

ical and morphological forms characteristic of formal spoken Hebrew (e.g., "I'll be with you shortly," "This dress is very festive/gorgeous/amazing"), forms that typically would not occur in the girls' conversational speech. Similarly, when two 9-year-old boys discussed a problem they were having with a mutual friend, they practiced using turn-taking skills, cohesive markers, logical sequencing, and collaborative comments. According to Blum-Kulka, these attainments were promoted, in part, by the shared culture of childhood – the knowledge that each child had of the situation, each other, and of other people. Other studies of peer talk and socialization indicate similar benefits to later language development (e.g., Dorval & Eckerman 1984).

## Conclusions

The chapters in this book provide intriguing new information and insights into later language development. With contributions from international researchers, it represents an inspiring trend in the field of psycholinguistics, indicating that later language development is being investigated with intensity around the world. It is fascinating to consider the similarities in this process across languages and the manner in which this expanding body of knowledge contributes to an understanding of how the human capacity for language development remains active well beyond the preschool years.

It is not the purpose of this book to explain how this body of knowledge can be applied for practical purposes. Nonetheless, it is important to note that it offers substantial implications for professionals working in a variety of disciplines, including linguistics, psychology, education, language pedagogy, and speech-language pathology. As more is learned about the nature of later language development, its relationship to literacy, and the factors underlying its growth, practitioners will gain insight into the difficulties experienced by school-age children and adolescents who demonstrate language-learning weaknesses, as some of the authors in this volume indicate (e.g., Dockrill & Messer; Scott). Importantly, this information will enable professionals to enhance the learning process in students who struggle to become literate language users. For these reasons, this book will surely speak to readers around the world that have very different interests.

## Between emergence and mastery The long developmental route of language acquisition \*

Ruth A. Berman

### 1. Introduction

The chapter considers an apparent paradox in children's acquisition of their native language: the incompatibility between early emergence versus late mastery of linguistic knowledge. The term 'acquisition' in the title is itself anomalous, since concern here is crucially with language *development*, in the sense of the path taken by children from initial emergence to mature mastery of linguistic knowledge. The study reflects a general thrust of my research in the domain, and its claims are supported by findings from other chapters in this volume: the need to take into account linguistic, cognitive, and social forces as shaping the path from becoming a 'native speaker' to being a 'proficient speaker' (and/or writer) of a given language. From this perspective, language proficiency involves a complex configuration of interrelated types of knowledge: (1) *linguistic* command of the full range of expressive options, both grammatical and lexical, available in the target language; (2) the *cognitive* ability to integrate forms from different systems of the grammar, and to deploy these options to meet different communicative goals and discourse functions; and (3) *cultural* recognition of what constitute the favored options of a given speech community, adapted to varied communicative contexts and to different norms of usage.<sup>1</sup>

As a starting point, I take a key finding of work with Dan Slobin on narrative development (Berman & Slobin 1994). Children of different ages and speaking different languages were asked to tell a story based on a wordless picture-book describing the adventures of a boy and his dog in search of a runaway frog. Even the youngest subjects, aged 3 to 4 years, produced texts that were syntactically constructed in accordance with the grammatical struc-

tures of their first language. This confirms the Chomskian view of language acquisition as a short-lived and efficient process, which “envisions a rapid and effortless transition from the ‘initial state’ to the ‘final state’ (Crain & McKee 1985: 94), and it supports the claim that “There is growing consensus that by the age of three, children have acquired the basic phonological, morpho-syntactic, and semantic regularities of the target language irrespective of the language or languages to be learned” (Weissenborn & Höhle 2000: vii). On the other hand, our study showed that the oldest children in our sample, aged 9 to 10 years, produced narratives that differed markedly from those of the adults, not only in content but also in morpho-syntax and lexicon. From this we concluded that becoming a *native* speaker is a rapid and highly efficient process, but becoming a *proficient* speaker takes a long time. This chapter aims to provide further evidence that linguistic forms, many of which emerge at early preschool age, in fact have ‘a long developmental history’.

