad] and the optionally non-assimilated form as in [tə.’sā.ʕad] (Anttila, 1997; Kiparsy, 1993). This selection is conditioned by a spectrum of linguistic pressures, pragmatic contexts, and sociolinguistic influences.

In terms of linguistic pressures, grammar is governed by articulatory economy during rapid speech. Speakers tend to diminish phonetic duration by employing assimilated forms, where these forms ease the articulatory trajectory. Even though Form VI verbs possess a prosodic buffer, the complex articulatory trajectory is avoided (Boersma, 1997; Boersma & Hayes, 2001).

Regarding semantic transparency, perspicuity in certain contexts is supreme. For example, when speaking in noisy environment or when dictating a speech, the non-assimilated forms are exclusively favoured. In non-assimilated forms, the morphemes are fully realized to guarantee semantic recoverability. Ensuring listener clarity is crucial, because Form VI verbs considerably have high functional load.

From sociolinguistics angel, morphological productivity and register variation indicate that employing both assimilated and non-assimilated forms varintly can be influenced by different social indexes (Plag, Dalton-Puffer, & Baayen, 1999). Governed by Cyrenaican identity, the assimilated form is utilized to index authentication of the colloquial dialect. On the other hand, the non-assimilated form, since it closely adhered to Modern Standard Arabic forms, it may index higher level of education, formal contexts, or a deliberate shift toward more prestigious linguistic register.

3. Optionality in Almarj dialect and Stochastic Optimality Theory:

To adequately provide a formal account of Form VI structured optionality, Stochastic Optimality Theory (StOT) or Partial Ordering method (PO) must be adopted instead of strict constraints ranking OT used for Form V (Anttila, 1997; Boersma, 1997). According to (StOT) principles, instead of rigid and fixed constraints of SOT model, constraints are more flexible and operate on a continuous scale with overlapping abilities among ranking values (Boersma & Hayes, 2001). In Almarj dialect, Form VI verbs have two constraints that reveal overlapping ranges; faithfulness constraint IDENT(Morph) (in which the dialect grammar mandates the preserving of the /t-/ prefix to ensure semantic transparency) and AGREE(Place) markedness constraint. In this form, the prosodic buffer provides an alternative option for the dialect grammar, where IDENT(Morph) constraint has a significant chance in constraints competition.

A. Non-Assimilated Form Ranking:

In formal settings or guarded speech, faithfulness constraints are prioritized influenced by sociolinguistic pressures. The resulting constraint hierarchy is:

IDENT (Morph) » AGREE (Place)

The prefix /tə-/ is totally preserved in the output without experiencing prothesis: [tə.'sā.ʕad].

Table (4): Form VI under Formal/Careful Speech Settings

Input: / tə- sā.ʕad/	IDENT(Morph)	AGREE(Place)	DEP-V
a. ✓ [tə.'sā.ʕad]		*	
b. [ɪs.'sā.ʕad]	*!		*

B. Assimilated Form Ranking:

In informal speech or rapid speech settings, articulatory economy becomes a dominant feature. The constraint ranking is changed because of stochastic evaluation, **resulting in the following (Boersma, 1997):**

AGREE (Place) » IDENT (Morph)

The assimilation of the prefix /tə-/ triggers the obligatory processes of gemination and prothesis required to fulfil * COMPLEX(Onset) constraint (Prince & Smolensky, 1993/2002), resulting in assimilated form: [ɪs. 'sā.ʕad].

Table (5): Form VI under Casual/Rapid Speech Settings

Input: / tə- sā.ʕad/	IDENT(Morph)	AGREE(Place)	DEP-V
a. [tə.'sā.ʕad]	*!		
b. ✓ [ɪs.'sā.ʕad]		*	*

In contrast to Elramli's general categorical model, Almarj dialect exhibits a dynamic and gradient model. The active interaction between prosodic boundaries and morphological constraints generates a system of dual-grammar, in which native speakers employed this duality fluently (Kiparsky, 1993).

Agentive Noun Derivation (*ism al-fāʕil*):

In Almarj dialect, the process of the agentive noun derivation from Form V and Form VI verbs reveals a highly sophisticated and systematic morphophonemic interaction. The interaction between morphological processes and variant phonological rules in Almarj dialect is not random but follows systematic constraints-based operations. The derivation mechanism requires the removal of the verbal inflections, prefixing the nominalizing marker /mə/, removing the vowel in the infix /tə-/, and apply mandatory resyllabification (Kager, 1999; Prince & Smolensky, 1993/2002).

1. Form V Agentive Nouns:

In Form V agentive noun, Almarj dialect follows the template of /mət-C_1aC_2-C_2iC_3/. This template is generated by infusing the nominal prefix /mə-/ with the prefix /tə-/(verbal prefix), deleting the vowel /ə/ of the prefix /tə-/, resulting in / mət-/ sequence. This operation strictly mandates separating the root geminate / C_2 .C_2/ across syllables, where the first consonant/ C_2/ is the coda of the second syllable and the second consonant/ C_2/ is the onset of the sequent syllable, and the vowel [a] in the final syllable is invariantly replaced with [ɪ] (agentive noun specific syllable feature), such as in the verb [ta.cal.lam] becomes the agentive noun [mət.cal.lɪm].

