The Distibution of Arabic Verbal Patterns in Text Production: Between Varieties and Modalities

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Abstract Arabic is a typical case of diglossia, in which different varieties of the same language are used within the same speech community for different communicative functions, and often in different contexts: Spoken Arabic for everyday speech and Modern Standard Arabic (MSA) for formal speech and for conventional reading/writing. While Spoken Arabic is typically used only in the spoken modality, MSA may be used in both modalities: speaking and writing. The verbal system of both Spoken Arabic and MSA consists of roots and patterns, which differ mainly in transitivity and semantic class, e.g. causative, incohative. This study examines the distribution of verbal patterns in (spoken) Palestinian Arabic (PA) and in Modern Standard Arabic (MSA), in the spoken modality (MSA-S) and in the written modality (MSA-W), as they are actually used in narrative text production. Verbs were coded accordng to roots, patterns, transitivity and semantic class.

The results reveal that the distribution of verbal patterns and their semantic functions may be clearly differentiated according to variety (PA vs. MSA) and according to modality (spoken PA/MSA vs. written MSA), as some patterns are more typical of one variety/modality than others. In addition, the results demonstrate the special status of spoken MSA as an intermediary variety sharing some features with spoken PA and others with written MSA.

Keywords Arabic · Diglossia · Modality · Narrative texts · Variety · Verb · Verbal pattern · Form-function relations

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1 Introduction

Arabic is a typical case of diglossia (Ferguson, 1959), where two varieties of the language co-exist and are used for two different sets of communicative fucntions (Albirini, 2016; Eid, 1990; Ibrahim, 1983; Maamouri, 1998; among others). In the Israeli context, these are MSA (Modern Standard Arabic) and PA (Palestinian Arabic). PA is the language of daily communication among Arabic native speakers, whereas MSA is the language of formal speech and of reading/writing (Saiegh-Haddad & Henkin-Roitfarb, 2014).[1] While PA is mainly used in the spoken modality, it has been used in recent years in the written modality in the social media and in other electronic means of informal communication like whatsapp. In contrast, MSA is used both for formal speech (religious sermons, lectures, TV broadcasts etc.) and for conventional writing. Lexical and grammatical differences between the two varieties have been shown to exist in all domains of language (Eid, 1990; Ibrahim, 1983; Maamouri, 1998; Saiegh-Haddad & Henkin-Roitfarb, 2014; Saiegh-Haddad & Spolsky, 2014).

Mastering the verbal system of Arabic requires mastery of these systems as they are used in the colloquial varieties and MSA and this includes mastery of different types of morpho-phonological and semantic-syntactic knowlege: (i) the inflectional paradigm of each pattern; (ii) the semantic-syntactic features of each pattern; and (iii) the derivational relations (if any) between the different patterns. Thus, examining how verbs are deployed in actual text production in this morphologically rich context can shed light on various aspects of speakers'linguistic knowledge, as well as the structure and content of the Arabic mental lexicon.

While most studies of the Arabic verbal system have focused on MSA, the current study examines the deployment of verbal patterns in narrative text production among adult native speakers in Palestinian Arabic (hereafter PA) and in Modern Standard Arabic (hereasfter MSA). The verbal system of Arabic, both Spoken Arabic varieties and MSA, consists of patterns which differ mainly in semantic class (e.g., causative and inchoative) and transitivity. Various studies have examined the morpho-phonological and semantic-syntactic properties of the Arabic verbal system (e.g. Benmamoun, 2003; Henkin, 2009; Holes, 1995; Younes, 2000), but few studies have examined their actual usage in text production, and even fewer, if any, have compared the actual use of verbal patterns in the two Arabic varieties: PA versus MSA, or in the two modalities of MSA: spoken versus written. The current study is one step in this direction.

The study addresses the following questions:

(i) What is the distribution of verbal patterns and their semantic features in narrative text production?
(ii) Does the deployment of verbal patterns show sensitivity to variety-related differences (PA vs. Spoken/written MSA)?

[1] While we agree that diglossia consists of a continuum, for the sake of convenience, we will continue to refer to it in a dichotomous way, acknowledging that this is just an abstraction (Basiouny, 2009).

(iii) Does the deployment of verbal patterns show sensitivity to modality-related differences (spoken PA and MSA vs. written MSA)?

We will show that the distribution of the verbal patterns and their semamtic functions reflect a remarkable disparity in langage deployment between the two varieties of Arabic, more so than between modalities within the same variety.

2 Arabic Diglossia

In all literate societies, spoken and written languages are used in different sociocultural contexts, and the two forms of linguistic expression tend to be associated with different communicative conditions and distinct processing constraints, involving such factors as clarity, speed, and effort in online versus offline output (Chafe, 1994; Olson, 1994; Slobin, 1977; Strömqvist et al., 2004). Yet, what appears unique to Arabic diglossia, although possibly applying to some extent in other sociolinguistically analogous situations (Saiegh-Haddad et al., 2021), is that the spoken and written language varieties are so distinct in lexicon, phonology, morphology, and syntax that preliterate children find it very difficult to understand a textwhen it is presented to them in the standard language.

Diglossia is "a relatively stable language situation in which, in addition to the primary dialects of the language there is a very divergent, highly codified (often grammatically more complex) superposed variety, which is largely learned by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation" (Ferguson, 1959: 345). Though Ferguson proposes a dichotomy between a spoken and a written variety, the linguistic situation in Arabic diglossia has been described in terms of levels, or a continuum, with speakers shifting between as many as four (Meiseles, 1980) or five (Badawi, 1973) varieties, ranging between colloquial/vernacular and literary/standard forms, resulting in levels that are neither fully standard nor fully colloquial. As such, there are "gradual transitions" (Blanc, 1960) between the various varieties, and "theoretically an infinite number of levels" (Basiouny, 2009: 15). See Albirini (2016) for an extensive discussion of diglossia in relation to language attitudes, social identities, variation and codeswitching and their individual and combined impact on the linguistic behavior of Arabic speakers.

In diglossic Arabic, children start out speaking a local variety of *Spoken Arabic* (hereafter SpA), the one used in their immediate environment: at home and in the neighborhood; once they enter school, at the age of 5–6, they are formally exposed to Modern Standard Arabic as the language of reading and writing, while *Spoken Arabic* remains the language of informal speech.[2] Academic school-related speech

[2] Implicit learning of some of the linguistic strcutures of MSA (e.g., sounds, words) can happen before school from exposure to the language via TV and book reading. Yet this question has not so far been tested.

is conducted in SpA or in a semi standard variety, Educated *Spoken Arabic* (Badawi, 1973), except in Arabic lessons, where MSA is more dominant, at least in aspiration (Amara, 1995). Outside the school milieu, there is a similarly stable co-existence of the two major varieties, each functioning for distinct spheres of social communication: Spoken Arabic is used by all native speakers: young and old, educated and uneducated, for informal and intimate verbal interaction in the home, at work, in the community, and so forth. On the other hand, MSA, alternating with Educated SpA, is expected to be used for formal oral interactions, such as giving a speech or a lecture, and for writing (however, see, Abu Elhija, 2012; Al-Khatib & Sabbah, 2008; Haggan, 2007; Khatteb Abu-Liel et al., 2021, Mostari, 2009; Palfreyman & Al Khalil, 2007; Warschauer et al., 2002 for use of *Spoken Arabic* in electronic writing in Arabic). Thus, while *Spoken Arabic* is undoubtedly the primary language of spoken usage, native speakers of Arabic, including young children, are actively and constantly engaged with MSA as well. They complete their school assignments and take their exams in MSA, and they also pray, watch some TV programs and read storybooks in MSA. Thus, besides proficiency in using *Spoken Arabic*, linguistic proficiency in Arabic involves concurrent proficiency in using MSA, from an early age, for both reading and writing, and also for formal speech.

2.1 Linguistic Distance in Arabic Diglossia

Arabic diglossia was established, at the latest, with the standardization of Arabic in the eighth and ninth centuries A.D., with the early grammarians producing a set of norms for the written form of the language that they called *Alfusha* 'the most eloquent language', the modern descendent of which is called *Alfasiha*, 'the eloquent langauge' often referred to as (Modern) Standard Arabic (MSA, StA). Over the course of many years, the continued use of this favored set of written linguistic norms has led to substantial differences between the dynamic spoken varieties and the fixed written form, making the two linguistically distant, and has engendered the notion that the written standard was the 'real language', while the other varieties were 'degenerate' and 'corrupt' versions (Maamouri, 1998). The linguistic distance between the spoken and the written varieties of Arabic is evident in all areas of structure and usage, including not only lexicon and phonology, but also syntax and morphology, as documented in a range of studies in the past several decades (see for example, Eid, 1990; Geva-Kleinberger, 2000; Hary, 1996; Henkin, 2010; Ibrahim, 1983; Ibrahim & Aharon-Peretz, 2005; Kay, 1994; Levin, 1995; Khamis-Dakwar et al., 2012; Meiseles, 1980; Rosenhouse, 2007, 2014; Myhill, 2014; Saiegh-Haddad & Henkin-Roitfarb, 2014; Saiegh-Haddad & Armon-Lotem, in press; Versteegh, 2001; Wright, 1889).