Our earlier findings are supported by recent cross-linguistic research on the text production abilities of schoolchildren and adolescents compared with adults, as summarized in Berman & Verhoeven (2002a, b), and detailed by Berman (2004; in press b); Berman & Nir-Sagiv (2004); Ravid (in press); and the chapter by Jisa, this volume. This work supports findings of English-language researchers such as Nippold (1998) and Scott & Windsor (2000), which underscores the protracted nature of language development, into and even beyond adolescence. These and related studies also shed light on the cognitive and socio-cultural underpinnings of developing language use in constructing expository compared with narrative texts, and in writing compared with speech (Berman & Katzenberger 2004; Berman et al. 2002; Ravid & Berman 2003; in press; Reilly et al. 2002; Strömqvist et al. 2004; and by Wengelin & Strömqvist, this volume).

In accounting for *order* of acquisition, researchers have tended to focus on linguistic complexity, of form – in morpho-syntactic structures and processes – or content, in semantic representations and lexical specificity. The approach taken here is that neither structural complexity nor transparency of form-meaning mappings suffice to account for what linguistic forms children acquire, and master, when. Rather, factors of cognitive demands, expressive options, and target language typology also play a role in the path from emergence to mastery of language.

The cognitive demands involved in language acquisition have been freshly illuminated by recent cross-linguistic and cross-cultural research on the topic of ‘language and thought’ (Bowerman & Levinson 2001; Gumperz & Levinson 1996). These studies highlight the complexity of the task faced by children in

mastering language use along with linguistic structure. One reason is that language learners, like everybody else, face the problem of *choice* – both of what to say and how to say it. To this end, they need to learn how to tap into the full repertoire of expressive options available to them in ways that are appropriate to a particular context of discourse. This is not simply a question of the conceptual complexity of relevant notions, such as causality, attribution, or temporal sequence. The mental abilities needed to talk about such concepts emerge quite early in development. This is also true for other types of cognitive representations relevant to extended discourse, like knowledge of scripts, the ability to recall past events in constructing narratives, and to distinguish between different discourse genres such as descriptions versus stories. For example, in their initial attempts to express the discourse function of making reference to the characters in a story, young children can rely on their conceptual ability to distinguish between people and animals, between children and adults, between men and women. But these abilities still do not mean that preschoolers’ cognitive representations and processing abilities are adequate to the task of producing communicatively appropriate and well-organized pieces of discourse on a range of topics.

On the other side of the ‘form-function’ coin, it is not enough to in some sense ‘know’ the relevant linguistic forms. Thus, 4-year-olds are familiar with many linguistic devices for making reference, and 5- and 6-year-olds know even more: naming and labeling by proper or common nouns; describing by adjectives, prepositional phrases, or relative clauses; and using pronouns, null subjects, and determiners. However, young children are not yet capable of coping with the cognitive load involved in the simultaneous execution of different tasks. In the case of narrative reference, they need to organize a text globally around the main protagonist(s), taking into account secondary protagonists, while at the same time recruiting the appropriate linguistic devices for encoding this by unambiguous means of expression (Hickmann 2003). In an earlier study (Berman & Katzenberger 1998), we interpreted preschoolers’ inability to cope with the cognitive demands involved in execution of these different tasks concurrently in light of the ideas of Shatz (1984) on storytelling and of Pascual-Leone (1987) in other cognitive domains – as deriving from the difficulty imposed by cognitive overload on young children’s online processing of linguistic output.

Another factor affecting what children will learn relatively late is *target language variability*. The source of such variation may be dialectal, as in the standard language of school compared with the local dialect of the home; historical, as in the different strata of English vocabulary; and/or contextual, as in regis-

ter differences between everyday colloquial usage, standard intermediate-level usage of the media or of academic discourse, and the normative requirements of the official language establishment (Ravid 1995). Ready and flexible access to diverse linguistic registers, varied levels of usage, and different types of texts are prerequisites for 'linguistic literacy' (Ravid & Tolchinsky 2002), and require both protracted cognitive maturation and extensive experience with different communicative settings. These demands, as noted by several of the chapters in this volume, are met, if at all, only in adolescence or beyond.

