ACQUISITION OF ISRAELI HEBREW AND PALESTINIAN ARABIC: A REVIEW OF CURRENT RESEARCH[*]

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A B S T R A C T

The article concerns features of Israeli Hebrew and Palestinian Arabic, two contemporary Semitic languages spoken in the same geographic region. It reviews the complex situation of linguistic diglossia in these two languages as the sociolinguistic context in which each is acquired as a first language by children growing up in Israel. In psycholinguistic perspective, the article considers the impact of literacy on register distinctions and metalinguistic awareness in child language acquisition in general and in these two languages in particular. Empirical studies of children's developing knowledge of the consonantal root as the basis for new-word formation are reviewed as evidence for the interaction between universally shared, general processes of language acquisition and the typologically specific and language-particular tasks faced by children acquiring a Semitic language like Israeli Hebrew or Palestinian Arabic.

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ACQUISITION OF ISRAELI HEBREW AND PALESTINIAN ARABIC: A REVIEW OF CURRENT RESEARCH

1. INTRODUCTION

The paper concerns acquisition of two languages which serve as the first language of Hebrew- and Arabic-speaking children growing up in Israel. Its frame of reference is developmental psycholinguistics, a field of research which became established in the 1960s as a result of developments in cognitive psychology and linguistic theory. Research in this field investigates how children acquire their native language from the initial period of prelinguistic babbling across the preliterate stages of single-word utterances, early morpho-syntax and simple-clause structure, at the one extreme, to school-age, literacy-related development of discourse abilities in speech and writing, at the other. This is in essence an interdisciplinary domain of inquiry, since it has recourse to ideas and methods from different branches of psychology — cognitive, developmental, and social – as well as from the various areas of linguistics — syntax, morphology, lexicon, and discourse studies. The present study focuses on morphological and lexical development from the dual perspective of the impact of linguistic universals and of target language typology in acquisition.

A sociolinguistically oriented motivation for our study is to compare the complex nature of linguistic diglossia as manifested in the two languages dealt with here. (Section 2). From a psycholinguistic perspective, we then consider the impact of literacy on register distinctions and metalinguistic awareness (Section 3). And we examine the typological particularities of the task faced by children learning Hebrew or Palestinian Arabic as a first language by reviewing empirical studies among children from preschool through gradeschool age in acquisition of three areas of linguistic knowledge -- the

consonantal root, orthographic representations, and morphological processes of affixation (Section 4). An underlying motif, as noted, will be to compare shared, universal properties of language learning among children across the languages of the world with uniquely Semitic acquisitions. We hope to demonstrate that in acquiring a Semitic language, children are from very early on attuned to typologically peculiar properties of their target languages, despite the impact of universal psycholinguistic factors such as perceptual saliency or semantic transparency in the mapping of form-meaning relations.

The database considered here derives from Israeli Hebrew and Palestinian Arabic, two contemporary languages spoken in the same geographic region. Recent years have seen a flourishing of psycholinguistic research on acquisition of Israeli Hebrew as a first language. A survey of research on acquisition of Hebrew conducted in the early 1980s[1] listed three doctoral dissertations[2], about a dozen Masters' theses, and no more than 20 published articles on the topic. An article on the same subject published some 15 years later lists nearly double that amount of published studies, including books covering a rich spectrum of issues, from inflectional morphology and the lexicon to narrative discourse.[3]

Far less material is available on children's acquisition of contemporary Arabic. An extensive search of the literature revealed that other Semitic languages which are in current spoken usage and so are also relevant to preschool or "natural" language

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[1] See R.A. Berman, "Acquisition of Hebrew" in D. I. Slobin, *The Crosslinguistic Study of Language Acquisition,* Hillsdale, NJ: Erlbaum, 1985, pp, 255-371, also published as a separate monograph.

[2] Two of these were written in Hebrew at the Hebrew University, Jerusalem (A. Bar-Adon, *lešonam ha-meduberet šel ha-yeladim be-yisrael.*[Children's Hebrew in Israel], 2 volumes, 1959, and Y. Levy, *ha-min bi-sfat ha-yeladim: mexkar bi-rexišat sfat ha-em.* [Gender in child language: A study in acquisition of the first language], 1980), and one was submitted in English to the University of Illinois, Urbana (E. Bentur, *Some effects of orthography on the linguistic knowledge of Modern Hebrew speakers,* 1978).

[3] See R.A. Berman (1997). *iyun u-mexkar bi-rexišat ha-ivrit ki-sfat em.* [Studies in Hebrew acquisition] In Y. Shimron, ed. *Mexkarim ba-psixologiya šel ha-lašon ve-ha-kria be-yisrael* [Studies in the psychology of language and reading in Israel] . Jerusalem: Magness, 57-100.

acquisition, for example, Amharic and Aramaic, have not been the topic of any child language research at all. Research on the Arabic spoken by children, including Palestinian Arabic, is also regrettably sparse, and is only now beginning to develop. To date, studies on the acquisition of Arabic include a book on Egyptian Arabic[4], and a few unpublished doctoral dissertations[5], and there is also some work comparing Bedouin children's narratives to those of adults[6]. The single domain which to date has given rise to substantial psycholinguistic research on Arabic is noun pluralization. These include non-developmentally oriented studies on the representation and organization of plurals in Algerian Arabic in non-brain-damaged and aphasic adults, and computer simulations of morphological acquisition in neural network models from a connectionist perspective[7]. Experimental investigation of acquisition of plural nouns in Palestinian Arabic is reported in papers by the second author of this article with a native speaker of Palestinian Arabic [8].