Phonological differences between the two varieties are apparent in their phonemic and syllabic structure, phonotactic constraints, syllable weight and stress patterns (Aquil, 2011; Broselow, 1979; Jastrow, 2004; Watson, 1999, 2002). Morphologically, MSA and the dialects of SpA differ markedly in inflectional

categories, such as the absence in SpA of final short vowel inlfections indicating case and mood, and of the preponderance of the genitive-accusative forms of duals and so-called "sound masculine plurals" (Holes, 1995, 2004). MSA has a rich morphological system of grammatical agreement, contrasting with a far less varied and less complex system of agreement marking in SpA (Aoun et al., 1994, 2010; Benmamoun, 2000; Brustad, 2000). Derivational morphology also reveals differences between the two varieties, primarily in the distribution and frequency of verbal patterns, with some patterns being less frequent and productive in MSA than in SpA (Benmamoun, 1991; Blanc, 1970; Bolozky & Saad, 1983; Fassi Fehri, 1994; Rosenhouse, 2002; Shawarbah, 2007; Younes, 2000). For example, the verb pattern *ʔaCCaC* (e.g. *ʔarsal* 'send') is hardly productive in Palestinian Arabic (PA), with a dictionary search revealing only 75 *ʔaCCaC* verbs in PA, only 3.5% of all PA verbs (Laks, 2018). Syntactically, SpA and MSA vary in clausal word order; with VSO as the typical word order of MSA as against SVO in SpA (Bolotin, 1995; Fassi Fehri, 1993; Mohammad, 1989, 2000; Shlonsky, 1997). The two varieties also differ in use of nominal constructions, with nominalizations being far more common in MSA than SpA (Laks & Berman, 2014; Rosenhouse, 1990, 2008). Moreover, at the intersection of morphology and syntax, the two varieties differ in processes of passivization, with use of passive verbs being far more common in MSA than in SpA (Hallman**,** 2002; Holes, 1998; Laks, 2013). *Lexically*, SpA and MSA feature overlapping and unique lexicons, with approxmately 40% of the words in the spoken lexicon of young speakers of a dialect of PA depicting a unique SpA lexical form (Saiegh-Haddad & Spolsky, 2014).

Given the linguistic distance between SpA and MSA and the complementary distribution of the way words and structures pattern in the two varieties, a given linguistic form can generally easily be identified as belonging to either SpA or MSA, with certain forms common to both varieties. For example, inflectional endings marking case and mood are used only in MSA, never in SpA, and negation relies on different sets of negation particles in SpA and MSA (Benmamoun & Albirini, 2016). On the other hand, processes of noun pluralization are similar in SpA and MSA, although in a few cases the same word may be pluralized differently in the two varieties (Saiegh-Haddad et al., 2012; Albirini, 2016).

These linguistic differences have clear implications for language development in general and for the acquisition of linguistic literacy in particular. Yet, the literature to date is almost lacking in psycholinguistic developmental research that measures (not only outlines) linguistic differences between the two varieties of Arabic in acutal use, and investigates the consequences of such differences for language acquisition and usage. One exception is a recent study measuring the lexical distance between SpA and MSA in a dialect of Palestinian Arabic used in Central Israel: about 40% of the words in the spoken lexicon of kindergarten children had completely different lexical forms in MSA; another 40% consisted of partial cognates that had overlapping yet different forms in the two varieties (with differences ranging between one-to-seven phonological parameters, including phoneme substitution, addition, and deletion); and only about 20% had the same lexico-phonological form in both SpA and MSA (Saiegh-Haddad & Spolsky, 2014). The fact that only

20% of the words used by children aged 4–6 years maintain an identical surface lexical-phonological form in MSA is a compelling result – particularly in light of the finding that children found it difficult to recognize the lexical relatedness between SpA/MSA cognates, even when the gap between the two forms consisted of a single consonant, and of further research showing an impact of distance on phonological represntations in the long-term memory(Saiegh-Haddad, 2011; Saiegh-Haddad & Haj, 2018) and phonological processing in short-term memory (Saiegh-Haddad & Ghawi-Dakwar, 2017). These findings support the results of earlier studies demonstrating the difficulty encountered by precshool children as well as by adolescnets speaking the same variety of Palestinian Arabic in reading and in operating on the phonological structure of MSA words – such as recognizing, isolating, or encoding a phoneme – when the same word had a different phonological form from that used in their SpA vernacular (Saiegh-Haddad, 2003, 2004, 2005, 2012; Saiegh-Haddad et al., 2011, 2020; Saiegh-Haddad & Schiff, 2016; Schiff & Saiegh-Haddad, 2017, 2018). These results have been shown to be related to quality of phonological representations in the lexicon (Saiegh-Haddad & Haj, 2018), and were shown to have cross-dialectal external validity (Saiegh-Haddad, 2007). Further evidence from the scant research available in this domain demonstrating the difficulty schoolchildren have with linguistic structures that do not exist in their spoken vernacular is provided by the forced-choice grammaticality judgment study of Khamis-Dakwar et al. (2012) among schoolchildren, native speakers of Palestinian SpA, when presented with MSA linguistic structures. Laks and Berman (2014) investigated morpho-syntactic differences between SpA and MSA as reflected in the speech and writing of adult native speakers of Jordanian Arabic; they found clear inter-modality linguistic differences on a range of linguistic structures, including case marking, adverbials, dual forms, copula construction, nominalizations, aspect, and modalized prepositions.

3 The Verbal System of Arabic

Verbs constitute a central lexical category as they express relations between entities and events or states. They encode semantic, morphological and syntactic information, and they determine the argument structure of sentences (Berman, 1980, 1987, 1990, 1993; Hirsh-Pasek & Golinkoff, 2006; Pine et al., 1998; Ravid, 1995, 2008; Schachter, 1985; among others).

Semitic morphology relies heavily on non-concatenative morphology, and all Semitic verbs have a consonantal root and must conform to one of the verbal patterns (templates) available in the language (Aronoff, 1994; Bat-El, 1989, 2011; Benmamoun, 2003; Berman, 1978, 1993; Bolozky, 1978; Ravid, 1990, 2008, 2011; Schwarzwald, 1981, 2002; among others). The pattern determines the phonological shape of the verb, i.e. its vowels, prosodic structure and consonantal affixes (if any). The phonological shape of the verb is essential for determining the shape of the other forms in the inflectional paradigm.

Table 1 Arabic verbal patterns

Pattern	Example	
CaCaC	ʔakal	'Eat'
CaCCaC	Farraq	'Scatter'
Ca:CaC	Sa:ʕad	'Help'
ʔaCCaC	ʔarsal	'Send'
tCaCCaC	Tfarraj	'Watch'
tCa:CaC	Tna:qaš	'Discuss with'
inCaCaC	Inkatab	'Be written'
iCtaCaC	ijtamaʕ	'Meet'
iCCaCC	Izraqq	'Become blue'
istaCCaC	istaʕmal	'Use'

There are different methods of transcribing the verbal patterns (see for example, Holes, 1995). We do not include the glottal stop consonants, except for the *ʔaCCaC* pattern, as we assume it is epenthetic. However, selecting one mode of presentation or another has no implications for the results of the study, and we adhere to one mode for the sake of uniformity

Table 1 lists the verbal patterns of PA.[3]

When examining the Arabic verbal system, including the PA verbal system discussed here, it is important to note that two paradigmatic relations are relevant: inflectional and derivational. Each one of the derivational patterns listed above has its own set of inflectional paradigms for tense/aspect, and each paradigm consists of conjugated forms according to gender, number and person (see Aronoff, 1994).[4] Such paradigms share some properties, but they are also distinct from one another. For example, while the formation of imperfective forms in all patterns is based on affixation, the vowels of the prefixes and the stems for each pattern are different.

