

Hebrew verbal passives in Later Language Development: the interface of register and verb morphology*

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(Received 15 May 2016 – Revised 3 August 2016 – Accepted 5 September 2016)

ABSTRACT

The current study examined the production of Hebrew verbal passives across adolescence as mediated by linguistic register and verb morphology. Participants aged eight to sixteen years and a group of adults were asked to change written active-voice sentences into corresponding passive-voice forms, divided by verb register (neutral and high), *binyan* pattern (*Qal* / *Nif'al*, *Hif'il* / *Huf'al*, and *Pi'el* / *Pu'al*), and verb tense (past and future tense). Results showed that Hebrew passive morphology is a very late acquisition, almost a decade later than in other languages, that passivizing neutral-register verbs was less challenging than high-register verbs, and that past tense verbs were easier to passivize than future tense verbs. An order of acquisition was determined among the three *binyan* pairs. The paper provides an account of these findings grounded in the event-telling role of Hebrew passives in discourse and the spurt of abstract, lexically specific vocabulary in Later Language Development.

INTRODUCTION

Passive voice is among the most prominent and widespread perspective-changing constructions in the world's languages (Abraham & Leisiö, 2006; Givón, 1981; Keenan & Dryer, 2007). The acquisition of passive forms by children has been the controversial topic of research studies across the last decades (Baldie, 1976; Messenger, Branigan & Mclean, 2012). Passive constructions have been described as delayed in some languages (Gordon & Chafetz, 1990; Prat-Sala, Shillcock & Sorace, 2000), and as early acquisitions in others (Allen & Crago, 1996; Aschermann, Gulzow & Wendt, 2004; Demuth, Moloi & Machobane, 2010). Syntactic, semantic, discourse, cognitive, and usage factors as well as elicitation conditions have

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been invoked in explaining why young children struggle in comprehending and producing passive forms (Brooks & Tomasello, 1999; Messenger, 2010; Pinker, Lebeaux & Frost, 1987).

The current study aimed to examine the acquisition of passive forms in Hebrew in a new light. First, focus here is on the MORPHOLOGY of the passive verb. As general theoretical motivation for this verb-focused investigation, we follow Haspelmath's (1990, p. 25) comment that "the verbal morphology associated with a passive construction is an essential part of the construction whose properties are worthy of study in their own right. Indeed, the passive can be regarded as first and foremost a verbal morphological category whose meaning implies certain changes in the clause structure." From a Hebrew-specific typological perspective, studying passive verb morphology in acquisition is key, as Hebrew passive forms are part and parcel of the verb-pattern *binyan* system, a set of seven conjugations which provide the vocalic form of the verb and its syntactico-semantic category. Second, previous research on passive acquisition – in Hebrew as in other languages – examined spoken passive constructions in young children, mostly in preschoolers. In contrast, the current study elicited passive forms in writing from school-going children and adolescents, compared with adults, during the period of Later Language Development (Berman, 2004; Nippold, 2007). This framework enabled us to contextualize the acquisition of passive verbs as part of a set of Hebrew morpho-lexical classes whose learning is delayed to adolescence – a time of when socio-cognitive, linguistic, and literacy abilities connect together in the complex expression of communicative goals (Berman & Ravid, 2009).

The main goals of the current study were as follows: (i) to provide an account of the development of Hebrew passive verb morphology across the school years, based on an experimental task; and (ii) to determine the role of derivational and inflectional *binyan* morphology in this development.

Passive constructions

Passive voice seems to be a universal phenomenon; nonetheless, it has been described as an elusive category, deserving of sound conceptual foundations (Shibatani, 2006). Several conclusions come to mind when reviewing the linguistic literature on passive constructions and their functional roles across different languages, which can be useful in laying the background and generating expectations for the current developmental study of Hebrew passives.

First, passives are noted among the most prominent and widespread perspective-changing constructions in the world's languages (Givón, 1981). The general view of passive constructions as backgrounding the

agent role while highlighting the patient role is shared among linguists (Myhill, 1997). We adopt here Keenan and Dryer's (2007) analysis of the passive as essentially different from syntactically restricted inversion phenomena such as topicalizing and dislocating constructions: unlike the former, passive forms are integral to the grammar of languages in occupying unmarked positions and the case marking of NPs, in requiring no specific intonation patterns, and in undergoing all major syntactic operations. According to Keenan and Dryer, the most distinctive property of passives is the formation of the passive verb phrase (Haspelmath, 1990). This supports our focus on the morphology of Hebrew passive verbs in investigating their acquisitional path.

A second observation from the cross-linguistic literature indicates that the notion of 'passive' often serves as an umbrella term for a cluster of constructions sharing the perspective of the patient. Across languages, these include middle voice and impersonal constructions (Abraham & Leiss, 2006), in addition to get-passives, medial passives, and adjectival passives (Mitkovska & Bužarovska, 2012; Rathert, 2006), all participating in different configurations of agent and patient roles in the event. Viewed from a developmental psycholinguistic perspective, passives constitute one form of voice construction whose function is to depict a non-canonical view on events and situations. This can generate the expectation that a language learner would need to gain experience not only with variegated communicative events and contexts, but also with the array of agent-demoting constructions and discourse types typically associated with their expression in her language.

A third conclusion drawn from the literature is the strong relationship between transitivity and voice, on the one hand, and between aspect and voice, on the other (Abraham & Leisiö, 2006; Shibatani, 2006). Middle voice constructions tend to express a generic and imperfective outlook, e.g. *these books sell well*. Passive voice, in contrast, prefers a transitive construction that expresses the patient argument in an object NP, with an agentive, volitional grammatical subject and a concrete, actional verb affecting the object, as in the alternation *John built the IKEA chest* / *the IKEA chest was built by John*. No less importantly, expression of canonical passive voice is associated with realis, concrete/agentive transitivity, and perfective temporality (Foley, 2007). In a language such as Hebrew, which does not mark aspectual distinctions in verb inflectional morphology, this means a strong association of passive forms with the narrative past tense—unlike telic past, which strongly associates with middle/inchoative semantics (Berman & Slobin, 1994). This generates two expectations: that passivization of abstract, less agentive and object-affecting Hebrew verbs should be more challenging to children; and that future tense passive forms should be more difficult to passivize than past

tense verbs. The relationship between resultative predicates and passive verbs has been shown to benefit learning (Lee & Lee, 2008), but the tense hypothesis, to our best knowledge, has not been tested before. The acquisition literature (see below) has long known that actional passive constructions are comprehended earlier than non-actional ones (Maratsos, Fox, Becker & Chalkley, 1985), but testing passive formation in late childhood adolescence makes it possible to examine a much richer array of cognitive and abstract verbs.

Acquisition of passive constructions

The acquisition of passive forms by children has been the controversial topic of numerous research studies across the last decades regarding the timing of the acquisition of passive forms and the reasons thereof (Budwig, 1990; Crain, Thornton & Murasugi, 2009). Much of the investigation of passive acquisition has focused on English, where it was often described as delayed to age six years in both comprehension and production (Brooks & Tomasello, 1999; Marchman, Bates, Burkardt & Good, 1991). Children were shown to experience particular difficulty when full passives – that is, the whole syntactic structure including the *by*-phrase – were involved (Fox & Grodzinsky, 1998). The realization that the passive is a complex phenomenon with different parts and facets dictates a more nuanced view of passive learning as a drawn-out process of learning. Many studies have shown that young children start by attending to semantically restricted, prototypical passives – that is, irreversible passives with actional verbs and animate subjects (Ferreira, 1994; Pinker *et al.*, 1987). Children initially prefer less patient-oriented, agent-demoting devices, such as the *get* passive or middle voice (Gámez, Shimpi, Waterfall & Huttenlocher, 2009). Only later on, beyond age six and even later, does children’s knowledge go beyond the canonical passive (Messinger *et al.*, 2012).

Frequency of passive forms and their discourse contexts in the input have often been invoked as determining factors in children’s acquisition of passives (Tomasello, Brooks & Stern, 1998). Thus, the rarity of agentless and passive constructions in English input to children (Gordon & Chafetz, 1990) could explain the discrepancy in reports on timing of acquisition. Investigations of the early emergence of passive forms (around age two) in languages with prevalent passive constructions such as Bantu languages, Inuktitut, and Quiche Mayan, have ruled out a universal maturational constraint on passive learning (Alcock, Rimba & Newton, 2011; Allen & Crago, 1996; Demuth *et al.*, 2010; Pye & Quixtan Poz, 1988). But children acquiring languages with lower frequencies of passive forms than English, such as Catalan or Hebrew, are reported to continue struggling with passive production even beyond age ten (Prat-Sala *et al.*, 2000;

Ravid, 2004). At the same time, exposure of child and adult participants to passive constructions of all types has been shown to enhance their passive productions (Gámez *et al.*, 2009). Thus, the literature suggests that learners are sensitive to the way the immediate and general linguistic input employs passive constructions in the depiction of different agent-demoting scenes.

Passive voice in Hebrew

Syntactically, the active/passive alternation in Hebrew is rather similar to that of English. Consider the pair of Hebrew sentences in (1), which express active (a) and passive (b) voice perspectives on the same event.

- (1) a. *ha-texnay hiklit et ha-re'ayon*
 the-technician recorded ACC the-interview
 'The technician recorded the interview'
 b. *ha-re'ayon huklat al-yedey ha-texnay*
 the-interview was-recorded by the-technician
 'The interview was recorded by the technician'

The active version (1a) has a grammatical subject depicting the agent *ha-texnay* 'the technician' at sentence-initial position, and a direct object patient *ha-re'ayon* 'the interview' marked by accusative *et*, following the transitive verb. In (1b), the patient serves as subject at sentence-initial position, followed by the passive verb. The *by*-phrase is a crucial test of passive voice in Hebrew, since only truly passive (as opposed to medial passive) constructions can take it. The scope of the Hebrew passive is notably less broad than in English, as passivization is generally restricted to transitive constructions with direct, sometimes oblique, objects. Unlike English, Hebrew does not allow passivization of indirect objects in ditransitive constructions such as *Mary handed the flowers to John / John was handed the flowers by Mary*.