In what follows I try to show how structural and referential complexity interact with factors of target-language typology, register variation, and speaker preferences for particular expressive options in specifying development from emergence via acquisition to mastery. As background, the chapter outlines a phrase-based model of language development (Section 2), illustrated by research on three domains of Hebrew lexicon and grammar (Section 3), summed up by predictions based on these ideas and research findings (Section 4).

## 2. A phase-based model of language development

The discrepancy between early emergence and late mastery can best be explained by considering linguistic form in relation to language use across development. Within such a *form-function* approach, 'linguistic form' is a cover-term for the entire gamut of devices available in a language – grammatical inflections, derivational morphology, lexical expressions, syntactic constructions, and syntactic processes (Slobin 2001); and 'discourse functions' involve textual properties such as making reference to persons, objects, and ideas; expressing spatial and temporal relations; and interconnecting the parts of a discourse into thematically coherent units (Hickmann 2003). The basic idea underlying this approach is that, as a result of increased linguistic knowledge and greater experience with language use, speakers (and writers) come to deploy a wider, more flexible variety of linguistic forms to express a particular discourse function (Berman 1996, 1997a; Berman & Slobin 1994; Slobin 1996, 1997).

A second facet of this conception is that language acquisition is not instantaneous but essentially developmental in nature. Moreover, the process follows a developmental route which is peculiar to linguistic development in some respects but which also shares key properties with development in other cognitive and social domains (as argued by Berman et al. 2002; Karmiloff-Smith 1986a, 1992).

In order to integrate a 'form-function' approach with the 'developmental paradox' noted at the outset, I propose a phase-based model of language acquisition and development, as summarized in (1).

- (1) Phases in language development:
  - I Pre-grammatical: item-based, situation-bound
  - II Grammaticalized: structure-dependent, rule-bound
  - III Conventionalized: context-oriented, discourse-motivated

This model was first articulated in relation to Hebrew inflectional and derivational morphology (Berman 1986a). Other domains to which it has since been applied are: morphological marking of transitivity and voice (Berman 1993b); syntactic constructions such as complex noun phrases, word classes, null subjects, and nominalizations (Berman 1987a, 1988a, 1990, 1993c); and narrative text construction (Berman 1988b, 1993a, 1995a). The focus of these studies, as well as of the analyses in the next section, is on the *nature* of these changes rather than on the 'mechanisms of language acquisition' (MacWhinney 1987). However, both the claims made in the preceding section and the evidence marshaled in Section 3 uphold the view that no single mechanism can account for the complex question of 'what drives change in children's grammar' (Bowerman 1987).

Several general properties characterize the changes from emergence to mastery, from juvenile to fully appropriate use of language. First, following Karmiloff-Smith (1986a), these changes occur – in fact recur – across developmental *phases* rather than in invariant, cross-domain Piagetian stages. For example, children may have acquired the grammar of number and gender agreement, yet still be at an 'item-based' phase of person marking (Tomassello 2001b); and children may have structure-dependent knowledge of inflections without rule-based command of form-meaning relations in derivational morphology (see Ravid, this volume). Second, this model takes into account 'partial knowledge' and reorganizations en route from 'entry to exit', from the initial to so-called end-state. In fact, it is intrinsically 'open-ended', to allow for individual differences, linguistic variation, and language change. Third, command of linguistic knowledge develops and is successively reintegrated with increased ability in the domain of language *use*. That is, there is a constant two-way interaction, rather than a dichotomous distinction, between competence and performance in this as in other domains (Berman 1995a). With age and increased cognitive and social maturation, the linguistic behavior of speaker-writers comes to have an increasing effect on their internal linguistic representations; concomitantly, growing knowledge in different linguistic

domains has an increasing impact on language use. Thus, later language development involves a more expert and flexible interplay between augmented linguistic knowledge, on the one hand, and greater experience with language use in varied communicative contexts, on the other.

This general framework is elaborated in (2), which breaks down the three phases of (1) into a sequence of five steps.