The relations between verbs in the different patterns are derivational and are manifested mainly in transitivity alternations and other types of semantic relations (e.g., Bolozky & Saad, 1983; Fassi Fehri, 1994; Glanville, 2011; Goldenberg, 1998; Guerssel & Lowenstamm, 1996; Hallman, 2006; Henkin, 2009, 2010; Holes, 1995; Izre'el, 2010; Jastrow, 2004; Levin, 1995; Ouhalla, 2014; Ryding, 2005; Shawarbah, 2012; Younes, 2000; Watson, 2002; Wittig, 1990). The use of the same stem consonants in different patterns results in different verbs, and the semantic relations between them can be of different degrees of transparency. At the same time, verbs that are formed in certain patterns share some typical semantic and syntactic

[3] MSA consists of the same number of patterns with some morpho-phonological differences, for example *tCaCCaC* (PA) vs. *taCaCCaCa* (MSA). For purposes of uniformity, we will use the PA patterns with respect to both PA and MSA. The examples in this study are in their 3rd person masc. Past form, the citation form, which is conventionally assumed to be the base of formation throughout the inflectional paradigm as it is free of inflectional suffixes (see Bat-El, 2002; Ravid, 1995; Ussishkin, 1999; among others). However, the direction of derivation is irrelevant for the purpose of this study.

[4] The participle forms do not mark differences in person, but have only four forms that differ in gender and number.

features. For example, *CaCCaC* verbs are usually active transitive (e.g. *ʔaθθ*ar 'affect'), and their intransitive alternates are formed in *tCaCCaC* (e.g. the inchoative verb- *tʔaθθ*ar 'get affected'). The two verbs are formed in two different patterns, yet both use the same root consonants *ʔ-θ-r*.

The patterns differ in their distribution and frequency. *CiCeC*/ *CaCaC* is considered the most basic verbal pattern, hosting a large number of verbs that constitute the basic vocabulary items of MSA, as well as of many other dialects (See for example, Holes, 2004).[5] This verbal pattern does not have specific semantic-syntactic features, and it hosts active transitive verbs like *katab* 'write', *rikeb* 'ride' and *šireb* 'drink', active intransitive verbs like *miše* 'walk' and *rakadˁ* 'run', and intransitive inchoative verbs that denote a change of state, e.g. *jimed* 'freeze' and *kiber* 'grow', as well as other types of verbs. Some patterns tend to have a 'usual mate', namely another pattern, or several patterns, with which they have typical derivational relations (see Table 2). *CiCeC*/ *CaCaC* is related to *CaCCaC* in two ways. In (a) the *CaCCaC* verb is the transitive causative counterpart of the *CiCeC* intransitive inchoative verb, while in (b) the *CaCaC* verb is transitive and the *CaCCaC* verb is also transitive and denotes an intensification of the action of the verb. In (c) the same *CaCaC* verb as in (b) is in relation with an *inCaCaC*, which is inchoative. In (d) the transitive-intransitive alternation is between *CaCCaC* (transitive) and *tCaCCaC* (intransitive).

The examples in Table 2 demonstrate that *CaCCaC* is typically active and transitive, *inCaCaC* and *tCaCCaC* are typically intransitive and *CiCeC*/*CaCaC* is neutral with respect to transitivity. In addition, *CiCeC* can be derivationally related to *CaCCaC* and *tCaCCaC* we need to add another example in the table for this one, *inCaCaC* like jimed-tjammad but not *inCaCaC*, whereas *CaCCaC* is derivationally related to *CiCeC*/*CaCaC* and *tCaCCaC* but not to *inCaCaC*.[6] The picture that emerges is that the verbal patterns are organized in terms of families, where some patterns are more related to others (see Berman, 1978, 2003; Bolozky, 1978, 1999; Doron, 2003; Ravid, 1990, 2008; Ravid et al., 2016; Ravid et al., 2016; Schwarzwald, 1981, 2002, for Hebrew). It is crucial to note that such distinctions reflect strong tendencies rather than a clear-cut distribution. The derivational relations between verbs in different patterns depict many irregularities. For example, the verb *tfarraj*

Table 2 Relations between verbal patterns

Patterns	Verb1		Verb2	
a. CiCeC – CaCCaC	wiqeʕ	'fall'	waqqaʕ	'make X fall'
b. CaCaC – CaCCaC	mazaʔ	'Tear X'	mazzaʔ	'Tear X into small pieces'
c. CaCaC – inCaCaC	Kasar	'Break X'	Inkasar	'Become broken'
d. CaCCaC – tCaCCaC	ɣayyar	'Change X'	tɣayyar	'Become changed'

[5] *CiCeC* and *CaCaC* are considered the same pattern as they differ only in their vowels and they share similar inflectional paradigms.

[6] This has some exceptions, e.g. *ʃiref* 'know' and *tʃarraf* 'get to know'.

'watch' is formed in *tCaCCaC* but is active and transitive, and it does not fall into one of the typical semantic classes of this pattern (e.g. inchoative and reflexive). Derivation in patterns in Semitic languages makes a critical contribution to the structure and organization of the lexicon and provides its infrastructure (Boudelaa, 2014; Benmamoun, 2000; Ravid et al., 2016).

3.1 Traditional Classification of Arabic Verbal Patterns

Several studies offer a traditional semantic-syntactic classification of the verb patterns of MSA (see Holes, 1995; Ryding, 2005; and references therein). According to these accounts, *CaCaC* is the most basic pattern and it has three templates that vary in the vowel patterns: *a-a, a-i*, and *a-u*. The *a-a* pattern *CaCaC* refers to an action performed by an agent, and it can be either transitive (e.g. *fataħ* 'open') or intransitive (e.g. *rakadˁ* 'run'). The *a-i* pattern *CaCiC*, e.g. *xasir* 'lose' has an inchoative function. The *a-u* pattern *CaCuC* is an intransitive form that refers to the process of acquiring a particular new quality, e.g. *sˁaɣur* 'become small', related to the adjective *sˁaɣi:r* 'small'. In PA, there are just two vocalic patterns: *a-a* (e.g. *qaʃad* 'sit') and *i-e* (e.g. *fihem* 'understand'). We will relate to these two vocalic patterns as one verbal pattern throughout the paper.

CaCCaC, in which the second consonant is geminated, is active and is mostly transitive. This pattern can have an intensive/iterative and causative meaning in relation to *CaCaC* verbs. For example, the root *ħfr* 'dig' can have an active meaning in *CaCaC ħafar 'dig'*, compared to the iterative meaning of *CaCCaC ħaffar* 'dig up continuously'. Similarly, the root *rqsˁ* has a causative meaning, e.g. *raqqasˁ* 'make X dance', compared to the *CaCaC* verb *raqasˁ* 'dance'.

Ca:CaC is also mostly transitive. This pattern implies the involvement of a particular patient or another participant other than the agent, e.g. *ja:dal* 'argue with' requires the cooperation on part of a patient as a second argument.

ʔaCCaC is mostly transitive, but in some cases it can also be intransitive. As transitive, it can have a causative meaning, e.g. *ʔadxal* 'make X enter' (cf. *daxal* 'enter'). If it is intransitive, it can/may be inchoative, e.g. *ʔaðˁlam* 'become dark'.

taCaCCaC actualizes the effect of its action on its agent, so it is generally a reflexive verb, e.g. *taqarrab* 'make oneself close to'. It could be either transitive, e.g. *taʃallam* 'study', or intransitive e.g. *tasˁarraf* 'behave'.

taCa:CaC is mostly intransitive. It implies a reciprocal relationship between the participants, e.g. *tafa:ham* 'understand each other'. Many of *taCa:CaC* are derivationally related to *Ca:CaC* transitive verbs, e.g. *ka:tab* 'write to X' and *taka:tab* 'correspond'.

inCaCaC signifies the effect of the action without the presence of an agent; it is mostly an inchoative-passive verb, e.g. *inkasar* 'become broken'.

iCtaCaC is either transitive (e.g. iktašaf 'discover') or intransitive. When it is intransitive, it can be either reflexive e.g. *iɣtasal* 'wash oneself' or inchoative, e.g. *iħtaraq* 'become burned'.

iCCaCC is intransitive and is used to denote becoming colored or having physical defects, and it is considered as the rarest of patterns, e.g. *ixdˁarr* 'become green' and *iʃwarr* 'become blind in one eye'.

istaCCaC is either transitive or intransitive. It can be mostly reflexive, e.g. *istaʃadd* 'make oneself ready' or active, e.g. *istafsar* 'inquire'.