Two language-specific, structural, and functional characteristics render the Hebrew passive very different from that of English, providing grounds for further hypotheses regarding acquisition. One is its Semitic verb morphology; another is the prevalence of generic subjectless constructions in Hebrew.

Passive verb morphology. Like all Hebrew verbs, passive verbs are formed within the *binyan* system by the Semitic non-linear affixation of root and pattern morphemes. Semitic roots are discontinuous morphemes consisting of three or four radicals, which constitute the structural and semantic core of Hebrew words in general and verbs in particular, e.g. root *g-d-l* 'grow' or root *t-q-n* 'fix'. All Hebrew verbs are constructed by combining a root with one of seven verb conjugations termed *binyanim* (literally

'buildings') – traditionally named *Qal*, *Nif'al*, *Hif'il*, *Huf'al*, *Pi'el*, *Pu'al*, and *Hitpa'el* (based on the root *p-'l* 'act'). *Binyan* conjugations provide the main vocalic structure of the verb (sometimes accompanied by prefixation). For example, *Pi'el* provides the *CiCeC* template into which the root (marked by capital Cs) is inserted. In addition, each *binyan* consists of a specific bundle of temporal patterns that combine with a root to create its paradigm of temporal stems. For example, *gidel*, *megadel*, and *yegadel* serve as the respective past, present, and future tense stems of 'raise' in *Pi'el*.

The *binyan* system not only dictates the morphological structure of verbs, but also how transitivity relations, including passive voice, are expressed syntactically. Thus, *binyan* patterns are associated with higher or lower transitivity values, with correspondingly richer or poorer argument structures – e.g. high-transitivity *Hif'il*, which is often associated with two or three arguments, or low-transitivity *Nif'al*, mostly occurring in single-argument structures (Berman, 1993). In this respect, Hebrew *binyan* conjugations differ from Romance verb conjugations, which are morphophonological in nature (Monachesi, 2005), and are somewhat similar to Slavic verb formation, which is also associated with aspect and Aktionsart (Svenonius, 2004). Hebrew root-based verbs with different *binyan* patterns constitute semi-productive derivational families combining lexically specific meanings with Aktionsart values such as inchoativity, causativity, reflexivity, reciprocity, middle, and passive voice (see Berman & Nir-Sagiv, 2004, p. 355, for a detailed table). For example, root *g-d-l* 'grow' combines with *binyan* patterns to create a family of six different verbs – two of which in passive voice:¹ basic *gadal* 'grow', causative *higdil* 'enlarge', passive *hugdāl* 'be enlarged', causative *gidel* 'raise', passive *gudāl* 'be raised', and middle-reflexive *hitgadel* 'aggrandize oneself'.

Passive verb formation takes place within this morphologically stringent root-*binyan* verb system. Hebrew passive morphosyntax is based on the three transitive *binyan* patterns² – *Qal*, *Hif'il*, and *Pi'el*, each associated with a dedicated passive counterpart: *Qal* with *Nif'al*, *Hif'il* with *Huf'al*, and *Pi'el* with *Pu'al* (Table 1). In the current context, we investigate VERBAL passives, that is, passive verbs in the past and future tense, rather than resultative adjectival passives, which are based on the present tense stems of passive *binyan* patterns, such as *Pu'al metukan* 'fixed' or *Huf'al mufta* 'surprised' (Berman, 1994). Adjectival passives constitute a major

¹ Verbs are presented according to the Hebraic tradition in the past tense, third person masculine singular form, which corresponds to the *binyan* name.

² See Ravid *et al.* (2016) for an account of the two *binyan* subsystems occupied by *Qal*, *Hif'il*, *Pi'el*, and their passive counterparts.

TABLE 1. *The three active/passive binyan pairs illustrated with three roots (l-m-d ‘learn’, s-b-r ‘explain’, and t-p-l ‘take care of’) across past, present, and future tenses (in third person masculine singular), and the infinitive form*

Voice →	Active	Passive	Active	Passive	Active	Passive
<i>Binyan</i> →	Qal	Nif'al	Hif'il	Huf'al	Pi'el	Pu'al
Past tense	<i>lamad</i>	<i>nilmad</i>	<i>hisbir</i>	<i>husbar</i>	<i>tipel</i>	<i>tupal</i>
Present tense	<i>lomed</i>	<i>nilmad</i>	<i>masbir</i>	<i>musbar</i>	<i>metapel</i>	<i>metupal</i>
Future tense	<i>yilmad</i>	<i>yilamed</i>	<i>yasbir</i>	<i>yusbar</i>	<i>yetapel</i>	<i>yetupal</i>
Infinitive	<i>lilmod</i>	<i>lehilamed</i>	<i>lehasbir</i>	—	<i>letapel</i>	—

structural source of Hebrew adjectives, learned early on, around four years of age (Berman, 1985).

In one sense, passive morphology is the most predictable of all *binyan* functions, as choice of passive *binyan* is always entailed by its active counterpart (Table 1). However, the three patterns expressing passive voice are not uniform – rather, they fall into two distinct groups: strict passives (*Pu'al* and *Huf'al*), and *Nif'al*. *Pu'al* and *Huf'al* passives share several unique features. First, the passive voice is their only functional role, so that their existence is predicated on that of a corresponding transitive *Hif'il* or *Pi'el* verb. Structurally, they share the vowel *u* across their temporal paradigms, and unlike all other *binyan* patterns, they do not have infinitive forms (Table 1). Again, unlike all other patterns, *Pu'al* and *Huf'al* form their action nominals by attaching the abstract suffix *-ut* to their adjectival present tense stems, e.g. *muxan-ut* ‘readi-ness’ or *me'orav-ut* ‘involve-ment’ (Ravid & Avidor, 1998). Importantly, their present tense forms express both passive participial and resultative meanings, so that *mefursam* in *Pu'al* can be interpreted as both ‘is being published’ and ‘famous’. *Nif'al*, in contrast, has several characteristics that mark its special status (Schwarzwald, 2008). First, in addition to its role as the passive counterpart of *Qal*, it has most of the middle functions of *Hitpa'el*, serving as the inceptive and inchoative counterpart of *Hif'il* (Berman, 1993). Moreover, and again unlike the strict passives, present tense participial *Nif'al* participates in a tripartite system with *Qal* and the resultative pattern *CaCuC*, as in *Qal kotev* ‘is writing’ / *CaCuC katuv* ‘written’ / *Nif'al nixtav* ‘is being written’. Structurally, too, *Nif'al* does not have the typical passive *u* vowel of the strict passives, and again, unlike them, it has an infinitival stem and a derived action nominal like all other non-passive *binyan* patterns.³ Finally, *Nif'al* is the only *binyan* (or for that matter, any derivational pattern in Hebrew) starting with

³ Side by side with derivation from present tense stems, like its strict passive counterparts. Compare *hipakdut* ‘state of being counted’ (regular action nominal with pattern

prefixal *n-*, with a further peculiarity of having identical past and present stems and phonologically distinct future and infinitive stems (Ravid, 1995).

Hebrew passive formation is firmly embedded in Hebrew verb morphology, using the same structural devices employed for the expression of other *binyan* functions. There is nothing special about the morphophonology of either the strict passives or *Nif'al*: the developmental literature shows that present tense adjectival passives with *u* are found in child speech (e.g. *mekulka* 'out of order', *hafux* 'upside down'). Moreover, telic *Nif'al* verbs such as *nishpax* 'spilled' or *nirtav* 'got wet' are among the earliest past tense forms to occur in child speech, with medial passive *Hitpa'el* forms such as *hitparek* 'fell apart' soon following in their steps (Berman, 1985). Therefore, morphological structure alone cannot be the culprit in the very late acquisition of passive voice in Hebrew. We argue that the problem lies elsewhere, at the interface of syntactic constructions and event structure in the ambient language.

Passive versus generic subjectless constructions. Hebrew has several subjectless constructions that serve to express a non-agent oriented outlook on events (Berman, 1980). Two prominent examples are predicate-first (2) and impersonal (3) constructions, which are prevalent in everyday interactions, child speech, and input to children (Dromi & Berman, 1986).

- (2) a. *mutar lexa laléxet*
Allowed to-you to-go
'You may go'
- b. *xam po*
hot here
'it's hot here'
- (3) a. *bonim po gesher*
building,PL here bridge
'A bridge is under construction here'
- b. *lo yimkeru lexa kan glida*
not will-sell,PL to-you here ice cream
'They won't sell you ice cream here'

Constructions such as those in (2) and (3) share a general, often modal, discourse stance (Berman, 2005). Such subjectless, often verbless, impersonal constructions, usually anchored in the present tense, are prevalent in everyday communication and written discourse, thus occupying the preferred slot for the expression of habitual, generic states, scenarios, and situations in Hebrew. Hebrew passive constructions are very different. Like their active counterparts, and in direct contrast to

hiCaCCut) with *nifkadut* 'going AWOL' (based on the present tense stem), both based on the root *p-q-d*.

subjectless/verbless constructions, they require a grammatical subject and are based on lexical verbs that take all temporal inflections, favoring the perfective past tense. By itself, passive syntactic structure cannot be regarded as the cause of delayed passive acquisition in Hebrew, as children produce the required, grammatically integral SV(O) structures (Keenan & Dryer, 2007) fairly early, including many with non-agentive subjects and unaccusative verbs (Berman, 1985). Relating different structures should not be challenging to Hebrew-speaking children, who are early on exposed to and produce sentences with pragmatically alternating word orders such as (4) (Ravid, 1995).