Despite the relative lack of empirical studies on acquisition of Arabic as a first language (hence of spoken Arabic), we consider it critical to include Arabic in our

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[4] See M. Omar (1973). *The acquisition of Egyptian Arabic as a native tongue.* The Hague: Mouton.

[5] These are studies submitted to universities in the United States and Great Britain which deal with children's learning of word-formation in Standard Moroccan Arabic (F. Badri, "Acquisition of lexical derivation rules in Moroccan Arabic", University of California, Berkeley, 1983), with language comprehension in Saudi Arabic (A. Al-Akeel, "The acquisition of Arabic language comprehension by Saudi children", University of Newcastle upon Tyne, 1998), and a metalinguistic study comparing Arabic-speaking children and adults (B. Idrissi-Bouyahyaoui, "Metalinguistic awareness in Arabic speaking literate and illiterate children and adults: A psycholinguistic study", University of Edinburgh, 1987

[6] These are two studies written by an Israeli researcher, R. Henkin: "Negev Bedouin and sedentary Palestinian narrative styles". In S. Izre'el & S. R Raz eds. *Israel Oriental studies XVI: Studies in modern Semitic languages.* NY: Brill, 1996, pp. 169-191, and "Narrative styles of Palestinian Bedouin adults and children", published in *Pragmatics,* 8, 1998, pp. 47-78.

[7] Reference is, respectively to: Z. Mimouni., E. Kehayia, & G. Jarema, "The mental representation of singular and plural nouns in Algerian Arabic as revealed through auditory priming in agrammatic aphasia patients. *Brain and Language* 61, 1998, pp. 63-87 and a study by K. Plunkett & R. C. Nakiss, "A connectionist model of the Arabic plural system." *Language and Cognitive Processes,* in press.

[8] The two articles by D. Ravid and R. Farah are "Rule and rote in the acquisition of Palestinian Arabic noun plurals", in Aksu-Koc, E. Erguvanli-Taylan, A. Sumru Ozsoy & A. Kuntay (eds.). *Perspectives on language acquisition.* Istanbul: Bogazici University Press, 1998, pp. 31-45 and "Learning about noun plurals in early Palestinian Arabic". *First Language,* 19, 1999, pp. 187-206.

review, in order to provide a more general perspective on such questions as linguistic change, empirical research in child language, and the role of linguistic typology. With regard to the first issue, scholars approaching the topic from very different perspectives have suggested that Modern Israeli Hebrew has lost many if not all of its Semitic features [9], so that today some researchers tend to associate Israeli Hebrew with what is termed "Standard Average European"[10]. As against such proposals, the Semitic scholar Blau has shown that in the course of modernization, Modern Hebrew and Modern Standard Arabic have in fact undergone many similar and even parallel processes of change from their classical origins [11]. This makes it critical to refer to both Hebrew and Arabic, the major remaining spoken languages of Semitic origin, as the basis for our analysis. Palestinian Arabic and Israeli Hebrew are particularly relevant in this respect, since the two languages co-exist side by side geographically and culturally as mother tongues in the Israel of today.

A second consideration is that Palestinian Arabic is, to the best of our knowledge, the only variant of Arabic which is currently studied among young monolingual speakers *in situ*, that is, in a situation where both the subjects of the research (preschool and schoolage children) and those conducting the fieldwork (research students and scholars) not only know the language natively but live and work in the country where the language is acquired and used as a first and dominant language. Besides, findings that have emerged since the anglocentric orientation of developmental psycholinguistics as well as

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[9] The two studies which, as noted, reach not dissimilar conclusions in this (but not necessarily in other) connection based on radically different premises, are H. Rosen's *Textbook of Israeli Hebrew,* Chicago, Chicago University Press, 1966 and P. Wexler's *The schizoid nature of Modern Hebrew*: *a Slavic language in search of a Semitic past.* Wiesbaden: Otto Harassowitz, 1990.

[10] The term is taken from a crosslinguistic typological study edited by J. van der Auwera, *Adverbial constructions in the Languages of Europe.* Berlin: Mouton de Gruyter, 1998.

[11] J. Blau, J. *The Renaissance of Modern Hebrew and Modern Standard Arabic: Parallels and differences in the revival of two Semitic languages.* University of California Publications in Near Eastern Studies 18. Berkeley: University of California Press, 1981

general linguistics in the 1960s highlight the importance of crosslinguistic research both within and across language families. Research in progress on developing text production abilities of children from different languages with which the two authors are involved confirms prior research demonstrating the value of comparing closely related languages (Icelandic and Swedish, French and Spanish). So, too, careful comparison of selected features in the acquisition of Israeli Hebrew and Palestinian Arabic should throw light on important similarities and differences in how they are acquired.