3.2 Semantic-Syntactic Relations Between Verb Patterns: A Psycholinguistic Perspective

While the literature provides a classification of the functions of Arabic verbal patterns (see Ryding, 2005), there has been relatively little research on their function as realized in actual text production. Saed (2006) examined the acquisition of the verbal system in PA in preschool children, aged 2–3, 3–4, 4–5 and 5–6 years. Based on spontaneous conversations, the study showed that in all age groups, *CaCaC* was the most prevalent pattern, followed by *CaCCaC* and then *tCaCCaC*, with a slight rise in the frequency of the remaining patterns with age. She argues that the semantic functions of causativity (*šarrab* 'make drink'), then reflexivity (*tħarrak* 'move') and inchoativity (*tkassar* 'get broken') are acquired early, between the ages of 3–4. Reciprocal verbs (*tqa:tal* 'fight each other') are acquired as late as ages 5–6 and intensive verbs (e.g., *kassar* 'break X intensively') are the second most frequently used verbs between the ages of 3–4, but become less frequent after the age of 4. Tarabani (2006) examined the distribution of PA verbal patterns in five Palestinian groups from the ages of 2–6, and then in 4th grade for comparison. The study showed that the most common pattern for all age groups was *CaCaC*, follwed by *CaCCaC*. A recent study Laks et al. (2019) examined the distribution of verbal patterns in Palestinian Arabic. The study showed that only some of the patterns are used in nnartive text production. *CaCaC* was shown to be the most productive pattern, followed by *CaCCaC* and *tCaCCaC*. The other patterns were relatively rare (see Sect. 4). Most studies that were conducted in Arabic (see Bolozky & Saad, 1983; Hallman, 2006; Holes, 1998; Saad, 1982) mainly focused on MSA. These studies revealed the semantic-syntactic features that underlie some of the systematic alternations between patterns. For example, *CaCCaC* transitive verbs alternate with *tCaCCaC* in passive, inchoative and reflexive formation (Rosenhouse, 1991–1992; Tucker, 2011; Younes, 2000). Similarly, causative verbs are mostly derived in *CaCCaC*/*ʔaCCaC* from *CaCaC* verbs (Dank, 2011; DeMiller, 1988; Ford, 2009; Ouhalla, 2014).

Research shows that the acquisition of the verbal system in Semitic lanuages is a critical milestone in the acquisition of language, because it incorporates the acquisition of derivational morphology as an organizing principle in the lexicon. Many studies have examined the acqusition of the verbal patterns in Hebrew, including use of patterns in different types of elicited texts (Armon-Lotem & Berman, 2003; Ashkenazi et al., 2016; Berman, 1980, 1993; Berman & Slobin, 1994; Berman & Ravid, 2009; Berman et al., 2011; Ravid, 1995, 2003, Ravid & Berman, 2009; Ravid et al., 2016). Hebrew has a system of five verbal patterns in addition to two

patterns that host passive verbs. It has been shown that with age, speakers-writers use a wider variety of patterns for a wider range of semantic-syntactic functions (Berman, 1993). Some studies also pinpoint age-related differences in the acquisition of the verbal patterns in Hebrew. For instance, Berman (1980, 1982, 1993) observes two stages in the acquisition of verbal patterns before children master the system and the relations between patterns (ages 5–6). The first stage is up to around the age 3, in which a single non-alternating form is used for a given concept, and with all thematic realizations of it conflated into a single pattern. For example, *ʔaxal* (*CaCaC*) 'eat'can be used to convey both 'eat' and the causative verb 'make eat', instead of *heʔexil* (*hiCCiC*), e.g., *ʔima ʔaxla oti* 'Mom ate me' instead of *ʔima heʔexila oti* 'Mom made me eat'. Later, around the fourth year, children alternate between patterns of the same root, manifesting two main types of switching – between the transitive patterns *hiCCiC* and *CiCeC* (e.g., *heʔelim – ʔilem* 'make vanish') and between the intransitive patterns *niCCaC* and *hitCaCeC* (e.g., *nirdam – hitradem* 'fall asleep').[7] This shows that children's errors during the course of acqusition do not cross transitivity boundaries, a finding that Berman interprets as indicating that children demarcate predicates according to the value of transitivity.

Research on Hebrew also shows that, at any age, *CaCaC* is the most frequent pattern for both transitive and intransitive verbs (Ashkenazi et al., 2016; Berman, 1993; Berman & Ravid, 2009), but the frequency rates of *CaCaC* verbs vary with development. *CaCaC* verbs constitute about 70% of all verb tokens in the speech of children up to 3rd grade, yet they decrease with age, whereas *hiCCiC* and *CiCeC* increase. A drastic drop in *CaCaC* was noticed between the age of 5–6 (Stansaz, 2016). The second most frequent patterns in speech and writing in Hebrew appear to be the transitive patterns *hiCCiC* and *CiCeC*, followed by the intransitive patterns *niCCaC* and *hitCaCeC*. The rarest verbs are the passive patterns *CuCaC* and *huCCaC* (Berman, 1993; Ravid et al., 2016; Ravid & Vered, 2017), which are virtually absent before the age of 3 (Ashkenazi et al., 2016).

A recent study by Ravid et al. (2016) examined the linkage between roots and derivational families in Hebrew, based on the input to toddlers. This study showed that children are exposed to far fewer verb derivational families, with most input consisting of singleton verbs, namely verbs with no root-related verb siblings in the database, and a small number of two-pattern families. Levie et al. (2020) examined the emergence and development of Hebrew verb families from infancy to adulthood. The study consisted of of spoken and written productions of Hebrew-speaking toddlers, children, adolescents and adults. It shows that roots, patterns and derivational verb families are emergent properties of the Hebrew verbal system, as it develops in communicative contexts. It is only by late adolescence and adulthood that Hebrew speakers are endowed with the morphologically diverse and rich Semitic lexicon that enables new-verb creativity. This mature lexicon has multiple

[7] Children did not use *CaCaC* instead of other patterns. Berman (1980) regards this pattern as "basic" since it is neutral with respect to transitivity.

and larger derivational verb families; and much of it is based on regular, transparent roots that are often derived from words in other lexical categories.

Given the rich verbal system of Arabic and the interesting semantic relations between the verbal patterns in this system, the current study investigates the distribution of verbal patterns, their syntactic-semantic features and relations and the occurence of morphological families in actual spoken text production by adult native speakers of Palestinian Arabic.

4 Distribution of Verbal Patterns in Narrative Texts

The current study examines the deployment of verbal patterns in narrative text production among adult native speakers in spoken PA and spoken and written MSA. We examine the semantic propreties of the verbal patterns and whether their deployment differs with respect to variety (PA vs. spoken and written MSA) and modality (spoken PA and MSA vs. written MSA).

4.1 Methodology

The study is based on data elicited in spoken and wrriten narrative text production. It is methodologically grounded in the framework of an international cross-linguistic research project on text construction, entitled "Developing Literacy in Different Contexts and Different Languages", that investigated the text construction abilities of schoolchildren and university graduate students in seven different countries (as described in Berman, 1997, 2007, 2008; Berman & Verhoeven, 2002).

4.1.1 Participants

The sample of the study consisted of 30 adult (aged 25–35) native speakers of Palestinian Arabic (17 women and 13 men), who reside in Kufur Qareʕ in central Israel, an Arabic-speaking non-mixed town. All participants were students at Hebrew-speaking universities or colleges (Arab and Jewish) in Israel.[8] None of the participants was studying the Arabic language or Linguistics.

[8] The participants in our study were monolinguals and code switching to Hebrew was minimal. As the Table below shows, Hebrew words were at most 3.83% with repect to content word types in PA and the ratio of Hebrew words was even lower in MSA, as well as with repect to word types in PA.

	PA	MSA-S	MSA-W			
	Type	Token	Type	Token	Type	Token
Content words	3.83%	1.55%	1.79%	3.11%	0.37%	0.41
Function words	1.89%	0.25%	0.48%	0.16%	0%	0%

4.1.2 Procedure

Participants were shown a silent 5-min movie depicting different scenes of unresolved interpersonal conflicts before each of two elicitation sessions, for example, a fight in school. In the first session, participants were asked to tell a story about interpersonal conflicts in PA (spoken) and in MSA (spoken and written), yielding three narratives. In the second session, they were asked to produce an expository text on conflicts between people, also in PA (spoken) and in MSA (spoken and written), yielding three expository texts. The order of text elicitation was counterbalanced to ensure data is elicited under carefully controlled conditions (Berman & Ravid, 2009) and to allow an examination of similarities and differences between modalities, MSA-S and MSA-W, and varieties, PA and MSA-S.

4.1.3 Coding

Texts were transcribed in broad phonemic transcription using CHILDES (MacWhinney, 2000).[9] All verbs were coded manually according to their pattern, root and semantic class (e.g. inchoative, causative, reciprocal) and transitivity. Coding was perfomed by one of the authors and was examined by another. The analysis excluded auxiliary verbs, which denote aspectual and modality properties and the majority of them are in the *CaCaC* pattern. For the purposes of the current study, verb types constitute verb lemmas, namely unique combinations of root and pattern yielding verbs (see Ravid et al., 2016 for detailed coding of Hebrew verbs). For example, the combination of the root *k-t-b* with the *CaCaC* pattern constitutes one verb type (*katab* 'write'), while the combination of the same root with the *tCa:CaC* pattern constitutes another type (*tka:tab* 'correspond'). Verb tokens were counted as all occurrences of inflected verb forms. Root types constitute different structural skeletons, so that all verbs sharing the same consonantal root are considered one root type.