- (4) a. *ha-tik nafal / nafal ha-tik*
 the-bag has-dropped / has-dropped the-bag
 'the bag has dropped'
- b. *kvar axalti et ha-agas / et ha-agas kvar axalti*
 already ate,1ST.SG ACC the-pear / ACC the-pear already ate,1ST.SG
 'I already ate the pear'

We argue that the FUNCTIONAL ROLE reserved in Hebrew to passive verb constructions is the gist of the problem. In direct contrast to generic, present tense, state-oriented subjectless constructions, verbal passives functionally pinpoint highly transitive, perfective EVENTS, either realis or irrealis,⁴ as in (5).

- (5) a. *af báyit lo shupats be-maha'lax ha-tkufa*
 no house not renovated in-the-course the-period
 'Not a single house was renovated during this period'
- b. *im ta'ase kax, lo tenuke me-ashma*
 If will-do,2ND.SG that, not will-be-cleaned,2ND.SG from-guilt
 'If you do that, you will not be cleared of guilt'

Passive constructions thus require the expression of specific, perfective events through an abstract and distanced agent-demoting stance, which does not characterize early child language interaction. This restricted functional role predicts a prolonged period of learning passive voice, enabled by socio-cognitive changes in adolescence during Later Language Development (Blakemore & Choudhury, 2006). Learning passive constructions in Hebrew is based on gaining extensive experience with the appropriate communicative contexts of event- and story-telling, and the passive constructions associated with them; and the ability to perceive multiple perspectives, as well as familiarity with literate, written language styles that prefer such forms of expression (Berman & Ravid, 2009).

⁴ We take irrealis as an umbrella term covering non-indicative, less-than-real modality functions (Timberlake, 2007).

Learning Hebrew passives. Most research on Hebrew passive acquisition to date has focused on its distributions in child, adolescent, and adult corpora. Verbal passives of *Pu'al* and *Huf'al* were virtually absent in spoken mother-child interactions, child-directed speech, child speech, children's peer talk (Berman, 1985; Ravid *et al.*, 2016), and in children's spoken personal-experience story-telling (Berman & Slobin, 1994). They were also negligible (under 2%) in the written narrative and expository texts of Hebrew-speaking high-schoolers and even university-educated adults (Berman & Nir-Sagiv, 2004). Past tense (no future tense) *Pu'al* and *Huf'al* verbs constituted under 1% of verb types and tokens in children's story-books and early school texts. Passive *Nif'al* past and future tense forms in the same corpora were as sparse. However, passive verb usage was noted as a prominent high register marker in the expression of detached, abstract discourse stance in adolescent and adult discourse production (Berman & Ravid, 2009; Ravid & Berman, 2009), with special concentration in adult narrative writing (Ravid & Chen-Djermal, 2015). This supports our hypothesis regarding the special role passive constructions occupy in Hebrew event-telling and the drawn-out route to learning their usage contexts in the language.

Ravid (2004) reviewed several small-scale Hebrew-language experimental studies where past tense passive constructions were elicited in school-aged children. They all showed that, by age ten, syntactic errors in passive sentences were negligible, but correct production of passive morphology was still at 70%. A number of studies that elicited passive forms in morphosyntactic tasks had the same results (Ravid & Geiger, 2009), showing correct production of passive verb morphology at ceiling only by late adolescence (Ravid & Saban, 2008). Relatedly, Ravid and Epel Mashraki (2007) reported strong correlations between passive production, prosodic reading, and reading comprehension in nine-year-olds. Across all of these studies, *Nif'al* had the highest correct scores and attracted the most errors, leading us to assume that it constituted the bridge leading towards strict passives, given the prominence of intransitive, telic, and change-of-state *Nif'al* forms in early childhood (Berman, 1985).

To sum up, corpora studies indicated the marked absence of passive constructions from spoken and written Hebrew texts, except for the specific, adult preference for narrating events from a distanced discourse stance. Correspondingly, passive verb production in experimental conditions outlined a learning path starting very late, around age nine, reaching command only by late adolescence. Given children's command of Hebrew verb morphology and argument structure in early childhood, we hypothesized that the delay in learning Hebrew passives does not derive from syntactic nor morphological factors, but rather from the rare encounters with Hebrew passive constructions that are the direct outcome of their specific narrative role coupled with a detached and general stance.

Linguistic register. A critical component of the current study is the notion of LINGUISTIC REGISTER, characterized by Ferguson (1994, p. 16) as “the linguistic differences that correlate with different occasions of use”. This means that acquisition of register involves gaining command of the range of expressive options available in the target language, and being able to map relevant linguistic forms in accordance with communicative context (Biber, 1995). Moreover, register-sensitive usage is more aligned with the displaced writing mode, which allows for more planning and monitoring, hence more complex linguistic features (Halliday, 1989). Accordingly, verbal passives occupied a prominent part of the elevated Hebrew register in Ravid and Berman’s (2009) analysis of text production across adolescence.

Hypotheses in the current study

Against this background, the current study was the first systematic, large-scale, dedicated study of Hebrew passive elicitation in sentential context to engage school-going populations – children and adolescents – compared with adults. The passivization task included two new variables studied for the first time, suitable for examining the language of literate participants during the period of Later Language Development. First, the variable of linguistic REGISTER, that is, language level. Register was used as a measure of lexical specificity and degree of abstractness of the verb, following the criteria established in Hebrew by Ravid and Berman (2009). A second new variable was past versus future verb tense, as against all previous experimental studies on Hebrew passive production which involved past tense, the default form of Hebrew passives.

We had four hypotheses following the literature reviewed above. (1) Correct performance on the passive task was expected to increase from the youngest age group to adulthood, across the period of later language development. (2) Sentences with active verbs in higher register were expected to incur lower correct scores than those with verbs in neutral register. (3) We expected *Nif’al* to lead correct passive performance, that is, to have the highest scores starting from the lowest age group. We had no expectations regarding the ordering within the two strict passives *Pu’al* and *Huf’al*, as previous studies had shown conflicting results. (4) As an irrealis temporal form, future tense is rarely used in referring to events. Accordingly, we expected higher performance on the canonical past tense verbs.

METHOD

This study was a structured elicitation task testing the production of Hebrew passive voice constructions in writing. PARTICIPANTS were 134 typically developing monolingual, native Hebrew-speaking children, adolescents, and adults with no diagnosed language or learning disorders. They were all of

TABLE 2. *Structure of the Passive Task (N = 48 items)*

<i>Qal / Nif'al</i> N = 16		<i>Pi'el / Pu'al</i> N = 16		<i>Hif'il / Huf'al</i> N = 16	
Neutral register N = 8		Neutral register N = 8		Neutral register N = 8	
Past tense N = 4	Future tense N = 4	Past tense N = 4	Future tense N = 4	Past tense N = 4	Future tense N = 4
High register N = 8		High register N = 8		High register N = 8	
Past tense N = 4	Future tense N = 4	Past tense N = 4	Future tense N = 4	Past tense N = 4	Future tense N = 4

middle SES (socio-economic status), as determined by the Strauss Cultivation Measure (Strauss, 2007; Ensminger & Fothergill, 2003). All participants lived in the same region in the south of Israel. Participants were in seven age/schooling level groups: 23 eight- to nine-year-olds ($M = 8;8$) in third grade (henceforth designated eight-year-olds); 15 nine- to ten-year-olds ($M = 9;7$) in fourth grade; 17 ten- to eleven-year-olds ($M = 10;11$) in fifth grade; 20 eleven- to twelve-year-olds ($M = 11;7$) in sixth grade; 20 thirteen- to fourteen-year-olds ($M = 13;11$) in eighth grade; 19 sixteen- to seventeen-year-olds ($M = 16;10$) in eleventh grade; and 20 adult university students aged 25–35.

Materials

Participants were asked to change written active-voice sentences into corresponding passive-voice sentences. Materials consisted of 48 task sentences divided according to three variables: verb register, *binyan*, and verb tense (Table 2).

Register. Half of the sentences (24) were in neutral register, and the other half in high register. Verbs with neutral register corresponded to Ravid and Berman's (2009) level 2 – colloquial everyday usage, e.g. *shalax* 'sent' – while high-register verbs corresponded to level 3 – the standard written usage of educated monolingual speakers, e.g. lexically specific, abstract *hexerim* 'confiscated'. Task verbs were checked against school texts to ensure their suitability for eight-year-olds, the youngest age group. Sentential arguments (agent and patient nouns) were adjusted to the verb's register level, based on Ravid's (2006) Noun Scale. For example, the agent and patient for neutral-register *send* were *Ron* and *letters* respectively (*Ron sent the letters*), while the agent and patient for high-register *confiscate* were *the Customs* and *merchandise* respectively (*the Customs confiscated the merchandise*). The register division was designed to determine whether lexical properties of the active verb and its context were helpful or detrimental in learning. All materials were piloted in a corresponding population to ensure that children understood the meanings of the sentences and their components.

Binyan. The three transitive verb patterns were given equal representation of sixteen sentences each: *Qal* (targeting passive *Nif'al*, as in *shadad/nishdad*

‘robbed / was robbed’), *Pi’el* (targeting passive *Pu’al* as in *pizer/puzar* ‘scattered / was scattered’), and *Hif’il* (*Huf’al*, as in *yaklit/yuklat* ‘will record / will be recorded’). This division enabled us to test the role of *binyan* morphology in learning to passivize.

Tense. Half of the task sentences had past tense verbs and half future tense verbs. The most compelling reason for this was that present tense passive forms (e.g. *meluxlax* ‘dirty’ in *Pu’al*) comprise an entirely different linguistic and psycholinguistic domain in Hebrew acquisition (Berman, 1994; Pe’er, 2013). Past and future tense verbs agree with their grammatical subjects in person, gender, and number, while present tense verbs carry gender and number (but no person) agreement marking, like adjectives. The division into past and future verb tense enabled us to test the role of the specific temporal patterns of each *binyan* in learning the passive forms, and to ask whether past tense passives were easier to acquire. All task verbs were in third person, e.g. *ha-talmid te’er et ha-riiv* ‘the-student described ACC the-fight’, so as to be narrative in tone.