2. SOCIOLINGUISTIC BACKGROUND

Both Israeli Hebrew and Palestinian Arabic show a marked distinction between the forms and structures of everyday spoken usage, on the one hand, and the more literate register of academic prose and other formal written discourse, on the other. Clearly, they are not the only languages which do so. Such differentiation is true to a greater or lesser extent of all languages with a long and well-established history of literate usage. For example, Modern English reveals a strong contrast in both linguistic structure and language usage between its everyday, largely native Germanic vocabulary, and the more sophisticated or learned items derived from the Graeco-Latinate lexicon, with the latter being typically later, school-age, literacy-related acquisitions[12]. French provides another example, since it reveals marked differences between the everyday language spoken by educated speakers of the prestigious standard dialect compared with the structures and forms of usage described in French grammars and prescribed in French

[12] Research in this area includes: J. M. Anglin's monograph, *Vocabulary development: a morphological analysis, Society for Research in Child Development,* 58, 10, 1993; M.A. Nippold, "The literate lexicon" in her book on *Later Language Development: The school-age and adolescent years,* 2nd edition. Austin, Texas: Pro-Ed, 1998, pp. 13-30; and a study by A. Tyler and W. Nagy "The acquisition of English derivational morphology". *Journal of Memory and Language,* 28, 1989, pp. 649-667.

schools based on traditional written sources[13].

Israeli Hebrew and Palestinian Arabic both demonstrate rich intradialectal distinctions between different contexts of language use deriving from a range of socio-historical factors. As a result, both languages exhibit diglossia, in the sense that written and spoken forms can be construed as two distinct varieties of the same language. [14] Moreover, the written variety is in both cases a highly divergent and often grammatically more complex literary system, usually older than the spoken variety. It is learned in the context of formal education and used mainly for formal or school-based purposes, typically in the written medium [15].

The nature of this diglossia differs in Israeli Hebrew and Palestinian Arabic for socio-historical rather than strictly language-internal, structural reasons. Hebrew diglossia results from its peculiar history as a language which for many centuries existed side by side with other first languages that served as the spoken vernaculars of Jews in different parts of the world. Related to this background are the unique circumstances of the revival of Hebrew, first as a written standard and subsequently as a spoken language[16].

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[13] Such differences are documented, for example, in: C. Blanche-Benveniste. "The unit of written and oral language." In C. Pontecorvo, ed. *Writing Development: an interdisciplinary view.* Amsterdam: John Benjamins, 1997, pp. 21-46; in H. Jisa, "Relevant features of spoken and written French. In R. Aisenman, ed. *Working Papers in Developing Literacy Across Genres, Modalities, and Ages, Volume I,* February 1999, Tel Aviv University International Literacy Project., pp. 30-42; and in K. Lambrecht (1994). *Information structure and sentence form: A theory of topic, focus, and the mental representations of discourse referents.* Cambridge: Cambridge University Press, 1994.

[14] This is discussed in a range of studies, including studies undertaken from an educational perspective, e.g., M. Al-Batal "Diglossia proficiency: the need for an alternative approach to teaching", *The Arabic language in America.* Detroit: Wayne State University Press, 1992, pp. 284-304; J. Rosenhouse, J. & C. Shehadi. "Notes on diglossia problems in Arabic: the educational aspect". In I. Idalovich & N. Ararat, eds. *Philosophy, language, arts.* Haifa: Technion, 1986, pp. 251-272; and K. C. Ryding "Proficiency despite diglossia: a new approach for Arabic". *The Modern Language Journal,* 75, 1991, pp. 212-218.

[15] This is shown for Hebrew in a research study by D. Cahana-Amitay. & D. Ravid. "Optional bound morphology in the acquisition of text production" Paper presented to the Boston University Conference on Language Development, November 1999; and for Arabic in C. A. Ferguson's classic study "Diglossia", Diglossia. *Word* 15, 1959, pp. 325-40.

[16] This is forcefully argued by B. Harshav, *masa al texiyat ha-lašon ha-ivrit.* [Essay on the revival of the Hebrew language]. *Alpayim, 2,* 1990, pp. 39-53.

The result has been that the colloquial vernacular of the Hebrew spoken in Israel today has undergone wide-reaching changes from its earlier antecedents, especially in the area of morpho-phonology (for example, in areas such as stop-spirant alternation or vowel lowering). Yet its written varieties remain strongly embedded in the historical sources of the language. Thus, Biblical, Mishnaic and Rabbinical Hebrew, as well as Medieval texts provide the contemporary language with rich sources for expansion of its literate lexicon and for alternative means of morpho-syntactic constructions (for example, both morphologically bound and analytic forms of genitive constructions). Traditional written forms are the basis for normativist prescription on the part of the Hebrew Language Establishment, and are typically in conflict with standards of spoken usage.