- (2) Five developmental steps:
  - a. *Rote-knowledge* – initial acquisition of individual items as unanalyzed amalgams, closely tied to the immediate situational context, with no generalization beyond form-meaning mappings of particular linguistic forms (words or set phrases).
  - b. *Initial alternations* – a few highly familiar items are modified contrastively within or across paradigms and constructions, with no abstraction beyond certain limited groups of forms.
  - c. *Interim schemata* – transitional, non-normative and idiosyncratic, although partly productive application of rules and tentative generalizations.
  - d. *Rule-knowledge* – grammaticization, with strict adherence to rules plus some lacunae, including inadequate command of structural and lexical constraints expressed as over-regularizations and ‘creative errors’.
  - e. *Proficient integration of knowledge and use* – in mature language usage, abstract rules are constrained by norms of usage, rhetorical conventions, and discourse appropriateness, yielding variation in style and register in accordance with particular communicative context (e.g., genre and modality) as well as individual predispositions, backgrounds, and levels of literacy.

Steps (a) and (b) are characteristic of ‘emergent’ phases of language knowledge and use; they are ‘pre-grammatical’ and ‘item-based’ in a highly specific sense: as non-rule-generated and not generalized to abstract categories of linguistic or discourse structure; they rely critically on the mechanisms of rote learning and imitation; yet at the same time they have recourse to universal semantic and conceptual distinctions that are shared across languages and hence do not need to be learned (see, further, Section 4 below).

Steps (c) and (d) relate to what is generally termed ‘acquisition’, since they involve grammaticality, in the form of productive use of structure-dependent rules of morpho-syntax and the lexicon, along with internalization of relevant schemas of discourse structure. And step (e) represents proficient ‘mastery’ of both linguistic structure and language use.

The progression delineated in (1) and (2) is in a way ‘U-shaped’ (Strauss 1982), since the initial and final phases are both highly *context sensitive*, but in two different senses. Initially, children’s language knowledge and use is intimately tied to and dependent on the extra-linguistic contexts of language input and output. Maturely proficient language use is also peculiarly fine-tuned to context, but this is shaped by the interaction between the cognitive and cultural constraints of a given communicative situation (e.g., shared knowledge, social status of interlocutors), on the one hand, and discourse-internal constraints on the organization of linguistic information (e.g., global text construction, online processing of speech production), on the other. A related facet of this U-shaped progression is that there will be more individual variation and less stereotyped language use both in the initial and the more mature phases, but for different reasons. Early learning is tied to specific situations and individual items – words, constructions, conversational turns. With maturity, personalized styles of expression take shape in line with the particular socio-cultural background and life experience of individual speaker-writers.

This view of the process is consistent with the idea of *multiple mechanisms* for bootstrapping children’s entry into initial acquisition (Shatz 1987) or consideration of perceptual, logical, and syntactic bootstrapping in accounting for how and why “grammar and the lexicon develop together in infancy” (Bates & Goodman 2001: 158). That is, moving from unanalyzed rote usage to rule-bound command of form-meaning relations in early acquisition is driven by a ‘confluence of cues’ – perceptual, semantic, structural, and pragmatic (Berman 1993b, 1994). This can help explain the early and rapid emergence of abstract linguistic knowledge in the preschool years. But the idea of multiple bootstrapping needs to be extended to account for the manifold factors involved in *later* language development of the kind that occurs before and across adolescence (Hickmann 2003; Nippold 1998).

### 3. Examples from acquisition of Hebrew

Below, these ideas are examined in light of findings for three aspects of Hebrew grammar: types of adjectives (3.1), passive constructions (3.2), and nominalizations (3.3). These were selected to represent different linguistic domains: lexicon, clause-construction, and complex syntax respectively. And each focuses on distinct discourse functions: semantic modification in the case of adjectives, agent downgrading by passivization, and clause-linkage and connectivity by means of non-finite nominalization. Moreover, Hebrew typology

is such that each of these domains also interacts markedly with the domain of derivational morphology (see Ravid, this volume).