This coding methodology provides information on (i) the frequency of each pattern by type and token; (ii) the semantic and syntactic features of each pattern and (iii) the pattern(s) typical (and atypical) of each semantic and syntactic function. Semantic classification is modelled after the categories that were used in earlier research on Hebrew, e.g. active, mental, inchoative and reciprocal verbs (see Berman, 1978, 2003; Ravid et al., 2016, and references therein). This classification is based on semantic criteria rather than morphological criteria. Transitive verbs that denote causation of change to somebody or something were classified as causatives, regardless of whether they were derived from a more 'basic' entry. Verbs were classified as inchoative if they denoted a non-volitional event that an argument underwent. Here, we did not consider whether an inchoative verb is derived from a

[9]We would like to express our deep gratitude to Bracha Nir for her assistance in coding the verbs.

transitive verb or is used as the base for the derivation of a causative verb.[10] In a few cases where verbs did not fall into one of the semantic categories, they were coded as 'other'.

4.2 Results

4.2.1 Distrinution of Verbal Patterns

Tables 3 and 4 summarize the distribution of patterns by type and token frequency and percentage out of the total number of patterns in the corpus. The PA results were reported in Laks et al. (2019), and part of the MSA results were reported in Laks and Saiegh-Haddad (2022). Here we present an integration of the results presented in previous studies together with a new set of data in MSA.

As can be seen from Tables 3 and 4 above, *CaCaC* is the most productive pattern in text production in both modalities and varieties, both in type and token. In PA, it constitutes 41% of verb types and 59% of tokens. In spoken MSA, it constitutes 34% of verb types and 50% of tokens, and in written MSA it constitutes 38% of verb types and 51% of tokens. The *CaCaC* pattern is followed in frequency by *CaCCaC* and *tCaCCaC,* which constitute between 12% and 19% of the verb types, respectively, and 7% and 12% of tokens, depending on modality and variety. The remaining patterns are less frequent, and each constitutes less than 10% of the verb types and tokens. In addition, the data in Tables 3 and 4 also shows that *iCCaCC* is not used at all, and *inCaCaC* and *istaCCaC* are very rarely used.

Table 3 Distribution of Arabic verbal patterns by variety and modality in types

Pattern	PA		MSA-S		MSA-W	
	No	%	No	%	No	%
CaCaC	102	41%	84	34%	77	38%
CaCCaC	48	19%	34	14%	24	12%
Ca:CaC	13	5%	21	8%	17	8%
ʔaCCaC	10	4%	12	5%	15	7%
tCaCCaC	29	12%	35	14%	25	12%
tCa:CaC	19	8%	21	8%	15	7%
inCaCaC	5	2%	2	1%	1	0%
iCtaCaC	19	8%	29	12%	28	14%
iCCaCC	0	0%	0	0%	0	0%
istaCCaC	6	2%	10	4%	3	1%
Total	251	100%	248	100%	205	100%

[10] We are aware of the ongoing debate on the classification of verbs as causative and of the different approaches to this question. Since the classification of other types of verbs is based only on their meaning, we thought it would be most consistent to adhere to that classification with respect to causative and inchoative verbs as well.

Table 4 Distribution of Arabic verbal patterns by variety and modality in tokens

Pattern	PA		MSA-S		MSA-W	
	No	%	No	%	No	%
CaCaC	456	59%	327	50%	196	51%
CaCCaC	86	11%	59	9%	29	7%
Ca:CaC	42	5%	56	9%	33	9%
ʔaCCaC	26	3%	24	4%	20	5%
tCaCCaC	71	9%	75	12%	42	11%
tCa:CaC	30	4%	37	6%	19	5%
inCaCaC	7	1%	3	0%	1	0%
iCtaCaC	45	6%	59	9%	42	11%
iCCaCC	0	0%	0	0%	0	0%
istaCCaC	7	1%	12	2%	5	1%
Total	758	100	652	100%	387	100%

Thus, our data shows that *CaCaC* is the most frequent pattern and hosts most basic verbs, both in PA and in MSA, spoken and written (Holes, 1995). This finding from the actual deployment of verbs in Arabic stands in contrast to studies investigating verb innovation (Laks, 2018), which demonstrate that *CaCaC* is hardly ever used in the coinage of new verbs, and that *CaCCaC* and *tCaCCaC* are used almost exclusively for this purpose.

The current data also reveals interesting variety-related differences, wherby some patterns are more typical of one variety than the other. As shown in Table 3, *CaCaC* and *CaCCaC* are more dominanat in PA than in MSA, both spoken and written. MSA texts, in contrast, demonstrate greater variation in the distribution of verbal patterns elaborated here. Finally, The *iCtaCaC* pattern is more frequent in MSA in both modalities than in PA; it constitutes 12% of verbs types in spoken MSA and 14% in written MSA, in comparison to only 8% in PA. Similarly, the *Ca:CaC* pattern constitutes 8% of the verb types in spoken and written MSA, as against 5% in PA. Similar tendencies emerge when verb tokens are considered, as shown in Table 4. As shown in Tables 3 and Table 4, no major differences between MSA-S and MSA-W were found with respect to the distribution of patterns. This shows that variety distinctions are more prominent than modality distinctions.

4.2.2 Semantic Functions Across Patterns

We examined the main semantic functions of the verbs in our corpus and their distribution across the verbal patterns: basic active verbs (*do*, *go*),[11] mental verbs (*remember*, *feel*), causative verbs (*break, destroy*) inchoative verbs (*fall*, *become dirty*), verba dicendi (verbs of utterance) (*say*, *shout*), and reciprocal verbs (*hug*, *fight*).

[11] Motion verbs are classified as active verbs in case they are agentive, e.g., *ra:ħ* 'go', or as inchoative verbs in case they denote an event that does not entail volition, e.g. *wiqeʕ* 'fall'.

Active Verbs

Tables 5 and 6 summarize the distribution of active verbs across patterns by type and token.

In PA, the most typical active verb pattern was *CaCaC*, which made up 56% of the types and 66% of tokens. Active verbs were also common in *CaCCaC*, constituting 17.5% and only 10% of types and tokens, respectively. In contrast, MSA texts displayed greater variation with respect to the distribution of active verbs in other patterns. The *tCaCCaC* pattern made up 10% of the active verb types in both written and spoken MSA. In addition, *iCtaCaC* hosted 10% and 8% of the active verbs types in spoken and written MSA, respectively. In spoken MSA, 13% and 14% of the active verb types and tokens were found in *Ca:CaC*, respectively. Other active verbs were distributed among the other patterns, with a level that ranged between 2% and 7%. Similar tendencies are also found in the distribution of verb tokens. These results mainly reveal variety-related differences. *CaCaC* and *CaCCaC* are typical of active verbs in PA, whereas other patterns, like *tCaCCaC* and *iCtaCaC*, are more typical of active verbs in MSA. In addition, *Ca:CaC* tends more typically to host active verbs in spoken MSA, especially in token count.

Table 5 Distribution of active verbal patterns by variety and modality in types

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
CaCaC	55	56%	30	42%	30	49%
CaCCaC	17	17.5%	6	8%	8	13%
Ca:CaC	6	6%	9	13%	4	7%
ʔaCCaC	3	3%	5	7%	4	7%
tCaCCaC	8	8.5%	7	10%	6	10%
tCa:CaC	3	3%	3	4%	3	5%
iCtaCaC	3	3%	7	10%	5	8%
istaCCaC	3	3%	4	6%	1	2%
Total	98	100	71	100%	61	100%

Table 6 Distribution of active verbal patterns by variety and modality in tokens

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
CaCaC	222	66%	113	59%	73	60%
CaCCaC	35	10%	11	6%	10	8%
Ca:CaC	17	5%	26	14%	10	8%
ʔaCCaC	20	6%	11	6%	5	4%
tCaCCaC	17	5%	10	5%	10	8%
tCa:CaC	3	1%	4	2%	3	2%
iCtaCaC	18	5.5%	11	6%	10	8%
istaCCaC	5	1.5%	5	3%	1	1%
Total	337	100%	191	100%	122	100%

Causative Verbs

Tables 7 and 8 below summarize the distribution of causative verbs across patterns, by type and token.