Contemporary Hebrew thus affords an interesting instance of diglossia which cuts across the accepted dichotomy of spoken versus written language. There was a time when spoken Hebrew was regarded merely as a distorted form of its written sources and as such inappropriate for scholarly study, and even today linguistic analysis of the grammar of Israeli speech is construed by some as dealing with slang or "street Hebrew". But current research also reveals an interesting situation of *oral* diglossia among literate Hebrew-speaking adults, for example, in studies contrasting the reading of vocalized and nonvocalized texts by gradeschool children compared with adults[17]. Many morphophonological differences between historically normative forms and newer standard forms are only apparent in the spoken language. For example, normative *yetarot* versus standard *yitrot* '(bank) credit:PL' or normative *kan ha-tsipor* versus standard *ken ha-tsipor* 'nest the-bird = the bird's nest' differ in their vowel patterns, and this has no

[17] D. Ravid, "Accessing the mental lexicon: Evidence from incompatibility between representation of spoken and written morphology". *Linguistics*, 34, 1996, pp. 1219-1246; and D. Ravid & Y. Shlesinger, "The language / literacy interface: a developmental study on reading". Paper given at Tel Aviv University School of Education Annual Conference. 1999.

written representation in the nonvocalized orthography of Hebrew. Educated, literate Hebrew-speaking adults, but they alone, will command both normatively prescribed as well as currently standard forms in their mental lexicon, suggesting that a "higher" variety of language use is not confined exclusively to the written language. Spoken Hebrew also manifests a range of registers and levels of usage which children need to master to become educated users of their language.

Despite these contrasts, the spoken and written varieties of Israeli Hebrew are in general less markedly dichotomous than in the case of Arabic. Palestinian Arabic shares many sociological properties with other dialects of spoken Arabic. Like them, it exists side by side with Modern Standard Arabic, the written variety of the language common to all literate Arabic speakers, used in literature, in the media, at school, and for all literate activities, as well as in oral form on the electronic media [18]. As analyzed, for example, by Holes, Modern Standard Arabic represents a unified, codified pan-Arab variety of Arabic, the modern descendant of Classical Arabic. It is not, however, the spoken language acquired by children. Arabic-speaking children acquire the local dialect at home, and learn Modern Standard Arabic in school. Nonetheless, Modern Standard Arabic, due to its high status and important role in the media and literate activities, constitutes an important underpinning and source of information to speakers of Palestinian Arabic like other indigenous vernaculars. In fact, the inferior social status of spoken dialects of Arabic in general may in part account for the paucity of systematic investigation of spoken Palestinian Arabic. In Israel, language practitioners including teachers of Arabic and speech clinicians still find it difficult to relate to Palestinian Arabic as a rule-

[18] See, for example, M. Alosh, M. " Arabic diglossia and its impact on teaching Arabic as a foreign language". In E.L. Ervin, ed. *International perspectives on foreign language teaching.* Lincolnwood, Ill: National Textbook Company, 1991 and also the study by Al-Batal (1991) referred to in footnote 14.
In this and other connections, an important source of reference is C. Holes, *Modern Arabic: structures, functions, and varieties.* London: Longman. 1995.

governed linguistic entity and to introspect on its components as a necessary underpinning of developmental research. As a result, there is a tendency to confound spoken Palestinian Arabic and written Modern Standard Arabic usage in test construction and in experimental elicitations. The lack of studies describing the grammar of Palestinian Arabic dialects is a further factor hindering the construction of a baseline of adult standards for comparison with children's productions.

Diglossia thus takes rather different forms and is more severe in Palestinian Arabic than in Israeli Hebrew. Yet in both instances, the disparities between officially sanctioned variants and the everyday usage of even well-educated native speakers create difficulties for investigating *spoken* varieties of the language. And they provide an important challenge for research into such usage among adult speakers and child learners alike.

3. THE IMPACT OF LITERACY

The term "literacy" is used here in the broad sense of familiarity with and ready access to a wide range of both spoken and written materials in the mother tongue (newspapers, fiction, reference works, and other nonfiction writing). The development of literacy relates to an important aspect of linguistic knowledge: the ability to use language not only correctly but also appropriately in diverse communicative contexts and types of discourse. In languages like Hebrew and contemporary Arabic which manifest such strong diglossia between everyday spoken usage and more formal written discourse, this aspect of literacy is a particularly important facet of language development and language knowledge. The usage of educated speakers of what we have termed a "standard" variety of Israeli Hebrew manifest register distinctions at all levels of linguistic structure -- morphology, syntax, and the lexicon.[19] For example, classical bound morphology in marking pronominal accusatives and genitives is typically restricted to more formal registers, e.g. bound *kvutsati* versus analytic *ha-kvutsa sheli* 'my group' in a narrative written by a 7th grade boy, Aviv. The morphologically bound alternatives are rarely mastered until high-school age, in contrast to the historically later developing analytical forms that are preferred in everyday speech.