The data discussed in this section derive from a range of sources: longitudinal and cross-sectional naturalistic language samples of young children in conversational interaction with adults; structured elicitations of morphological and syntactic constructions of preschool and school-age children in comprehension and production; oral picture-based narratives elicited from children aged 3 to 9 years; and personal-experience narratives and expository texts produced in speech and writing by schoolchildren and adolescents.<sup>2</sup> Findings and analyses are from Hebrew, but they are meant to illustrate quite general cross-language processes.

### 3.1 Classes of adjectives

This section deals with vocabulary acquisition by comparing three classes of Hebrew adjectives that differ in the morphology-semantics interface that they represent – in contrast to the corresponding classes in English, for which relevant data are available. These three classes are illustrated in (3), listed in order of their acquisition, as ‘basic’ in (3a), ‘resultative’ in (3b), and ‘denominal’ in (3c).

#### (3) Three classes of adjectives in Hebrew:

a. Basic:			
<i>gadol</i> ‘big’		<i>katan</i> ‘small’	
<i>lavan</i> ‘white’		<i>shaxor</i> ‘black’	
<i>toy, yafe</i> ‘good, nice’		<i>ra, garúa</i> ‘bad, terrible’	
b. Resultative ‘Endstate’ Passive Participles:			
Infinitives	Present	Past	(Resultative) Participle
<i>hi-sgor</i>	<i>soger</i>	<i>sagar</i>	CaCuC <i>sagur</i> <sup>3</sup>
‘to close’			‘(is) closed, shut’
<i>hi-xtov</i>	<i>kotev</i>	<i>kataw</i>	<i>kativ</i>
‘to write’			‘written’
<i>le-taken</i>	<i>metaken</i>	<i>tiken</i>	mCuCaC <i>metukan</i>
‘to fix’			‘fixed, in order’
<i>le-saper</i>	<i>mesaper</i>	<i>siper</i>	<i>mesupar</i>
‘to-cut’			‘cut, shorn’
<i>le-haxsil</i>	<i>mahsil</i>	<i>hixsil</i>	muCCaC <i>muhsal</i>
‘to thread’			‘threaded’
<i>le-havin</i>	<i>mevin</i>	<i>hevin</i>	<i>muvan</i>
‘to understand’			‘understood’

#### c. Denominated Adjectives:

<i>Klal</i>	/ <i>Klahi</i>	<i>ish</i>	/ <i>ishi</i>
‘rule’	‘regular’	‘person’	‘personal’
<i>tsava</i>	/ <i>tsvai</i>	<i>sifrut</i>	/ <i>sifruiti</i>
‘army’	‘military’	‘literature’	‘literary’
<i>midbar</i>	/ <i>midbari</i>	<i>har</i>	/ <i>harari</i>
‘desert’	‘desertlike’	‘mountain’	‘mountainous’

Basic adjectives like those in (3a) have the mono- or bisyllabic form CVC(VC) and they are morphologically underived, hence ‘basic’. They also generally have morphologically related verbs – transitive causatives and intransitive inchoatives – analogous to English *enlarge*, *written*, or *prettyfy*, which share the same consonantal root as the adjectives, e.g., *gadol* ‘big’ / *h-gdol* ‘to grow (larger)’ / *le-hagdil* ‘to make larger, enlarge; *yafe* ‘pretty’ / *le-yapot* ‘to make pretty’ / *le-hityapot* ‘to become pretty’.<sup>4</sup> (See Ravid, this volume). ‘Resultative adjectives’ are passive participles, corresponding to Germanic or Romance past participles with an end-state or completive sense, like English *written*, *spoken*, *born*. In Hebrew, these are marked by an internal vowel -u-, in one of three forms; each such form relates to one of the three transitive *binyan* verb-patterns, labeled here as ‘Pr’. Thus, in (3b), the P1-pattern verb *hi-xtov* ‘to write’ yields *kativ* ‘written’, the P3 *pi’el* verb *le-taken* ‘to fix’ yields *metukan* ‘fixed, unbroken’, and the P5 *hif’il* form *le-haxsil* ‘to thread, string’ yields *muhsal* ‘threaded, strung’. Denominal adjectives as in (3c) are formed by a (bound or free) noun stem plus the adjectivizing suffix, stressed -i-, e.g., *klal* ‘rule’ > *Klal-i* ‘regular, general’, *sifrut* ‘literature’ > *sifrut-i* ‘literary’, or *ir* ‘town, city’ > *iron-i* ‘urban, municipal’.