In PA, the most typical pattern of causative verbs was *CaCCaC*, whose verbs made up 63% of types and 58% of tokens. Causative verbs were also common in *CaCaC*, making up 17% and 23.5% of types and tokens, respectively. 17% of the causative verb types were also found in *ʔaCCaC*, but they made up only 13% of tokens. In contrast, MSA texts, and especially written MSA, demonstrated greater variation with respect to the distribution of causative verbs in other patterns. *CaCCaC* hosted 48% of the causative verb types in spoken MSA and only 29% in written MSA. In spoken MSA, 30% of the causative verb types were in *CaCaC*, while in written MSA there was even greater variation between *ʔaCCaC* (38%) and *CaCaC* (24%). Similar tendencies were also found with respect to tokens, as shown in Table 8. We demonsrate such variety-related differences below with respect to the expression of causativity. As shown in (1), the same participant used the root *f-h-m* 'understand' in two different patterns to denote the causative verb 'make understand', using *CaCCaC* in PA but *aCCaC* in MSA.

(1) a. **PA**: u-**fahhamtoh** inno: ha:ðˁa il-iʃi ɣalatˁ
'I made him understand that thing is wrong'
b. **MSA-S**: fa-**ʔafhamtuhu** wijhat naðˁari:
'I made him understand my point of view'
c. **MSA-W**: wa-**ʔafhamtuhu** wijhat naðˁari:
'I made him understand my point of view'

Table 7 Distribution of causative verbal patterns by variety and modality in types

Pattern	PA		MSA-S		MSA-W	
	No	%	No	%	No	%
CaCaC	5	17%	8	30%	5	24%
CaCCaC	19	63%	13	48%	6	29%
Ca:CaC	1	3%	1	4%	1	5%
ʔaCCaC	5	17%	5	19%	8	38%
tCaCCaC	0	0%	0	0%	1	5%
Total	30	100%	27	100%	21	100%

Table 8 Distribution of causative verbal patterns by variety and modality in tokens

Pattern	PA		MSA-S		MSA-W	
	No	%	No	%	No	%
CaCaC	13	23.5%	12	29%	6	21%
CaCCaC	32	58%	16	38%	8	29%
Ca:CaC	3	5.5%	4	10%	3	11%
ʔaCCaC	7	13%	10	24%	10	36%
tCaCCaC	0	0%	0	0%	1	4%
Total	55	100%	42	100%	28	100%

Mental Verbs

Mental verbs refer to a group of verbs that express the cognitive, affective and perceptive processes. Mental verbs can be found in various verbal patterns. Tables 9 and 10 summarize the distribution of mental verbs across the different patterns.

Table 9 shows that most mental verbs surfaced in *CaCaC* in both modalities and varities. This basic pattern hosted 43% of the verb types in PA, 39% in spoken MSA and 46% in written MSA. The second most typical pattern of mental verbs used in PA was *tCaCCaC*, whose verbs made up 22% of types and 20% of tokens. In contrast, this pattern was less frequent in MSA, where mental verbs in this pattern constitued 8% and 13% of verb types in spoken and written texts, respectively. Similarly, *tCaCCaC* mental verbs constitued 9% and 10% of verb tokens in spoken and in written MSA, respectively. Some *Ca:CaC* mental verbs surfaced in MSA, 11% of the verb types in spoken MSA texts and 15% in written MSA texts, in contrast with no such occurrences in PA. A few mental verbs also surfaced in *istaCCaC* in MSA, constituting 8% of the verb types in spoken MSA texts and 5% in written MSA texts, in contrast to no such occurrences in PA. Mental verbs were common in *CaCCaC* in the spoken modality. *CaCCaC* mental verbs acoounted for 16% and 17% of the verb types is PA and spoken MSA, respectively, in contrast to only 5% in written MSA. Similar tendencies were also found with regard to tokens as shown in Table 10.

Table 9 Distribution of mental verbal patterns by variety and modality in types

Pattern	PA No %		MSA-S No %		MSA-W No %	
CaCaC	16	43%	14	39%	18	46%
CaCCaC	6	16%	6	17%	2	5%
Ca:CaC	0	0%	4	11%	6	15%
tCaCCaC	8	22%	3	8%	5	13%
tCa:CaC	0	0%	1	3%	0	0
iCtaCaC	7	19%	5	14%	6	15%
istaCCaC	0	0%	3	8%	2	5%
Total	37	100%	36	100%	39	100%

Table 10 Distribution of mental verbal patterns by variety and modality in tokens

Pattern	PA No %		MSA-S No %		MSA-W No %	
CaCaC	68	57%	60	58%	45	58%
CaCCaC	13	11%	15	15%	3	4%
Ca:CaC	0	0%	7	7%	11	14%
tCaCCaC	24	20%	9	9%	8	10%
tCa:CaC	0	0	1	1%	0	0
iCtaCaC	14	12%	8	8%	7	9%
istaCCaC	0	0%	3	3%	4	5%
Total	119	100	103	100%	42	100%

Verba Dicendi

Verba dicendi refers to all words that express speech or introduce particular quotations, e.g. to tell, and so they convey verbal content to an addressee.

Tables 11 and 12 below summarize the distribution of verba dicendi across patterns with respect to verb types and tokens.

In PA, the typical pattern of verba dicendi was *CaCaC,* making up 55% of types, compared to just 36% and 46% in spoken and in written MSA, respectively. In contrast, MSA texts showed greater variation with respect to the distribution of verba dicendi across the other patterns. In spoken MSA, the *CaCCaC* pattern demonstrated a higher occurence of 21% of the all verb types, in comparison with just 5% and 14% in PA and in written MSA, respectively. In written MSA, the *istaCCaC* pattern was more frequent, with 17% of verb types, compared to 5% in PA and no single occurrence in spoken MSA. Variety-related differences were more dominant with respect to tokens, as shown in Table 12. Ninety-two percent of the verb tokens were in *CaCaC* is PA, in contrast to only 59% and 56% is spoken and written MSA, respectively.

Table 11 Distribution of verba dicendi verbal patterns by variety and modality in types

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
CaCaC	11	55%	12	36%	15	43%
CaCCaC	1	5%	7	21%	5	14%
ʔaCCaC	2	10%	2	6%	1	3%
tCaCCaC	1	5%	7	21%	3	9%
iCtaCaC	4	20%	5	15%	5	14%
istaCCaC	1	5%	0	0%	6	17%
Total	20	100%	33	100%	35	100%

Table 12 Distribution of verba dicendi verbal patterns by variety and modality in tokens

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
CaCaC	118	92%	84	59%	40	56%
CaCCaC	1	1%	13	9%	5	7%
ʔaCCaC	2	1%	3	2%	1	1%
tCaCCaC	1	1%	29	9%	5	7%
iCtaCaC	5	4%	13	9%	13	18%
istaCCaC	1	1%	0	0%	8	11%
Total	128	100%	142	100%	72	100%

Inchoative Verbs

Tables 13 and 14 below summarize the distribution of inchoative verbs across patterns according to type and token.

Table 13 shows that *CaCaC* is the most productive inchoative verb pattern, followed by *tCaCCaC*, whereas the other patterns are relatively rarely used for this semantic function. The distribution of inchoative verbs demonstrates both variety and modality-related differences. *CaCaC* is far less productive in hosting inchoative verbs in PA, whereby only 28% of inchoative verb types surface in this pattern in PA, in comparison with 44% in spoken MSA and 58% in written MSA. This difference is even greater when tokens are considered, where *CaCaC* inchoative verbs constitute 33% in PA, 56% in spoken MSA and 70% in written MSA. *CaCaC* is a far more productive form of inchoative verbs in written MSA than in PA, with spoken MSA falling in between. The distribution of inchoative verbs in *tCaCCaC* demonstrates modality-related differences. *tCaCCaC* inchoative verbs make up 21% of all verb types in PA, 26% in spoken MSA and only 11% in written MSA. The low productivity of *tCaCCaC* inchoative verbs in written MSA is even more prominent in terms of tokens, where only 5% of the verb tokens surface in *tCaCCaC*, in

Table 13 Distribution of inchoative verb patterns by variety and modality in types

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
CaCaC	8	28%	15	44%	11	58%
CaCCaC	3	10.33%	0	0%	0	0%
tCaCCaC	6	21%	9	26%	2	11%
tCa:CaC	3	10.33%	3	9%	1	5%
inCaCaC	5	17%	2	6%	1	5%
iCtaCaC	3	10.33%	3	9%	4	21%
istaCCaC	1	3%	2	6%	0	0%
Total	29	100%	34	100%	19	100%

Table 14 Distribution of inchoative verb patterns by variety and modality in tokens

	PA		MSA-S		MSA-W	
Patterns	No %		No %		No %	
CaCaC	15	33%	43	56%	28	70%
CaCCaC	3	6.5%	0	0%	0	0%
tCaCCaC	12	26%	11	14%	2	5%
tCa:CaC	3	6.5%	9	12%	3	8%
inCaCaC	7	15%	3	4%	1	3%
iCtaCaC	5	11%	8	10%	6	15%
istaCCaC	1	2%	3	4%	0	0%
Total	46	100%	77	100%	40	100%

contrast with 14% in spoken MSA and 26% in PA. The distribution of inchoative verbs in *inCaCaC* demonstrates variety-related differences. As we showed, *inCaCaC* is generally more common in PA than in MSA, and here this is manifested with respect to the expression of inchoativity. 17% of inchoative verb types and 15% of tokens surface in *inCaCaC* in PA, in comparison to 6% and 4% in spoken MSA, and 5% and 3% in written MSA. PA demonstrates greater variation with respect to the distribution of inchoative verbs within patterns. 10.33% of inchoative verb types surface in *CaCCaC* in PA, while this pattern does not host such verbs in either spoken or written MSA. A few inchoative verbs surface in *istaCCaC* in PA or spoken MSA (3% and 6% of verb types, respectively), in contrast with no such occurrences in written MSA.