Procedure

Testing took place in writing in the class forum, that is, during the school day in the classroom. Participation was voluntary: students who did not wish to participate were exempted and given other tasks in a different location on the school premises. Each student received one of two randomized versions of the target forty-eight sentences on two pages. Students sitting next to each other received two different versions to ensure individual work. Each target sentence in active voice was followed by a response line starting with the new grammatical subject, i.e. the active-sentence object NP, which served as a prompt to the passive voice construction that participants were asked to complete. For example, *ha-moxer yishkol et ha-sxora* ‘the-vendor will-weigh the-merchandise’ was followed by a line starting with *ha-sxora* ‘the merchandise’. Following piloting, the instruction at the top of the first page was as follows: “Following below are sentences. Re-write them without changing the meaning of the sentence nor its tense.” Given the age range of the participants, only one example was given: *Yossi axal et ha-tapúax* ‘Yossi ate ACC the-apple’, followed by *ha-tapúax ne’exal al yedey Yossi* ‘The-apple was eaten by Yossi’ (passive verb and *by*-phrase underlined in the given example).

Scoring

As the patient grammatical subject was used as the prompt, syntactic errors were virtually absent. Scoring thus focused on the morphological change from active to passive verb. Responses were categorized into six levels from 0 to 5. Level 5 designated a correct passive form in the required

TABLE 3. Percentages and standard deviations (in parentheses) of correct passive responses to the neutral-register verbs, by age/schooling group, *binyan*, and verb tense

Age/Schooling group	<i>Qal</i> → <i>Nif'al</i>		<i>Hif'il</i> → <i>Huf'al</i>		<i>Pi'el</i> → <i>Pu'al</i>	
	Past tense	Future tense	Past tense	Future tense	Past tense	Future tense
3 rd grade	86.96	39.13	70.65	91.30	63.04	48.91
8–9-year-olds	(22.45)	(35.21)	(24.60)	(23.36)	(30.03)	(36.52)
4 th grade	88.33	58.33	83.33	93.33	66.67	70.00
9–10-year-olds	(18.58)	(26.16)	(24.34)	(14.84)	(38.57)	(23.53)
5 th grade	91.18	66.18	91.18	95.59	82.35	86.76
10–11-year-olds	(21.54)	(34.16)	(17.55)	(9.82)	(27.62)	(26.69)
6 th grade	92.50	72.50	82.50	96.25	82.50	78.75
11–12-year-olds	(23.08)	(30.24)	(30.46)	(9.16)	(21.61)	(27.23)
8 th grade	96.25	80.00	91.25	98.75	98.75	96.25
13–14-year-olds	(12.23)	(20.84)	(16.77)	(5.59)	(5.59)	(9.16)
11 th grade	100	85.53	96.05	100	100	96.05
16–17-year-olds	(0.00)	(17.31)	(9.36)	(0.00)	(0.00)	(12.54)
Adults	100	96.25	100	100	100	100
25–35-year-olds	(0.00)	(12.23)	(0.00)	(0.00)	(0.00)	(0.00)

binyan, with further categorization indicating inflectional errors in tense. Level 4 indicated incorrect passive *binyan* responses, based on the correct root, e.g. erroneous *Huf'al hushdad* for correct *Nif'al nishdad* ‘was robbed’. For each of the three *binyan* patterns in the test, there were two possible erroneous alternatives – the other two *binyan* patterns. Thus, *Nif'al* or *Pu'al* passives were possible Level 4 errors for a target *Huf'al* passive form. Level 3 involved two passive-related errors: (1) present-tense resultative adjectives, e.g. *mexudad* ‘sharpened’ for target future tense *yexudad* ‘will be sharpened’; and (2) medial-passive *Hitpa'el*, e.g. erroneous *hitkanes* for target *Nif'al ninknas* ‘was fined’. Level 2 errors consisted of morphophonologically non-felicitous forms with some passive indication, such as *u*-vowels (e.g. *tusuman* for correct *tesuman* ‘will be marked’). Level 1 errors consisted of non-passive responses, usually focusing on the inflectional markers of the cue active form. For example, plural *hegifu* ‘they shuttered’ for *hegifa* ‘she shuttered’, where the target passive form should have been *hugfu* ‘were shuttered’. Level 0 errors consisted of non-passive semantic and syntactic alternatives (e.g. *kibel knas* ‘received a fine’ for *ninknas* ‘was fined’), irrelevant answers, and empty slots.

RESULTS

As register was the only non-morphological variable, we first report correct responses (Level 5 responses only, converted into percentages) in two separate tables, by register. Table 3 presents correct responses for the

TABLE 4. Percentages and standard deviations (in parentheses) of correct passive responses to the high-register verbs, by age/schooling group, binyan, and verb tense

Age/Schooling group	<i>Qal</i> → <i>Nif'al</i>		<i>Hif'il</i> → <i>Huf'al</i>		<i>Pi'el</i> → <i>Pu'al</i>	
	Past tense	Future tense	Past tense	Future tense	Past tense	Future tense
3 rd grade	29.35	26.29	57.61	73.91	66.30	41.30
8-9-year-olds	(30.76)	(26.65)	(32.36)	(23.21)	(28.81)	(40.32)
4 th grade	35.00	48.33	70.00	80.00	76.67	41.67
9-10-year-olds	(24.64)	(30.58)	(34.33)	(21.55)	(25.82)	(40.82)
5 th grade	50.00	50.00	82.35	83.82	89.70	61.76
10-11-year-olds	(36.44)	(36.44)	(24.63)	(26.43)	(21.76)	(36.57)
6 th grade	46.25	65.00	81.25	77.50	76.25	58.75
11-12-year-olds	(26.00)	(32.85)	(22.76)	(21.31)	(29.77)	(32.72)
8 th grade	66.25	75.00	96.25	87.50	95.00	85.00
13-14-year-olds	(30.64)	(34.41)	(9.16)	(19.02)	(13.08)	(23.51)
11 th grade	71.05	90.79	97.37	93.42	98.68	96.05
16-17-year-olds	(27.97)	(14.93)	(7.88)	(11.31)	(5.73)	(12.54)
Adults	95.00	100	100	100	98.75	96.25
25-35-year-olds	(10.26)	(0.00)	(0.00)	(0.00)	(5.59)	(9.16)

neutral-register verbs, and Table 4 presents correct responses for the high-register verbs. A four-way ANOVA of correct responses in (7) age/schooling groups (eight-, nine-, ten-, eleven-, thirteen-, sixteen-year-olds, and adults) × (3) *binyan* verb patterns (*Qal* → *Nif'al*, *Hif'il* → *Huf'al*, *Pi'el* → *Pu'al*) × (2) verb tense (past tense, future tense) × (2) register (neutral, high) was performed on the data in Tables 3 and 4.

This analysis yielded an effect for register ($F(1,127) = 179.43$, $p < .001$, $\eta = 0.59$) – verbs with neutral register scored higher ($M = 86.03\%$) than verbs with high register ($M = 74.08\%$). A four-way interaction of age/schooling group, *binyan* pattern, verb tense, and register was found ($F(12,254) = 3.43$, $p < .001$, $\eta = 0.14$), with subsequent two three-way and three two-way interactions involving register. These results confirmed our initial hypothesis regarding the critical importance of linguistic register in passivization. We thus turned to two separate analyses in neutral- and high-register active/passive verbs.

Correct passivization of verbs in neutral register

A three-way ANOVA of correct (Level 5) responses in (7) age/schooling groups × (3) *binyan* verb patterns × (2) verb tense was performed on the data in Table 3. Correct responses increased ($F(6,127) = 20.35$, $p < .001$, $\eta = 0.49$) from 66.67% in eight-year-olds to 93.54% in thirteen-year-olds. Further Bonferroni pairwise comparisons showed three clusters of

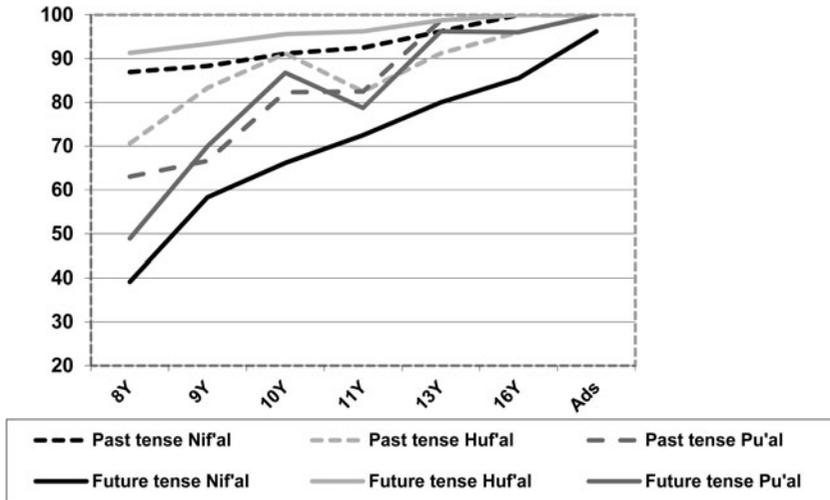


Fig. 1. Interaction of age group, *binyan* verb pattern, and verb tense in correct passive responses of neutral register.

age/schooling groups – eight- and nine-year-olds, ten- and eleven-year-olds, and the three oldest groups. The effect for *binyan* verb pattern ($F(2,254) = 13.70$, $p < .001$, $\eta = 0.1$) and further Bonferroni comparisons showed that *Huf'al* responses ($M = 92.16\%$) were higher than *Pu'al* ($M = 83.37\%$) and *Nif'al* ($M = 82.37\%$) responses, which did not differ from each other. Verbs in past tense scored higher ($M = 88.74\%$) than verbs in future tense ($M = 83.33\%$) ($F(1,127) = 25.45$, $p < .001$, $\eta = 0.17$).