Lexical doublets deriving from either the earlier Biblical or later Mishnaic periods of its history are also extremely common in Modern Hebrew. In such cases, one form of expression is typically confined to more formal, academic or journalistic writing, and to

[19] Relevant research and characterizations of the notion "standard Hebrew" are provided in R. A. Berman, *al ha-be'atiyut shel xeker ha-ivrit ha-xadasha* [Issues and problems in research on Modern Hebrew], *Praqim, 7*, 1987, pp. 84-96; in a detailed, unpublished report on a largescale study of written and spoken texts produced by Israeli schoolchildren and university educated adults (R.A. Berman & D. Ravid, *The Oral/Literate Continuum: Developmental Perspectives.* Final Report submitted to the Israel Science Foundation, Jerusalem, 1999); and an indepth, extensive study of inflectional and other grammatical usages of Hebrew-speaking preschoolers, schoolchildren, and adults from different socio-cultural backgrounds (D. Ravid, *Language Change in Child and Adult Hebrew,* Oxford University Press, 1995).

public lectures, speeches, and talks, while the other occurs in everyday spoken usage. This divide applies not only to in the major word classes of nouns, verbs, and adjectives, there are also numerous closed class doublets, of two kinds: various kinds of sentence-modifiers, conjunctions, prepositions, and even pronouns (the everyday form is listed first, followed by its more formal alternate), *aval / ax* 'but', *eyx / ketsad* 'how', *biglal še / mikevan še* 'because', *še* / *ašer* 'that (Relative marker)', *še / ki* 'that (Complementizer)', *ani / anoxi* 'I'; and markers of syntactic constructions which differ in formality. For example, (i) in the context of *benoni* verb-forms, colloquial Hebrew usage has extended the basic subordinating marker *še* 'that' as a relative clause marker in clauses which start with a present-tense participial, whereas the definite marker *ha-* serves in this context in formal register; (ii) in everyday usage, the general negator *lo* 'not' is extended to present-tense copular constructions, whereas the existential negator *eyn* serves this function in formal style; and (iii) in verbless present-tense copula constructions, the impersonal generic pronoun *ze* 'it, this, that' serves in everyday Hebrew as a pronominal link between subject and complement in place of the more normative, agreement requiring personal pronouns *hu, hi, hem* 'he, she, they' in this same function. In a developmental perspective, examination of comparable texts produced in both speech and writing in the two genres of personal-experience narratives and of expository discourse reveals that only at high-school age, in the last two to three years of formal language studies, will Israelis make use of these forms appropriately, to distinguish their formal written prose from informal narrative style. And even then, young people do not always use these forms appropriately or consistently. Our experience with the difficulty of students raised and educated in Israeli Hebrew when required to express themselves in the register of academic prose in writing term papers and essay-type examinations reveals that these stylistic distinctions are by no means "natural" to all of them. Only some very educated

and language-conscious adults alternate these register-specific variants skillfully and flexibly, which we take as proof that they constitute a hallmark of literate language use.

Literacy has a further impact on language speakers in the area of *metalanguage* or *language awareness*. This notion refers to the ability to introspect about language as an object from without, as a formal problem space in its own right, with an analytic focus on the elements of linguistic structure and content as an autonomous cognitive undertaking[20]. It involves analytical attention to units of language that blend together imperceptibly in natural language use -- phonemes, morphemes, words, syntactic constituents in sentences, and discourse segments in extended texts. And it requires a disassociation between surface form and semantic content, a conscious monitoring of the language user's linguistic knowledge. As a result, literacy and schooling play an important role in metalinguistic development, most especially in the emergence of explicit metalinguistic verbalization[21]. There is evidence that aspects of language awareness, especially phonological and morphological awareness, both promote and are promoted by learning to read and write. Current research demonstrates that this is achieved by schoolchildren once they are able to establish links between phonemes, syllables and morphemes, on the one hand, and their written representations, on the other.[22] Sensitivity to more specific language domains such as derivational morphology

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[20] Key studies in this domain include: E. Bialystock's study of bilingual children ("Factors in the growth of linguistic awareness", *Child Development, 57,* 1986, pp. 498-510); J. E. Gombert's book on *Metalinguistic Development*, translated from the French by T. Pownall, New York: Harvester Books, 1992; and A. Karmiloff-Smith, *Beyond Modularity: A developmental perspective of cognitive science*, Cambridge, Ma: M.I.T. Press, 1992.

[21] This is demonstrated in a Hebrew-based study of O. Ashkenazi & D. Ravid, "Children's understanding of linguistic humor: an aspect of metalinguistic awareness" *Current Psychology of Cognition, 17,* 1998, pp. 367-387.

[22] Such research includes studies by S. Bentin (e.g., "Phonological awareness, reading, and reading acquisition: a survey and appraisal of current knowledge" in L. Katz & R. Frost, eds. *Orthography, Phonology, Morphology and Meaning*, Amsterdam: Elsevier, 1992); by A. E. Fowler & I. Y. Lieberman ("The role of phonology and orthography in morphological awareness" in L. B. Feldman, ed. *Morphological Aspects of Language Processing*, Hillsdale, NJ: Erlbaum, 1995, pp. 157-188); and studies by I. Levin, D. Ravid, & S. Rappaport: "Developing morphological awareness and learning to

plays a role in reading ability of older school children and even among college students.[23] The uniquely Semitic morphological structures in Hebrew and Arabic coupled with the diglossic situations they exhibit offer rich potential for extended investigation of language awareness from a typological perspective.