This derivation is invariant in initial non-coronal roots. However, in roots that start with a coronal obstruent segment, Almarj dialect utilizes two competing patterns (assimilated and non-assimilated pattern), **resulting in significant grammatical tension (Anttila, 1997):**

- **The Assimilated Form (Pattern 1):** In this form, the verbal prefix /t/ in / mət-/ sequence completely assimilates regressively to the adjacent C_1 radical. Since the word-initial position is occupied by the nominal prefix /mə-/, the formed geminate is entirely secured in the word-internal position, such as in / mə+ssamma/. Consequently, with geminate occupying the internal position, this form does not violate *COMPLEX-ONSET word-initial constraint, and prosthetic vowel is not needed to authorize the complex onset (Owens, 1980; Prince & Smolensky, 1993/2002). In this prosses, the resulted form is syllabically stable and well-formed, such as in [məs.'sam.mɪ](one who is named). Pattern A significantly fulfils phonological naturalness requirements (McCarthy, 1986).
- **The Non-Assimilated Form (Pattern 2):** In this pattern, the agentive noun prefix / mət/ has a rigid morphological structure, and it is not experiencing any assimilation process, resulting in forms like [mət.'sam.mɪ]. In this form, the assimilation process is resisted due to the requirement of semantic transparency to recognize the morpheme of the form V. Accordingly, articulatory ease over ranked by the recognition ability of clear morphological boundaries by the listener (Kager, 1999; Prince & Smolensky, 1993/2002).

According to Elramli (2012), MLA dialect reveals a categorical application of OCP unified triggers that cause assimilation for all contexts without exceptions. However, this assumption is challenged in Almarj dialect data. The data indicates that dialect speakers operate systematic dual representations for nominal paradigms. The constraints are re-ranked according to lexical frequency, where Pattern A is

applied mostly to highly common words, while the non-assimilated form with its morphologically transparent features applies to the rare or low-frequent words (Boersma, 1997).

2. Form VI Agentive Nouns:

In contrast to the verbal prefix /tə-/, that is venerable to assimilation and phonetic adjustments, the nominal agentive noun prefix /mə-/ displays significant segmental resilience that survives reduction. The nomoinalizing prefix /mə-/, even when attached to the assimilated form of Form VI, maintains the syllable boundaries of the agentive noun marker that prevent phonetic erosion or reduction of the prefix (Owens, 1984).

For example, the derived agentive noun of the root {ð-k-r} yields [mət.' ðā. kɪr]" the one who remembers" and [məð.' ðā. kɪr], where the nominal agentive noun prefix /mə-/ is attached to both assimilated and non-assimilated forms without reduction in resulting output. Accordingly, the assimilated form [məð.' ðā. kɪr] suggests that the assimilation process of the verbal prefix /tə-/ occurs before the derivation of the agentive noun. Therefore, it can be observed that the nominal agentive noun prefix /mə-/ preserves its morphological structure without stimulating or experiencing any phonological repairs, and that provides evidence for the complex lexicon system in CLA which functions on multi-tiered derivational levels (Kiparsky, 1993).

Conclusion:

The ways in which Almarj dialect morphophonologically diverges from the assumptions postulated by Elramli (2012) concerning Misrata and Central Libyan Arabic suggest a phonological system characterized by considerable stratification and theoretical complexity. Despite using the Obligatory Contour Principle as the principal mechanism driving melodic agreement on the coronal tier, both the eastern and western varieties adopt different constraint hierarchies that prioritize substantially different linguistic outcomes.

Almarj dialect prioritizes word-initial phonotactic constraints and prosodic well-formedness over segmental faithfulness, thereby necessitating the obligatory and structurally complex prothesis observed in Form V verbs. Moreover, the CLA system is distinguished by its structural incorporation of the prosodic buffer, which protects prefixes from the effects of assimilation. This buffer enables Form VI paradigms to exhibit stable optionality conditioned by sociolinguistic factors, reflecting structured heterogeneity which can be accommodated within a unified grammar organized stochastically.

The derivation of agentive nouns provides further evidence of this regional divergence, highlighting a considerable degree of grammatical competition in Almarj between morphological transparency and phonological ease. Through giving paramount importance to prosodic constrains such as * COMPLEX (Onset) and MAX - μ , and through the use of phonemic vowel length as an active articulatory buffer, the Almarj variety demonstrates that Libyan Arabic morphophonology does not constitute a single, uniform set of rules. Instead, Libyan Arabic comprises a diverse set of regional grammars that manage the universal tension between the ease of articulation and communicative clarity through distinct, dialect-specific, and stochastically variable Optimality Theory rankings.

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