Three two-way interactions of age group with *binyan* ($F(12,254) = 2.25$, $p = .01$, $\eta = 0.1$) and with verb tense ($F(6,127) = 2.30$, $p = .04$, $\eta = 0.1$) and of *binyan* and verb tense ($F(2,254) = 79.02$, $p < .001$, $\eta = 0.38$) were found, as well as a three-way interaction of age group, *binyan*, and verb tense ($F(12,254) = 5.88$, $p < .001$, $\eta = 0.22$). Figure 1 shows that future tense *Nif'al* had the lowest scores in eight-year-olds and the shallowest growth curve, while future tense *Huf'al* verbs and past tense *Nif'al* verbs had the highest scores. Verbs in past tense *Huf'al* and both *Pu'al* tense patterns were in the middle.

Correct passivization of verbs in high register

A three-way ANOVA of correct responses in (7) age/schooling groups \times (3) *binyan* verb patterns \times (2) verb tenses was performed on the data in Table 4. Correct responses increased with age ($F(6,127) = 29.45$, $p < .001$, $\eta = 0.58$) from 49.09% in eight-year-olds to 91.23% in sixteen-year-olds.

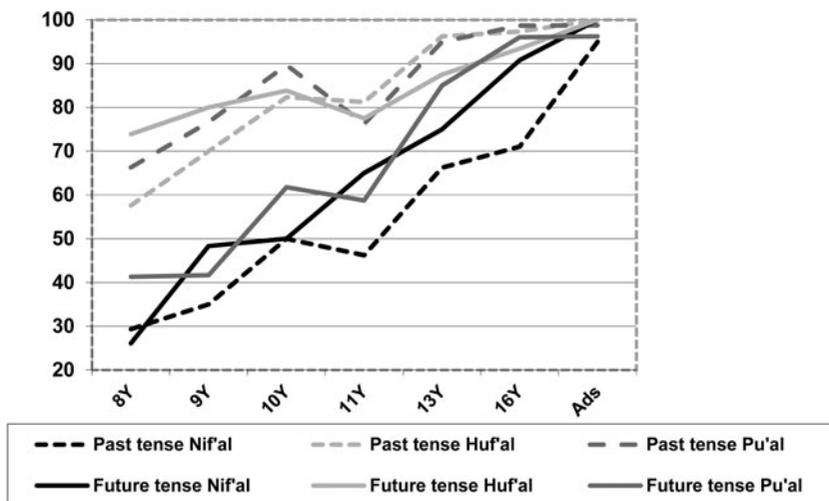


Fig. 2. Interaction of age group, *binyan* verb pattern, and verb tense in correct passive responses of high register.

Further Bonferroni comparisons showed the same three clusters of age/schooling groups as in neutral register – eight- and nine-year-olds, ten- and eleven-year-olds, and the three oldest groups. The effect for *binyan* verb pattern ($F(2,254) = 52.24$, $p < .001$, $\eta = 0.29$) and Bonferroni comparisons showed that all three *binyan* patterns significantly differed from each other: *Huf'al* responses ($M = 84.36\%$) were highest, followed by *Pu'al* ($M = 77.30\%$) and then *Nif'al* ($M = 60.58\%$) responses. Verb tense was not significant.

Two two-way interactions of age group with *binyan* ($F(12,254) = 2.41$, $p = .006$, $\eta = 0.1$) and of *binyan* and verb tense ($F(2,254) = 34.24$, $p < .001$, $\eta = 0.21$) were found, as well as a three-way interaction of age group, *binyan*, and verb tense ($F(12,254) = 3.64$, $p < .001$, $\eta = 0.15$). Figure 2 shows two distinct groups of patterns in acquisition: the three higher-scoring patterns were past tense *Pu'al* and the two *Huf'al* tense patterns; the three lower-scoring patterns were past tense and future tense *Nif'al*, and future-tense *Pu'al*.

Error analysis

Non-morphological errors were very few and did not permit statistical analysis. They occurred only in eight- and nine-year-olds, and mostly consisted of providing syntactic alternatives in the form of subordinated clauses, e.g. *ha-shulxan zaz biglal she-ha-mora heziza oto* 'the desk moved

TABLE 5. Percentages and standard deviations (in parentheses) of erroneous passive *binyan* responses out of the total of responses in neutral register, by age/schooling group, *binyan*, and verb tense

Age/Schooling group	<i>Qal</i> → <i>Nif'al</i>		<i>Hif'il</i> → <i>Huf'al</i>		<i>Pi'el</i> → <i>Pu'al</i>	
	Past tense	Future tense	Past tense	Future tense	Past tense	Future tense
3 rd grade	8.69	47.83	10.87	2.17	10.87	26.09
8–9-year-olds	(17.85)	(32.78)	(14.74)	(7.20)	(14.74)	(26.63)
4 th grade	10.00	41.67	10.00	0.00	15.00	8.33
9–10-year-olds	(18.42)	(26.16)	(15.81)	(0.00)	(18.41)	(15.43)
5 th grade	7.35	29.41	4.41	1.47	4.41	2.94
10–11-year-olds	(17.15)	(30.92)	(13.21)	(6.06)	(13.21)	(8.30)
6 th grade	7.50	27.50	13.75	0.00	1.25	3.75
11–12-year-olds	(13.08)	(30.24)	(27.47)	(0.00)	(5.59)	(16.77)
8 th grade	2.50	18.75	5.00	0.00	0.00	2.50
13–14-year-olds	(7.69)	(21.27)	(13.08)	(0.00)	(0.00)	(7.69)
11 th grade	0.00	14.47	3.95	0.00	0.00	1.31
16–17-year-olds	(0.00)	(17.31)	(9.36)	(0.00)	(0.00)	(5.73)
Adults	0.00	3.75	0.00	0.00	0.00	0.00
25–35-year-olds	(0.00)	(12.23)	(0.00)	(0.00)	(0.00)	(0.00)

because the teacher moved it', instead of changing *heziza* 'she moved, TR' to *huzaz* 'was moved' as prompted. The overwhelming majority of errors were morphological. Accordingly, we focused on Level 4 errors—that is, responses that used erroneous passive *binyan* morphology. Tables 5 and 6 present the percentages of erroneous passive *binyan* responses out of the total number of responses. Three-way ANOVAs of erroneous passive *binyan* responses in (7) age/schooling groups × (3) *binyan* verb patterns × (2) verb tenses were performed on the data in Tables 5 and 6.

Neutral register. Erroneous passive responses declined with age ($F(6,127) = 11.65$, $p < .001$, $\eta = 0.35$), with a cut-off between the younger age/schooling groups ($M = 22.75\%$ in eight-year-olds, $M = 12.78\%$ in nine-year-olds) and the rest of the groups (under 10% in ten- and eleven-year-olds, dwindling to 5% in the older groups, virtually absent in the adults). Regarding *binyan* ($F(2,254) = 38.16$, $p < .001$, $\eta = 0.23$), *Nif'al* had the most passive *binyan* errors ($M = 15.67\%$), followed by *Pu'al* ($M = 5.46\%$) and *Huf'al* responses ($M = 3.69\%$), which did not differ. Verb tense was also significant ($F(1,127) = 40.43$, $p < .001$, $\eta = 0.24$), with more passive *binyan* errors ($M = 11.04\%$) in future than in past tense ($M = 5.5\%$). Three two-way interactions of age group with *binyan* ($F(12,254) = 2.58$, $p = .003$, $\eta = 0.11$), age group and verb tense ($F(6,127) = 4.53$, $p < .001$, $\eta = 0.18$), and *binyan* and verb tense ($F(2,254) = 80.48$, $p < .001$, $\eta = 0.39$) were found, as well as a three-way interaction of age group, *binyan*, and verb

TABLE 6. Percentages and standard deviations (in parentheses) of erroneous passive *binyan* responses out of the total of responses in high register, by age/schooling group, *binyan*, and verb tense

Age/Schooling group	<i>Qal</i> → <i>Nif'al</i>		<i>Hif'il</i> → <i>Huf'al</i>		<i>Pi'el</i> → <i>Pu'al</i>	
	Past tense	Future tense	Past tense	Future tense	Past tense	Future tense
3 rd grade	44.56	55.43	13.04	4.35	5.43	25.00
8-9-year-olds	(29.15)	(30.11)	(19.76)	(9.69)	(10.54)	(28.20)
4 th grade	50.00	45.00	5.00	13.33	6.67	15.00
9-10-year-olds	(25.00)	(31.62)	(14.01)	(18.58)	(14.84)	(24.64)
5 th grade	42.65	41.18	1.47	10.29	1.47	11.76
10-11-year-olds	(35.09)	(31.80)	(6.06)	(17.81)	(6.06)	(21.86)
6 th grade	50.00	28.75	7.50	12.50	7.50	13.75
11-12-year-olds	(24.33)	(29.55)	(18.32)	(15.17)	(11.75)	(22.18)
8 th grade	33.75	22.50	1.25	10.00	1.25	3.75
13-14-year-olds	(30.64)	(32.34)	(5.59)	(18.85)	(1.25)	(12.23)
11 th grade	27.63	9.21	0.00	3.95	0.00	2.63
16-17-year-olds	(26.21)	(14.93)	(0.00)	(9.36)	(0.00)	(7.88)
Adults	5.00	0.00	0.00	0.00	1.25	1.25
25-35-year-olds	(10.26)	(0.00)	(0.00)	(0.00)	(5.59)	(5.59)

tense ($F(12,254) = 4.21, p < .001, \eta = 0.17$). Figure 3 shows that future tense *Nif'al* had the most passive *binyan* errors, declining from close to 50% in eight-year-olds to a virtual absence in adults. Of the 140 erroneous passive *binyan* responses to target future tense *Nif'al*, 120 (86%) were in *Huf'al*, and the rest in *Pu'al*.