4. EMPIRICAL STUDIES IN ROOT EXTRACTION AND WORD-FORMATION

As evidence for the impact of language typology on language acquisition, we survey some key findings from empirical research by the authors of this paper with students and colleagues in Israel and abroad in two domains of inquiry: the notion of a consonantal root and strategies of word formation.

4.1 The consonantal root in language development

The prime lexical construct in Arabic and to a rather lesser extent in Hebrew is the consonantal root which, together with the morphological pattern, is the basis for constructing most words in the lexicons of both languages.[24] Here, we consider the psychological reality of three facets of root construction -- phonological, orthographic, and lexical -- in the linguistic development of children acquiring Israeli Hebrew and Palestinian Arabic.

Studies of morphological acquisition point to an interesting tension between two types of constraints. Factors of language typology foster early emergence of root

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write: a two-way street" in T. Nunes, ed. *Integrating Research and Practice in Literacy,* Amsterdam: Kluwer, 1999, pp. 77-104; and "Morphology and spelling among Hebrew-speaking children: From kindergarden to first grade". *Journal of Child Language,* in press.

[23] This is shown in studies of American English by, for example, M. K. Henry, "Morphological structure: Latin and Greek roots and affixes as upper grade code strategies", *Reading and Writing, 5,* 1993, pp. 227-241 and D. I. Mahoney, "Using sensitivity to word structure to explain variance in high school and college reading ability", *Reading and Writing, 6,* 1994, pp. 19-44.

[24] Psycholinguistic research in this domain include works by I. Berent & J. Shimron, "The representation of Hebrew words: evidence from the contour principle", *Cognition, 64,* 1997, pp. 39-72; and by the authors of this paper, e.g., R. A. Berman, "Children's innovative verbs versus nouns", In L. Menn & N. Bernstein-Ratner, eds. *Methods in Studying Language Production,* Mahwah, NJ: Erlbaum, 1999, pp. 69-93, and D. Ravid, ""Internal structure constrains on new-word formation devices in Modern Hebrew", *Folia Linguistica, 24,* 1990, pp. 289-346; and both authors have lengthy chapters in a book currently being edited in this domain by J. Shimron, *The Processing and Acquisition of Root-Based Morphology.*

knowledge in Semitic language acquisition [25]. Yet these interact with universal processing principles such as semantic transparency and perceptual saliency, mitigating against exclusive reliance on consonantal roots as the basis for word formation. Children make productive use of roots in both Israeli Hebrew and Palestinian Arabic from early on in linguistic domains where roots are obligatory, for example, the way young children coin novel verbs in Hebrew and how they form plural adjectives with "broken" patterns in Palestinian Arabic. This ability is also apparent in non-obligatory contexts, for example, in Hebrew speakers' innovation of nouns and adjectives, where other structural options such as linear and compound formation are available. However, research with schoolage children shows that it is only in later gradeschool, around age 10 years, that the root-and-pattern option comes to occupy the dominant position out of the various morphological devices available for expressing nominal concepts in Hebrew. In Palestinian Arabic, where the root functions in inflectional as well as in derivational morphology, young children initially prefer a linear option (Feminine Sound) for noun pluralization, while older children make progressively more use of the broken option of root-and-pattern formation.

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[25] Studies relevant to the claims made in this subsection include, for Hebrew: R. A. Berman, "A developmental route: Learning the form and function of complex nominals", *Linguistics, 25,* 1987, pp. 1057-1085; R. A. Berman, "Children's innovative verbs versus nouns", In L. Menn & N. Bernstein- Ratner, eds. *Methods in Studying Language Production,* Mahwah, NJ: Erlbaum, 1999, pp. 69-93; E. V. Clark & R. A. Berman, "Structure and use in the acquisition of word formation", *Language, 60,* 1984, pp. 542-590; D. Ravid, ""Internal structure constrains on new-word formation devices in Modern Hebrew", *Folia Linguistica, 24,* 1990, pp. 289-346; D. Ravid & A. Avidor, "Acquisition of derived nominals in Hebrew", *Journal of Child Language, 25,* 1998, pp. 229-266; and D. Ravid, A. Ben-Zvi & R. Levy, "Derivational morphology in SLI children: structure and semantics of Hebrew nouns", In M. Perkins & S. Howard, eds. *New Directions in Language Development and Disorders,* New York: Plenum, in press. The few pieces of research which directly addresses such psycholinguistically relevant issues in Arabic. include: two unpublished seminars paper by graduate students of Tel Aviv University's Department of Communications Disorders (H. Abu-Nofel & R. Huri, "Learning to inflect plural adjectives in Palestinian Arabic", 1998 and H. Kawar & M. Sakran, "Developmental aspects of phonological and morphological awareness in Palestinian Arabic", 1998); Z. Mimouni., E. Kehayia, & G. Jarema, "The mental representation of singular and plural nouns in Algerian Arabic as revealed through auditory priming in agrammatic aphasia patients. *Brain and Language* 61, 1998; and D. Ravid & R. Farah,"Learning about noun plurals in early Palestinian Arabic", *First Language, 19,* 1999, pp. 187-206.