Reciprocal Verbs

Tables 15 and 16 below summarize the distribution of reciprocal verbs across patterns, according to type and token.

Table 15 shows that most reciprocal verbs surface in the *tCa:CaC* pattern, regardless of variety or modality distinctions. *tCa:CaC* verbs constitute 83% of reciprocal verb types in PA, 68% in spoken MSA and 90% in written MSA. Only 1–4 reciprocal verb types surface in *iCtaCaC*, or 10–27% of all reciprocal verb types. A similar tendncy is observed in tokens, though to a lesser extent, where reciprocal verbs in *iCtaCaC* constitute between 27% and 32% of verb tokens. Spoken MSA demonstrates greater variation with more verb types and tokens in *iCtaCaC* in comparison with PA or with written MSA.

Table 15 Distribution of reciprocal verb patterns by variety and modality in types

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
tCa:CaC	10	83%	11	73%	9	90%
iCtaCaC	2	17%	4	27%	1	10%
Total	12	100%	15	%	10	100%

Table 16 Distribution of reciprocal verb patterns by variety and modality in tokens

	PA		MSA-S		MSA-W	
Pattern	No %		No %		No %	
tCa:CaC	13	72%	15	68%	11	73%
iCtaCaC	5	28%	7	32%	4	27%
Total	18	100%	22	100%	15	100%

Table 17 Distribution of root related verbs by variety and modality in types

Pattern	PA		MSA-S		MSA-W	
	No	%	No	%	No	%
One pattern	169	83%	144	76%	143	83%
Two patterns	28	13.5%	37	19%	26	15%
Three paterns	6	3%	6	3%	2	1%
Four patterns	1	0.5%	2	1%	1	1%
Total	204	100%	189	100%	172	100%

4.2.3 Root-Related Verbs

We now turn to examining relations between verbs that share the same consonantal root. Table 17 presents the distribution of roots with respect to the number of patterns in which they surface in our data.

As can be seen in Table 17, the instances in which two or more verbs shared the same consonantal root and were formed in different patterns were relatively rare in all varieties and modalities. The great majority of all verb types (83%) surfaced in just one pattern both in PA and in written MSA, in comparison with 76% in spoken MSA; Spoken MSA demonstrated greater variation in this respect. Out of the roots that surfaced in more than one pattern, the majority surfaced in 2 patterns, 13.5% in PA, 19% in spoken MSA and 15% in written MSA. Roots that surfaced in more than two patterns were exteremely rare in all text types as well, constituiting between 0.5% and 3% of all roots types.

Of the verb roots with more than one pattern, 80% (28/35) were semantically related in PA, 82% (37/45) in spoken MSA, and 93% (27/29) in written MSA. These semantic relations were manifested mostly in transitivity alternations like causative/inchoative, e.g. *ʔaθθ*ar 'affect' – *tʔaθθ*ar 'get affected' and *ʔanha 'end X'* – *intaha 'end'*, and transitive-active/reciprocal, e.g. *dˁarab* 'hit' – *tadˁa:rab* 'hit each other'. Cases of verb roots hosted in more than one pattern, yet with no semantic relation, were relatively rare in all varieties and modalities, especially in written MSA. For example, in PA the root *s-b-b* was used in *CaCaC*, denoting 'curse', and in *CaCCaC*, denoting 'cause', and in written MSA the root *ħ-d-θ* was used in *CaCaC*, denoting 'happen', and in *tCaCCaC*, denoting 'speak with'.

5 Discussion

While most studies of the Arabic verbal sysem and their morpho-phonological and semantic-syntactic properties have focused on MSA (e.g., Benmamoun, 2003; Henkin, 2009; Holes, 1995; Younes, 2000), this study examined the deployment of verbal patterns as they are used in narrative text production among adult native speakers. The study compares the use of verbal patterns in light of Arabic diglossia by comparingthe two Arabic varieties: Spoken or Colloquial Arabic versus MSA, as well as in the two modalities of MSA: spoken MSA versus written MSA.

Linguistic proficiency in Arabic diglossia entails proficiency in the use of Spoken Arabic for everyday speech and MSA for formal speech and writing. Hence, mastery of the verbal system of Arabic means mastery of these systems as they are used in the two varieties and this includes mastery of a wide range of morpho-phonological and semantic-syntactic knowlege: (i) the inflectional paradigm of each pattern; (ii) the semantic-syntactic features of each pattern; and (iii) the derivational relations (if any) between the different patterns. Thus, examining how verbs are deployed in actual text production in this morphologically rich context can shed light on various aspects of speakers'linguistic knowledge as well as on the structure and content of the Arabic mental lexicon. Variety-related and modality-related differences in the deployment of verbal patterns and their semantic and syntactic features can serve as a window on variety- and modality-based distinctions in actual language use in general.

The study examined the distribution of verbal patterns and their semantic properties as they are realized in narrative text production, and the extent to which pattern deployment is sensitive to variety (PA versus MSA: written and spoken) and to modality (PA and spoken MSA versus written MSA). The results from our corpusof 90 texts produced by 30 adult Arabic speakersin three conditions: PA, MSA-spoken and MSA-written (30 texts per condition), reveal some interesting differences in the distribution of some patterns by variety and modality. Before we discuss these results, one finding is noteworthy and this consititutes in the observation that in the Arabic verbal system consisting nine potentially active patterns, only three, *CaCaC*, *CaCCaC* and *tCaCCaC*, are relied upon in actual text production, and *CaCaC* is the most dominant among them.

The results showed that the most frequent pattern in use in the data is *CaCaC*. This pattern is considered in the literature as the most basic pattern of verbs hosting the basic Arabic vocabulary items in the language (e.g., Holes, 1995; Watson, 2002). This pattern is also described in the literature as not carrying specific semantic functions and as neutral with respect to transitivity, as it hosts both transitive and intransitive verbs of all types. In accordance with this finding, the results from our corpus show that *CaCaC* hosts a variety of verb types. As such, except for reciprocal and reflexive functions, there was no semantic function that could not be represented in *CaCaC*. Hence, the picture that emerges from the behavior of this pattern in actual text production is that *CaCaC* functions as the most basic linguistic device in narrative text production by adult native speakers.

The frequent usage of *CaCaC* verbs in text production in PA stands in sharp contradiction with the productivity of this pattern in the formation of new verbs in this same variety. For instance, Laks (2018) showed that out of the ten PA verbal patterns, only two were highly active in the formation of new verbs: *CaCCaC* and *tCaCCaC,* but not *CaCaC*. In this study, 163 examples of new verbs were collected that are based mostly on loanwords and on existing PA nouns and adjectives.[12] For

[12] The main collection method relied on volunteer native speakers who documented the use of new verbs in their environments. Other data was based on online searches. Some of the new verbs collected in one of these ways came into regular use, while others are examples of a single occurrence. Importantly, both types show the same criteria in pattern selection, namely verbs were formed in *CaCCaC* and *tCaCCaC*.