High register. Erroneous passive responses declined with age ($F(6,127) = 17.08, p < .001, \eta = 0.45$), but the cut-off was between eight- and eleven-year-olds, with over 20% such errors ($M = 24.6\%$ in eight-year-olds) and the two oldest groups, with under 10% errors, with the thirteen-year-olds lying in between ($M = 12.1\%$), differing only from adults. Regarding *binyan* ($F(2,254) = 115.72, p < .001, \eta = 0.48$), *Nif'al* had the most passive *binyan* errors ($M = 32.55\%$), followed by *Pu'al* ($M = 6.91\%$) and *Huf'al* responses ($M = 6.91\%$), which did not differ. Verb tense was not significant. Three two-way interactions of age group with *binyan* ($F(12,254) = 4.54, p < .001, \eta = 0.18$), age group and verb tense ($F(6,127) = 2.91, p = .01, \eta = 0.12$), and *binyan* and verb tense ($F(2,254) = 16.30, p < .001, \eta = 0.11$) were found, as well as a three-way interaction of age group, *binyan*, and verb tense ($F(12,254) = 3.30, p < .001, \eta = 0.13$). Figure 4 shows that future tense and past tense *Nif'al* had the most passive *binyan* errors, declining from about 50% in eight-year-olds to virtual absence in adults. Of the 152 erroneous passive *binyan* responses on target future tense *Nif'al*, 141 (93%) were in *Huf'al*, and the rest in *Pu'al*;

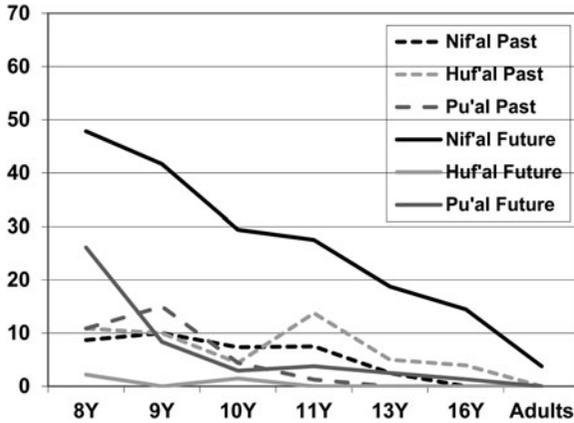


Fig. 3. Interaction of age group, *binyan* verb pattern, and verb tense in erroneous passive *binyan* responses, in neutral register.

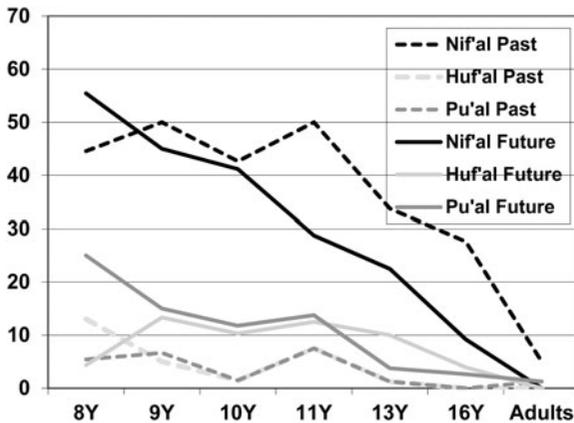


Fig. 4. Interaction of age group, *binyan* verb pattern, and verb tense in erroneous passive *binyan* responses, in high register.

of the 197 Level 4 responses on target past tense *Nif'al*, 179 (91%) were in *Pu'al*, and the rest in *Huf'al*.

DISCUSSION

This study elicited passive verbs in writing in a sentential context from Hebrew-speaking school-aged children, adolescents, and adults, focusing on the variables of neutral vs. high register, active/passive *binyan* pattern pairs (*Qal/Nif'al*, *Hif'il/Huf'al*, *Pi'el/Pu'al*), and past vs. future tense.

Passive as a very late acquisition: development

Our first two hypotheses regarding the protracted process of acquisition and the impact of register were confirmed. The current study found that learning passive verb morphology in Hebrew is a very late acquisition. Active verbs in neutral register with human subjects and concrete objects (e.g. *tsava* ‘painted’, *tadpis* ‘will type up’, *pizer* ‘scattered’) reached 90% correct responses only by age thirteen to fourteen, almost a decade later than attested in other languages with late passives. In our view, this delay is mostly due to the drawn-out process of learning to reconcile the role of Hebrew passives in the expression of event-oriented, dynamic and specific (rather than concept-oriented, generic, and static) content, with using the detached, distanced mode preferred by adult narrators (Berman, 2005; Ravid & Chen-Djema, 2015).

Passive learning in Hebrew demonstrates the interface of discourse abilities with grammatical acquisition. While Hebrew-speaking eight-year-olds have gained full and automatic command of verb morphology (Berman, 1985), their ability to productively match verb forms to discourse functions is just emerging (Berman, 2008). School-going ten-year-olds use distinct grammatical devices for narrative and expository agent demotion (Ravid, 2004), being familiar with the conventional child-oriented medial passive and adjectival passive devices prevalent in story-books (Ravid & Levie, 2010). Having encountered school texts, they are also familiar with the use of subjectless, often verbless, constructions for the expression of routines, ideas, and factual information (Berman, 1980; Ravid, 2005; Ravid & Zilberbuch, 2003). These two classes of grammatical devices are, however, kept apart for distinct genre expression.

Learning verbal passives in Hebrew requires the flexibility brought on by adolescent socio-cognitive development (Blakemore & Choudhury, 2006; Nippold, 2007), coupled with enhanced exposure to diverse communicative events and written texts of different genres (Berman & Ravid, 2009; Christie & Derewianka, 2008). By late adolescence, these developments enable Hebrew users to cross the strict genre–structure association and adopt the mature preference for the specialized usage of event-oriented verbal passives in taking a distanced, generic outlook on specific events.

Passive as a very late acquisition: register

As predicted, again, learning verbal passives was found to be mediated by linguistic register. In the current study, abstract, lexically specific, higher-register active verbs (*kansa* ‘fined’, *tanxe* ‘will lead the ceremony’, *nimek* ‘motivated’) yielded lower passive scores than neutral verbs, and reached 90% only by sixteen to seventeen years of age. Outside our experimental design, high-register verbal passives are the norm rather than

the exception in Hebrew usage, and moreover they usually co-occur with other abstract, mental, and irrealis high-register lexical items typical of adult expression (Ravid & Chen-Djermal, 2015). This is exemplified in (6), a 20 September 2015 Hebrew posting on Facebook:

- (6) *huḅhar li she-haséret yukran ha-érev*
 was-clarified to-me that-the-film will-be-screened this-evening
 ‘It was made clear to me that the film would be screened this evening’

As register is a lexical feature in Hebrew (Ravid & Berman, 2009), verbal passives are lexically rather than syntactically challenging. They are part of the lexical explosion that doubles adolescent vocabulary, ushering in also derived nominals (Ravid, 2004; Ravid & Avidor, 1998) and denominal adjectives (Ravid & Zilberbuch, 2003), categories with restricted semantic-pragmatic distributions and simpler alternatives used by younger speakers.

Learning the Hebrew passive: morphology and register

We now turn to the morphological aspects of passive acquisition. Recall the remaining hypotheses regarding the primacy of *Nif'al* as the bridge to passive learning, the indeterminate order of acquisition, and the challenge posed by future tense passive forms. The findings revealed a clear, though unexpected, order of acquisition among the three passive verb patterns, interacting differently with temporal patterns, and introducing syntactic and semantic considerations to the developmental picture.

Counter to previous findings, across development in both registers, and particularly in the high register, past and future tense *Huf'al* verbs fared the best in correct responses. *Pu'al* verbs followed; however, past was easier than future tense, especially in the high register. Finally, *Nif'al* verbs behaved differently in the two registers: future tense was extremely challenging in both registers, but past tense *Nif'al* verbs were as easy as *Huf'al* in neutral register, and as difficult as future tense *Nif'al* in high register. Moreover, target *Nif'al* verbs entailed four times as many passive *binyan* errors than both the other passive patterns, with *Huf'al* occupying all of *Nif'al* error space in neutral register, and all future tense *Nif'al* error space in high register. *Pu'al* attracted almost all past tense *Nif'al* errors. Explaining these results requires the examination of the properties of each active/passive *binyan* pair, as mediated by the lexical properties of register.

Huf'al passives. With the highest correct passive scores across all age groups, and as the major attractor of passive *binyan* errors, Hebrew learners clearly preferred *Huf'al* as the default verbal passive. This highlights *Hif'il/Huf'al* as the most syntactically, semantically, and phonologically regular and transparent active/passive pair in Hebrew. Of

the three active *binyan* patterns, *Hif'il* is the most transitive,⁵ with most *Hif'il* verbs taking the accusative direct object (Dattner, 2015), hence constituting the prototypical syntactic source for passive formation. Phonologically, too, *Huf'al* not only has the hallmark passive *u*-vowel, but is also completely uniform, the only passive *binyan* with the same vocalic pattern across all temporal stems. Semantically, *Huf'al* passives are the most inflection-like in nature, solely dedicated to the regular, virtually automatic passive modulation on the *hif'il* verb meaning. This is supported by a recent analysis of Hebrew resultative adjectives in children's peer talk, which showed that the category of derivational, lexically specific *Huf'al* adjectives was the smallest in the corpus (Pe'er, 2013).