The orthographic facet of Semitic root construal affords a rather different, no less interesting perspective on the interface of language typology, diglossia, and literacy. The fact that roots are most clearly represented in the writing systems of Hebrew and Arabic at the expense of vocalic patterns has important metalinguistic implications. Studies of meta-morphological acquisition in Israeli Hebrew and Palestinian Arabic confirm contemporary psycholinguistic claims to the effect that orthographies constitute models which shape metalinguistic thinking and bring into consciousness aspects of the oral language which figure prominently in the writing system[26]. Awareness of the root which, as noted, emerges early in both Israeli Hebrew and Palestinian Arabic, increases in explicitness with age and schooling. In structured elicitations, children speaking these languages are able to identify words sharing the same root (e.g., Palestinian Arabic *maxbaz / xubez* 'bread / bakery') and to give another word with the same root (e.g., Israeli Hebrew *saxkan* 'player' for *misxak* 'game, play'). Older schoolchildren are able to explain their choices in increasingly more literate formulations, while highschoolers and adults will resort to grammatical terminology such as "letters", "consonants", and "root". The highest level of metalinguistic root construal requires the integration of morphological knowledge in the orthographic root. This is revealed by two lines of research. First, correct spelling of written roots, which is consistently mastered much later than spelling of affix letters, consolidates only around age 9-10 in Hebrew. Second, the ability to explain language play and puns by relying on the interaction between phonological, semantic, and orthographic information in the root, knowledge which emerges only at highschool age.

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[26] Discussion and evidence for this claim is found in D.R. Olson, *The world on paper: The conceptual and cognitive implications of writing and reading.* Cambridge: Cambridge University Press, 1994.

4.2 Strategies of word-formation in acquisition of Hebrew and English

Over the past two decades, a range of studies has been conducted on the acquisition of derivational morphology and strategies for new-word formation in Hebrew compared with other languages. These include work on how children derive new nouns from familiar verbs, on how children produce novel compound nouns, how children derive new verbs from familiar nouns, and how they alternate verbs across the Hebrew *binyan* patterns to mark distinctions of syntactic transitivity and voice.[27] Here, we focus on results of these studies that highlight the impact of Semitic-specific derivational morphology, on the one hand, and of universal developmental trends, on the other.

First, across the board and from a very early age, Hebrew-speaking children construct the verbs they produce, both ones existing in the conventional lexicon and ones which they innovate spontaneously or in experimental elicitations, according to the small set of accepted *binyan* patterns. That is, even two- and three-year-olds hardly ever use other possible, but nontypically Semitic devices such as zero derivation or affixation to a stem to produce new verbs or to alternate verbs from intransitive to transitive or from active to passive. Second, and relatedly, children form nouns in a much wider range of morphological patterns than verbs; these include both forms which are based on existing *mishkal* patterns constructed out of consonantal roots plus associated affixal elements (e.g. *maglexa* 'shaver' for a razor, *mirshemet* 'noter' for *pinkas* 'notebook', *takan* 'fixer'

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[27] Details of the methods and findings of this rich array of research, from structured elicitations and naturalistic speech data, are summed up in R. A. Berman, "Word formation as evidence", in D. McLaughlin & S. McEwen, eds. *19th Annual Boston University Conference on Language Development, Volume I*, Somerville, Ma: Cascadilla, 1995, pp. 82-95; R. A. Berman, *iyun u-mexkar bi-rexishat ha-ivrit ki-sfat em* [Studies in acquistion of Hebrew as a first language], in Y. Shimron, ed. *Mexkarim ba-psixologiya shel ha-lashon ve-ha-kri'a be-Yisrael* [Studies in the Psychology of Language and Reading in Israel]. Jerusalem, Magness, 1997, pp. 57-100; and see, too, D. Ravid & A. Avidor, "Acquisition of derived nominals in Hebrew", *Journal of Child Language, 25,* 1998, pp. 229-266 Universal compared with language-specific trends, including in Hebrew as well as in English and other languages, are described in detail in E. V. Clark, *The Lexicon in Acquisition,* Cambridge University Press, 1994.

for someone who fixes things) and also forms which are based on a word-stem plus external suffix, e.g., *tsmi'ut* 'thirstiness' for *tsima'on* 'thirst', *neginut* 'playing' for *negina*, *taknay* 'fixer'). However, children construct not only verbs, but also most of their novel nouns and adjectives, by means of the canonically Semitic device of associating a set affixal pattern or *mishkal* with a consonantal root or at least "skeleton". Third, children's lexical innovations proceed according to universal principles of perceptual salience, structural simplicity, and semantic transparency. For example, across languages, young children will innovate more new nouns than verbs, and they name more concrete objects than abstract states. Also, in forming compound noun constructions (*smixut xavura*) they make fewest errors with strings that require no morphological change in the head noun, whereas it takes them till schoolage to make appropriate stem changes (compare *tsiporey ya'ar* 'birds-of forest' from the plural noun *tsiporim*, which children form correctly by age 5, with *pirxey xag* 'flowers-of festival' from the noun *praxim*, which even 7-year-olds found difficult to construct correctly). However, in contrast to children acquiring Germanic languages like English or German, Hebrew-speaking children rarely form novel compounds for naming agent nouns. Compare, for example, English juvenile **fixman* with Hebrew innovative *takan* or *taknay* 'fixer'. In general, when children learning Hebrew coin novel lexical items, they prefer the typically Semitic devices of affixation rather than zero derivation or juxtaposition of two words to form a novel compound,