example, the verb *massaj* 'sent a text message' is formed in *CaCCaC* based on the English word *message*, and the reflexive verb *tmakyaj* 'put makeup on' is formed in *tCaCCaC* based on the French word *maquillage*. The study showed that **116** verbs (71%) were formed in *CaCCaC* and 39 (24%) in *tCaCCaC*. Only 7 verbs (4%) were formed in *CaCaC* and one verb (<1%) in *inCaCaC*. New verb formation in *CaCaC* happened only in rare cases of phonological similarity between the base and the derived verb. The low productivity of *CaCaC* in verb innovation, as against *CaCCaC* and *tCaCCaC,* is explained by a morpho-phonological constraint (Laks, 2018). *CaCaC* verbs demonstrate prosodic alternations throughout their inflectional paradigms, as in syllabic structure alternations in different tense forms (e.g. *ka.tab* 'he wrote' – *yuk.tu*b 'he will write/ he writes (imperfective form)'). In contrast, the syllabic structure of other patterns remains intact throughout the inflectional paradigm (e.g. *naf.faz* 'he committed' – *ye.naf.fez* 'he will commit/he commits'). This is a constraint on derivation reducing the degree of productivity in novel word formation from *CaCaC* as against *CaCCaC* or *tCaCCaC*. In addition, *CaCCaC* and *tCaCCaC* are the only patterns that can host verbs with more than three stem consonants (e.g. *kahrab* 'electrify', *tkahrab* 'get electrified', both derived from the noun *kahraba* 'electricity') as they entail a geminate consonant. Altogether, these properties might explain why *CaCCaC* and *tCaCCaC* take over as the patterns that are used for the formation of new verbs, while *CaCaC* verbs remain a closed set of basic vocabulary items that surface heavily in actual language production. Interestingly, similar results were reported for Hebrew. In Hebrew, only 2 patterns (*CiCeC* and *hitCaCeC*)[13] were found to be highly active in the formation of news verbs (see Bat-El, 1994, 2017, 2019; Berman, 1978, 1993; Bolozky, 1978, 1999, 2005; Ravid, 1990, 2003, 2004; Schwarzwald, 1981, 1996, 2008; Ussishkin, 1999; among others)[14]; whereas *CaCaC* is the pattern that is predominant in actual language production.

The current study also showed that *tCaCCaC* and *CaCCaC* were the second most frequent patterns in actual use. These two patterns are also far more frequent than the remaining patterns observed in our corpus in both varieties and modalities, and this aligns with their status as the most productive patterns in the formation of new verbs.

To sum up, the picture that emerges from the examination of verb distribution in PA and MSA narrative texts, is that one verbal pattern (*CaCaC*) hosts the majority of basic and common verbs in the language and is used for most semantic functions. This predominant pattern is followed in frequency of use by two additional patterns: *CaCCaC* and *tCaCCaC,* which have also been shown to be productive in verb

[13] Note that Modern Hebrew *CiCeC* is a descendant of earlier Biblical Hebrew *CiCCeC*, the equivalent of Arabic *CaCCaC*, with a geminate consonant which disappeared from Modern Hebrew verbs. Similarly, Hebrew *hitCaCeC* is the equivalent of Arabic *tCaCCaC* with rather similar syntactic and semantic properties.

[14] Hebrew *hiCCiC* pattern is also used for the formation of verbs in cases where the base begins with a consonant cluster. The formation of *hiCCiC* is more faithful to the base (Bolozky, 1978, 1999, 2005).

innovation (Laks, 2018). The remaining patterns are far less frequent, and some are hardly used at all. As observed in Laks et al. (2019), this reveals a sharp contrast between (i) the existing morphologically rich system that theoretically allows the realization of any consonantal root in any pattern, yielding a variety of verb types; and (ii) a much smaller system of verb types that is actually realized in a restricted number of patterns. This contrast between the potential of the verbal pattern system in generating verbs, and its actual realization both in spoken and written text production and in the formation of new verbs, has important implications for the psycholinguistics of verbal patterns in acquisition and processing (Tallas et al., submitted).

With resect to semantic functions, our study shows that most of the semantic functions of verbs are realized in 1–3 patterns in both modalities and varieties, especially in *CaCaC*, with the exception of reciprocal verbs. The lack of transparent form-function relations between patterns within the verbal systems of both PA and MSA is also manifested in the fact that in the majority of cases, verbs consisted mostly of single roots hosted in single patterns. Less than a quarter of the roots surfaced in more than one pattern, and mostly in just two patterns in both varities and modalities (see Laks et al., 2019 for a detailed discussion of PA roots). Similar results were reported in Ravid et al. (2016) for Hebrew in a corpus of parental input. This stands in contrast to the way the verbal patterns are described in the literature (see for example, Holes, 1995; Ryding, 2005), where the root is perceived as an essential element that relates verbs and where the formation of the same root in different patterns represents predictable semantic relations.

In addition to investigating the general distribution of patterns and their semantic fucntions, the study also addressed variety-related differences in actual use of the different patterns. The results revealed that the distribution of verbal patterns can serve as a diagnostic tool differentiating between the two major varieties of Arabic: PA and MSA. In general, MSA texts: both spoken and written demonstrated greater variation in the distribution of verbal patterns than PA. Also, *CaCaC* was generally more frequent in PA than in MSA, while *Ca:CaC* and *iCtaCaC* were more frequent in MSA than in PA.

Variety-related differences in the distribution of verbal patterns were also reflected in the distribution of semantic functions across patterns. One of the most dominant variety-related difference was in the distribution of verba discendi. In PA, 70% of the verba discendi types surfaced in *CaCaC*, in comparison to just 36% and 43% in spoken and written MSA, respectively. This finding was even more prominent with respect to tokens, where 96% of verba discendi surfaced in *CaCaC,* in comparison with 59% and 56% in spoken and written MSA, respectively. Verba discendi in MSA surfaced in a greater variety of patterns, and primarily in *CaCCaC*, *tCaCCaC* and *iCtaCaC*.

With respect to mental verbs, *CaCaC* was found to host most of them across all text types, but PA demonstrated a greater use of mental verbs in *tCaCCaC* in contrast with a greater use of *iCtaCaC* and *istaCCaC* mental verbs in MSA.

The distribution of causative verbs revealed greater variation in MSA. In PA, *CaCCaC* causative verbs were more common than in MSA, both in types and tokens. MSA demonstrated greater deployment of *CaCaC* and *aCCaC* verbs.

Inchoative verbs also demonstrated variety related differences. PA inchoative verbs demonstrated greater variation, with a distribution of 26% of verb types in CaCaC, 21% in *taCaCCaC*, 18% in *inCaCaC* and the rest with lower percentages among other patterns. In MSA, in contrast, the majority of inchoative verb types surfaced in *CaCaC*, 44% in spoken texts and 58% in written texts. The function of inchoativeness showed a stronger relation to one pattern in MSA, namely *CaCaC*.

To conclude, most semantic functions were found to be primarily represented in *CaCaC* verbs, but the extent to which they were represented in this pattern in comparison to other patterns differed between PA and MSA. Except for inchoative verbs, MSA generally demonstrated greater variation in the distribution of semantic functions across patterns, as most semantic functions could be expressed in a greater variety of patterns.

With respect to modality-related differences, the results reveal less variation than variety-related differences. In most cases, the distribution of verbal patterns across semantic functions in spoken MSA was more similar to written MSA than to PA. However, there were cases where spoken MSA showed greater resemblace to PA as spoken modalities. Mental verbs were more frequent in *CaCaC* in the written modality; they constituted 46% of verb types in written MSA, in comparison to 39% in spoken MSA and 37% in PA. *CaCCaC* mental verbs, in contrast, were more common in the spoken modality, especially in spoken MSA (17%) and in PA (14%), in comparison to only 5% of the verb types in written MSA.

The results above imply a possibly special status of spoken MSA, as an intermediary category between PA and written MSA, sharing modality features of distribution with the former and variety features with the latter. This, for instance, was demonstrated in the distribution of mental verbs which were more frequent in *CaCCaC* in both PA and spoken MSA than in written MSA. The distribution of inchoative verbs also demonstrated some modality realted differences, whereby *tCaCCaC* verbs were more frequent in PA and spoken MSA than in written MSA. Finally, 42% of all active verb types surfaced in *CaCaC* in spoken MSA in contrast to 54% in PA and 49% in written MSA. In the same way, *Ca:CaC* active verbs were more frequent in spoken MSA, constituting 13% of the verb types, in contrast to 8% in PA and 7% in written MSA. Similar tendencies were observed in token counts.

To sum up, the results reported in this chapter shed light on variety and modality differences in the distribution of verbal patterns in text production in PA and in MSA. These differences can be used as diagnostic measures of the differences between Arabic modalities and varieties. Further studies should examine other grammatical aspects, e.g. the distribution of nominal and adjectival patterns, in order to see if they also reflect such variey and/or modality-related differences. The most noticable morphological differences were found between varieties rather than between modalities, reflecting the remarkable disparity in language deployment between the two varieties of Arabic. In other words, based on the deployment of

verbal patterns and on their semantic properties, the results indicate that spoken MSA and written MSA pattern more closely together as one variety, different from PA. At the same time, morphological differences are more prominent when PA is compared with written MSA, yet spoken MSA appears, at least on some of the features, to pattern in between the other two.

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