Pu'al passives. *Pu'al* passives had an interim status in the study. In neutral register, they lay in between the high-scoring *Huf'al* / past tense *Nif'al* and the low-scoring future tense *Nif'al*. In high register, past tense *Pu'al* verbs clustered with *Huf'al*, while future tense *Pu'al* verbs shared a steep trajectory with *Nif'al* verbs. These results reflect the specific properties of the *Pi'el/Pu'al* pair.

Syntactically, *Pi'el* is less transitive than *Hif'il*, with more oblique (rather than accusative) objects (Dattner, 2015), and therefore fewer opportunities for passive formation. Phonologically, although *Pu'al* shares the *u*-vowel and the strict passive morphology with *Huf'al*, it is less uniform, absent the typical past tense *h*-prefix. Morphologically, *Pi'el* and *Pu'al* are strongly linked to *Hitpa'el* (Ravid *et al.*, 2016), offering a medial-passive escape hatch for the younger age groups: Thus, *Pu'al* had nine times as many Level 3 medial-passive errors (9%) than *Nif'al* and *Huf'al* (under 1%) in the younger groups – all of them in *Hitpa'el*; for example, *hitpasru* 'scattered' for correct *puzru* 'were scattered', and *yistakem* 'will add up to' for correct *yesukam* 'will be summarized'.

Taken together, these properties indicate the double function of *Pi'el/Pu'al* as the less regular and transparent strict passive pair, side by side with *Pu'al*'s central role as a derivational device, generating twice as many resultative adjectives than the other two passive patterns, many of them lacking transitive *Pi'el* sources (Pe'er, 2013). *Pu'al* was also revealed as the canonical Hebrew perfective passive, accounting for the fact that past tense *Pu'al* passives attracted the overwhelming majority *Nif'al* errors, and by the inferior results of future tense *Pu'al* passives.

Nif'al passives. Counter our predictions, the *Qal/Nif'al* pair constituted the major challenge to passive learning as the least preferred option for the expression of passive voice in participants up to adulthood. Future tense *Nif'al* verbs in neutral register and both tenses in high register had the

⁵ Even the small set of intransitive, inchoative *Hif'il* verbs such as *hivri* 'get well' or *hexmir* 'grow severe' always have a causative interpretation.

lowest scores in eight-year-olds, and distinctly steep trajectories. The maverick morphophonological properties of *Nif'al*, so different from the strict passives, would have led us to posit a suitable hypothesis, but all previous studies on Hebrew passive in acquisition had pointed at *Nif'al* as the bridge to passive learning. Thanks to including the tense and register variables, the current study can now offer a solution to this apparent contradiction.

Clearly, passive voice is only one of the functions of *Nif'al*. It is the canonical intransitive *binyan* in the *Qal/Nif'al/Hif'il/Huf'al* subsystem, holding a similar role to *Hitpa'el* in the subsystem it shares with *Pi'el* and *Pu'al* (Ravid *et al.*, 2016). The relationship between *Qal* and *Nif'al* is often transitive/middle, as in *shavar/nishbar* 'break,TR/break,INT', often with a simultaneous interpretation of both middle or passive, as in *tarak/nitrak* 'slam,TR/slam, INT ~ be slammed'. Many *Nif'al* middle/passives do not have *Qal* counterparts, e.g. *nirtav* 'get wet', while others hold idiosyncratic relationships with *Qal*, e.g. both *avad/ne'evad* meaning 'get lost' in high and neutral register, respectively. *Qal* itself, the most structurally and semantically irregular and variegated *binyan*, is the least transitive of the three passive-source *binyanim*, designated as transitivity-neutral in Berman (1993). This is also supported in that half of the adjectival passives in *CaCuC*, the passive resultative adjective pattern corresponding to the *Qal* and *Nif'al* paradigm, do not match a transitive verb in *Qal* (Pe'er, 2013).

It was only the neutral register past tense *Nif'al* verbs, all conveying the canonical perfective outlook, that had early high scores in the current study, as in the previous studies, and served as the early bridge to mature passives. Although most of them had the double middle/passive interpretation (e.g. *neheras* 'be/get destroyed', *nishkal* 'be weighed / weigh oneself'), there was no separate middle option attracting errors, as *Hitpa'el* does for *Pu'al*. In other words, in a different *binyan* they would have shown Level 3 errors. But when required to use the non-canonical future for the perfective outlook, these atypical *Nif'al* passives were rejected in favor of the default *Huf'al*. The high-register abstract *Nif'al* passives, so very different from the early *Nif'al* telics such as *nikra* 'tore', were the last to be acquired. They were abstract, clearly passive verbs (e.g. *tibalem* 'will be restrained', *niknesa* 'was fined'), but nonetheless systematically rejected by younger participants in favor of *Huf'al* (future tense) and *Pu'al* (past tense) errors. For example, *Huf'al twdak* for correct *Nif'al tibadek* 'will be examined', or *Pu'al guzal* for correct *Nif'al nigzal* 'was usurped'. It was only in late adolescence that participants were willing to forgo the strict passive options and accept *Nif'al* as a passive option of *Qal*.

CONCLUSIONS

The very late acquisition of Hebrew verbal passives is an example of how specific language typology interacts with the agent-demoting outlook of

passive voice. Morphological passives ride piggyback on middle/passive past tense *Nif'al* forms to begin with, but once the canonical *Pu'al* and *Huf'al* passives are learned in grade school, the *Nif'al* bridge is burned. Hebrew passive morphology enters the developmental picture only when learners have identified how verbal passives behave in the specifically perfective yet detached communicative contexts, where generic subjectless or adjectival passives will not do the job – most typically, when conversant with the literate, written mode.

Taking an overarching view of the domain, the study of passive voice acquisition has undergone several phases, side by side with changes in the construal of the passive voice in linguistics. Earlier studies viewed passive voice (mainly through the prism of English) as a syntactic phenomenon, with the delay to about age five explained by the need to move NPs in the sentence (Borer & Wexler, 1987; Pierce, 1992), or due to a universal maturational delay preventing children from connecting the patient role to the subject position (Horgan, 1978; Maratsos *et al.*, 1985). Later, input-driven analyses explained that English-speaking children under three do not generalize the construction due to scarce exposure in early childhood (Brooks & Tomasello, 1999). This view was supported by typological studies pointing to the early acquisition of both simple and complex forms of the passive in languages where passive constructions are prevalent (Allen & Crago; Demuth, 1990, 1996; Gil, 2006; Pye & Quixtan Poz, 1988). The current study was chaperoned by the shifting linguistic spotlight towards the verbal morphology of passives, on the one hand, and the extension of developmental psycholinguistic investigation to the realms of adolescence and written language, on the other.

REFERENCES

- Abraham, W. & Leisiö, E. (eds) (2006). *Passivization and typology: form and function*. Amsterdam: John Benjamins.
- Abraham, W. & Leiss, E. (2006). The impersonal passive: voice suspended under aspectual conditions. In W. Abraham & E. Leisiö (eds), *Passivization and typology: form and function*, 502–17. Amsterdam: John Benjamins.
- Alcock, K. J., Rimba, K. & Newton, C. R. J. C. (2011). Early production of the passive in two Eastern Bantu languages. *First Language* 32, 459–78.
- Allen, S. E. M. & Crago, M. B. (1996). Early passive acquisition in Inuktitut. *Journal of Child Language* 23, 129–55.
- Aschermann, E., Gulzow, I. & Wendt, D. (2004). Differences in the comprehension of passive voice in German- and English-speaking children. *Swiss Journal of Psychology* 63, 235–45.
- Baldie, B. J. (1976). The acquisition of the passive voice. *Journal of Child Language* 3, 331–48.
- Berman, R. A. (1980). The case of an (S)VO language: subjectless constructions in Modern Hebrew. *Language* 56, 759–76.
- Berman, R. A. (1985). *Acquisition of Hebrew*. Hillsdale, NJ: Lawrence Erlbaum.
- Berman, R. A. (1993). Marking of verb transitivity by Hebrew-speaking children. *Journal of Child Language* 20, 641–69.