5. CONCLUSIONS

As in other domains of inquiry, so too in linguistics and language acquisition research, there is an interesting tension between the two strands underlying this paper: shared, common properties and trends defined as "universals" across languages and across children, and language-particular or typologically determined features specific to particular languages or types of languages. Recent crosslinguistic research has demonstrated the powerful impact of target-language typology on the process of acquisition from early preschool age in a range of domains, revealing that children are early on sensitive to the "typological imperatives" of their language. That is, even very young children recognize "where the action is at", so to speak, in the input language, not only *which* categories are formally distinguished, but also how these distinctions are expressed. Current research [28] reveals the influence of language-specific effects on speech perception and babbling in the first year of life; on how young children adjust their speech output to the prosodic character of their language, as intonation or tone-based and whether it requires vowel-harmony as in Turkish well before they have command of grammatical inflection; on young children's construal of the categories of

[28] Studies on which these claims are based include: in the domain of phonology, P.W. Jucszyk, *The Discovery of Spoken Language.* Cambridge, Ma: Bradford Books, 1997, pp. 178-179; K. Demuth, "Issues in the acquisition of the Sesotho tonal system", *Journal of Child Language, 20,* 1993, pp. 275-302; A. Aksu-Koc & D. I. Slobin, "Acquisition of Turkish", in D. I. Slobin, ed. *Crosslinguistic Studies in Language Acquisition,* Hillsdale, NJ: Erlbaum, 1985, pp. 839-880; on the effect of target language typology on the early acquisition of nouns compared with verbs in different languages, see: V. C. Gathercole & E. M. Mueller, "Word meaning biases, or language-specific effects? Evidence from English, Spanish, and Korean", *First Language, 17,* 1997, pp. 31-56, and A. Gopnik & S. Choi, "names, relational words, and cognitive development in English and Korean" in M. Tomasello & W. E. Merriman, eds. *Beyond Names for Things: Young Children's Acquisition of Verbs,* Hillsdale, NJ: Erlbaum, 1995, pp. 63-80; on children's marking of spatial distinctions in typologically different languages, see M. Bowerman, "Learning to structure space for language: A crosslinguistic perspective", in P. Bloom, M. Peterson, L. Nadel, & M. Garrett, eds. *Language and Space,* Cambridge, Ma: M.I.T. Press, 1996; on new-word formation, see work of R. A. Berman and of E.V. Clark referred to in the preceding footnote; on reliance on morphological cues in the spelling systems of different languages, see studies in press by S. Gillis & D. Ravid, "Typological differentiation in the development of orthographic systems: Evidence from Hebrew and Dutch", In I. Barriere, S. Chiat, G. Morgan, & B. Woll, eds. *1999 Child Language Seminar Conference Proceedings,* London: City University*;* and on crosslinguistic narrative development, see R. A. Berman & D. I. Slobin, *Relating Events in Narrative: A Crosslinguistic Developmental Study,* Hillsdale, NJ:

"noun" and "verb" in different languages; on how they encode spatial distinctions in languages like English and Dutch compared with Korean or Tzeltal; on their strategies for new-word formation in English compared with Hebrew and other languages and for extracting morphological information from orthography in Hebrew compared with Dutch; and also on the development of narrative discourse in a range of languages, including Hebrew.

Findings of research in these different domains converge to show that children are early on attuned to the language-particular way of encoding form-meaning relationships in their mother tongue. When this type of sensitivity finds expression will depend on shared, universal factors -- linguistic, cognitive, and perceptual -- which underlie developmental patterning in general. For example, the kind of spatial distinctions noted by Bowerman will precede command of derivational marking of linguistic subcategories, and these will emerge earlier than rhetorical mastery of linguistic forms in the context of extended narratives. But in each case reported, how children encode form-meaning relations accords with how this is done by adult speakers of the same target language rather than by children of the same age in other languages.

A key aim of this paper was to provide further evidence for the critical impact target-language typology on quite general processes of language learning and language use. We also hope to have demonstrated that the study of language acquisition and development from early childhood through to late schoolage levels of literacy affords rich potential for insights into the typological properties and patterns of Semitic linguistic structure in contemporary spoken as well as written usage. The challenge for future research to expand and deepen investigation of different types of language use in Israeli

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Hebrew and Palestinian Arabic, as instantiating two very different and yet highly similar instances of the interrelations between linguistic form and language use.

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