- Berman, R. A. (1994). Formal, lexical, and semantic factors in acquisition of Hebrew resultative participles. *Berkeley Linguistic Society* **20**, 82–92.
- Berman, R. A. (2004). Between emergence and mastery: the long developmental route of language acquisition. In R. A. Berman (ed.), *Language development across childhood and adolescence* (pp. 9–34). Amsterdam: John Benjamins.
- Berman, R. A. (2005). Introduction: developing discourse stance in different text types and languages. *Journal of Pragmatics* **37**, 105–24.
- Berman, R. A. (2008). The psycholinguistics of developing text construction. *Journal of Child Language* **35**, 735–71.
- Berman, R. A. & Nir-Sagiv, B. (2004). Linguistic indicators of inter-genre differentiation in later language development. *Journal of Child Language* **31**, 339–80.
- Berman, R. A. & Ravid, D. (2009). Becoming a literate language user: oral and written text construction across adolescence. In D. R. Olson & N. Torrance (eds), *Cambridge handbook of literacy*, 92–111. Cambridge: Cambridge University Press.
- Berman, R. A. & Slobin, D. I. (1994). *Relating events in narrative: a crosslinguistic developmental study*. Hillsdale, NJ: Erlbaum.
- Biber, D. (1995). *Dimensions of register variation: a crosslinguistic comparison*. Cambridge: Cambridge University Press.
- Blakemore, S.-J. & Choudhury, S. (2006). Development of the adolescent brain: implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry* **47**, 296–312.
- Borer, H. & Wexler, K. (1987). The maturation of syntax. In T. Roeper and E. Williams (eds), *Parameter setting* (pp. 123–172). Dordrecht: Reidel.
- Brooks, P. J. & Tomasello, M. (1999). Young children learn to produce passives with nonce verbs. *Developmental Psychology* **35**, 29–44.
- Budwig, N. (1990). The linguistic marking of nonprototypical agency: an exploration into children's use of passives. *Linguistics* **28**, 1221–52.
- Christie, F. & Derewianka, B. (2008). *School discourse*. London: Continuum.
- Crain, S., Thornton, R. & Murasugi, K. (2009). Capturing the evasive passive. *Language Acquisition* **16**, 123–33.
- Dattner, E. (2015). Enabling and allowing in Hebrew: a Usage-Based Construction Grammar account. In B. Nolan, G. Rawoens & E. Diedrichsen (eds), *Causation, permission, and transfer: argument realisation in GET, TAKE, PUT, GIVE and LET verbs*, 271–93. Amsterdam: Benjamins.
- Demuth, K. (1990). Subject, topic and the Sesotho passive. *Journal of Child Language* **17**, 67–84.
- Demuth, K., Moloi, F. & Machobane, M. (2010). 3-Year-olds' comprehension, production, and generalization of Sesotho passives. *Cognition* **115**, 238–51.
- Dromi, E. & Berman, R. A. (1986). Language-general and language-specific in developing syntax. *Journal of Child Language* **14**, 371–87.
- Ensminger, M. E. & Fothergill, K. E. (2003). A decade of measuring SES: what it tells us and where to go from here. In M. H. Bornstein & R. H. Bradley (eds), *Handbook of parenting: socioeconomic status, parenting, and child development*, Vol. 5, 13–27. Mahwah, NJ: Erlbaum.
- Ferguson, C. A. (1994). Dialect, register, and genre: working assumptions about conventionalization. In D. Biber & E. Finegan (eds), *Sociolinguistic perspectives on register*, 15–30. New York: Oxford University Press.
- Ferreira, F. (1994). Choice of passive voice is affected by verb type and animacy. *Journal of Memory and Language* **33**, 715–36.
- Foley, W. A. (2007). A typology of information packaging in the clause. In T. Shopen (ed.), *Language typology and syntactic description: Vol. II, Clause structure*, 362–446. Cambridge: Cambridge University Press.
- Fox, D. & Grodzinsky, Y. (1998). Children's passive: a view from the *by*-phrase. *Linguistic Inquiry* **29**, 311–32.
- Gámez, P. B., Shimpi, P. M., Waterfall, H. R. & Huttenlocher, J. (2009). Priming a perspective in Spanish monolingual children: the use of syntactic alternatives. *Journal of Child Language* **36**, 269–90.

- Gil, D. (2006). The acquisition of voice morphology in Jakarta Indonesian. In N. Gagarina & I. Güllzow (eds), *The acquisition of verbs and their grammar: the effect of particular languages*, 201–27. Dordrecht: Springer.
- Givón, T. (1981). Typology and functional domains. *Studies in Language* 5, 163–93.
- Gordon, P. & Chafetz, J. (1990). Verb-based versus class-based accounts of actionality effects in children's comprehension of passives. *Cognition* 36, 227–54.
- Halliday, M. A. K. (1989). *Spoken and written language*. Oxford: Oxford University Press.
- Haspelmath, M. (1990). The grammaticalization of passive morphology. *Studies in Language* 14, 25–72.
- Horgan, D. (1978). The development of the full passive. *Journal of Child Language* 5, 65–80.
- Keenan, E. L. & Dryer, M. S. (2007). Passive in the world's languages. In T. Shopen (ed.), *Language typology and syntactic description: Vol. II, Clause structure*, 325–61. Cambridge: Cambridge University Press.
- Lee, K.-O. & Lee, Y. (2008). An event-structural account of passive acquisition in Korean. *Language and Speech* 51, 133–49.
- Maratsos, M., Fox, D. E., Becker, J. A. & Chalkley, M. A. (1985). Semantic restrictions on children's passives. *Cognition* 19, 167–91.
- Marchman, V. A., Bates, E., Burkardt, A. & Good, A. B. (1991). Functional constraints of the acquisition of the passive: toward a model of the competence to perform. *First Language* 11, 65–92.
- Messenger, K. (2010). Syntactic priming and children's production and representation of the passive. *Language Acquisition* 17, 121–3.
- Messenger, K., Branigan, H. P. & Mclean, J. F. (2012). Is children's acquisition of the passive a staged process? Evidence from six- and nine-year-olds' production of passives. *Journal of Child Language* 39, 991–1016.
- Mitkovska, L. & Bužarovska, E. (2012). An alternative analysis of the English *get*-past participle constructions: Is *get* all that passive? *Journal of English Linguistics* 40, 196–215.
- Monachesi, P. (2005). *The verbal complex in Romance: a case study in grammatical interfaces*. Oxford: Oxford University Press.
- Myhill, J. (1997). Towards a functional typology of agent defocusing. *Linguistics* 35, 799–844.
- Nippold, M. A. (2007). *Later language development: school-age children, adolescents, and young adults*, 3rd ed. Austin, TX: Pro-Ed.
- Pe'er, M. (2013). *Resultative passives in the Hebrew lexicon and in Hebrew-speaking children's peer talk*. Unpublished MA thesis, Tel Aviv University [in Hebrew].
- Pierce, A. (1992). The acquisition of passives in Spanish and the question of A-chain maturation. *Language Acquisition* 2, 55–81.
- Pinker, S., Lebeaux, D. S. & Frost, L. R. (1987). Productivity and constraints in the acquisition of the Passive. *Cognition* 26, 195–267.
- Prat-Sala, M., Shillcock, R. & Sorace, A. (2000). Animacy effects on the production of object dislocated descriptions by Catalan-speaking children. *Journal of Child Language* 27, 97–117.
- Pye, C. & Quixtan Poz, P. (1988). Precocious passives (and antipassives) in Quiche Mayan. *Papers and Reports on Child Language Development* 27, 71–80.
- Rathert, M. (2006). Simple preterit and composite perfect tense: the role of the adjectival passive. In W. Abraham & L. Leisiö (eds), *Passivization and typology: form and function*, 518–42. Amsterdam: John Benjamins.
- Ravid, D. (1995). *Language change in child and adult Hebrew: a psycholinguistic perspective*. New York: Oxford University Press.
- Ravid, D. (2004). Later lexical development in Hebrew: derivational morphology revisited. In R. A. Berman (ed.), *Language development across childhood and adolescence: psycholinguistic and crosslinguistic perspectives*, 53–82. Amsterdam: Benjamins.
- Ravid, D. (2005). Emergence of linguistic complexity in written expository texts: evidence from later language acquisition. In D. Ravid & H. Bat-Zeev Shyldkrot (eds), *Perspectives on language and language development*, 337–55. Dordrecht: Kluwer.

- Ravid, D. (2006). Semantic development in textual contexts during the school years: Noun Scale analyses. *Journal of Child Language* **33**, 791–821.
- Ravid, D., Ashkenazi, O., Levie, R., Ben Zadok, G., Grunwald, T., Bratslavsky, R. & Gillis, S. (2016). Foundations of the root category: analyses of linguistic input to Hebrew-speaking children. In R. Berman (ed.), *Acquisition and development of Hebrew: from infancy to adolescence* (pp. 95–134) (TILAR (Trends in Language Acquisition Research) 19). Amsterdam: John Benjamins.
- Ravid, D. & Avidor, A. (1998). Acquisition of derived nominals in Hebrew: developmental and linguistic principles. *Journal of Child Language* **25**, 229–66.
- Ravid, D. & Berman, R. (2009). Developing linguistic register in different text types. *Pragmatics & Cognition* **17**, 108–45.
- Ravid, D. & Chen-Djermal, Y. (2015). Spoken and written narration in Hebrew: a case study. *Written Language and Literacy* **18**, 56–81.
- Ravid, D. & Epel Mashraki, Y. (2007). Prosodic reading, reading comprehension and language skills in Hebrew-speaking 4th graders. *Journal of Research in Reading* **30**, 140–56.
- Ravid, D. & Geiger, V. (2009). Promoting morphological awareness in Hebrew-speaking gradeschoolers: an intervention study using linguistic humor. *First language* **29**, 81–112.
- Ravid, D. & Levie, R. (2010). Adjectives in the development of text production: lexical, morphological and syntactic analyses. *First Language* **30**, 27–55.
- Ravid, D. & Saban, R. (2008). Syntactic and meta-syntactic skills in the school years: a developmental study in Hebrew. In I. Kupferberg & A. Stavans (eds), *Language education in Israel: papers in honor of Elite Olshtain*, 75–110. Jerusalem: Magnes Press.
- Ravid, D. & Zilberbuch, S. (2003). Morpho-syntactic constructs in the development of spoken and written Hebrew text production. *Journal of Child Language* **30**, 395–418.
- Schwarzwald, O. (2008). The special status of Nif'al in Hebrew. In S. Armon-Lotem, G. Danon, and S. Rothstein (eds), *Current issues in generative Hebrew linguistics*, 61–75. Amsterdam: John Benjamins.
- Shibatani, M. (2006). On the conceptual framework for voice phenomena. *Linguistics* **44**, 217–69.
- Strauss, S. (2007). *Ministry of Education Chief Scientist report on the Cultivation Measure*. Jerusalem: Ministry of Education [in Hebrew].
- Svenonius, P. (2004). Slavic prefixes inside and outside VP. In P. Svenonius (ed.), *Nordlyd, Tromsø Working Papers on Language and Linguistics* 32(2): *Special issue on Slavic prefixes*, 205–253. Tromsø: University of Tromsø.
- Timberlake, A. (2007). Aspect, tense, mood. In T. Shopen (ed.), *Language typology and syntactic description: Vol. II, Grammatical categories and the lexicon*, 280–333. Cambridge: Cambridge University Press.
- Tomasello, M., Brooks, P. J. & Stern, E. (1998). Learning to produce passive utterances through discourse. *First Language* **18**, 223–37.