The order of the examples in (3) reflects the general sequence in which children add adjectives to their productive lexicon: they start with basic adjectives, then add end-state resultatives, and only subsequently denominals. The question is what determines this difference in the acquisitional schedule.

The first group – ‘basic’ adjectives as in (3a) – are acquired much like their counterparts in English, from around age two years (Ravid & Nir 2000). That is, they are learned like other words in children’s early vocabulary, as ‘pre-grammatical’, ‘item-based’, morphologically unanalyzed amalgams unrelated to their associated causative or inchoative verbs – hence representing Phase I of the model outlined in Section 2. Moreover, the form-meaning mappings entailed by such lexical items develop, like in other languages, by relative *semantic* complexity in relation to other items in the same lexical category, for example, dimensional terms like *big* (acquired before *small* as its negative polarity converse and before *tall* or *wide* as semantically more specific terms); color terms

(e.g. *red* before *orange* or *crimson*); or evaluative attributives (e.g., *good* before *excellent*, *bad* before *awful*).

As for the second class of adjectivals – *u*-marked resultatives as in (3b) – Hebrew-speaking children show productive use of passive participles forms to express resultative endstates, corresponding to English *broken*, *born*, *lost*, from age 3 to 4 years. That is, children ‘acquire’ these forms at the same time as numerous other word-formation processes of derivational morphology (Berman 1995b; 1999; 2003a). Prior to this, children’s knowledge of these forms is similar to their ‘pre-grammatical’, non-analytic use of other, basic adjectives, e.g., *sagur* ‘shut, closed’, *meluxax* ‘dirty’ (literally ‘dirtied’; cf. basic *naki* ‘clean’), *mesudar* ‘neat, orderly’ (literally ‘tidied’; cf. basic *yafe* ‘nice, pretty’). Structure-dependent acquisition of these forms at around age 3 to 4 is attested by both structured elicitations and innovative use of *u*-marked forms in children’s spontaneous speech.

In a structured elicitation task (Berman 1994), children were shown pictures of an initial state and given an appropriate description (e.g., ‘Here is a man with a beard’), a means for incurring a change-of-state using the source verb (e.g., ‘and here is a razor to shave [source form = *le-gdalex*] his beard’), and then asked to describe the resultant endstate (e.g., ‘and here the man is... his face is... [target form: *megulax* ‘shaven’]). Children used *u*-marked, potentially passive participial forms of verbs to describe these end-states only rarely at age 2, nearly half the time by age 3 to 4 years, and close to 80% of the time from age 5 years. But the forms they produced, while ‘grammatical’ since they accorded with the structure of *possible* passive participles in the language, were often not those in the conventional lexicon (less than a quarter of the *u*-marked forms produced by the 3-year-olds, rising to 40% by age 4 years and 60% among 5-year-olds).

Support for such ‘rule-based’ but non-conventionalized knowledge of how to mark resultative end-state by passive participles is provided by children’s ‘creative errors’ in their naturalistic speech output from as young as age 2 to 3 years (Berman 2000). The examples in (4) are of possible, but non-established forms of resultative participles – CaCuC, meCuCaC, and muCCaC respectively. They are thus examples of step (c), signaling entry into the Phase II grammaticized command of the system.

(4) Spontaneous Coinages of *u*-Based Passive Participles:

- a. *ha-mecax sheli kasny be-se’ar* [Keren, 2;10]  
CaCuC: cf. *maxuse* ‘covered’  
‘My forehead (is) covered with hair’

- b. *ha’or kan (ba-sandal sheli) kannut* [Nir, 3;7]  
CaCuC: cf. *mekumnat* ‘crumpled’  
‘The leather here (=on my sandal) (is) crumpled’
- c. *ima, ha’orez kvar bashul* [Erez, 4;8]  
CaCuC: cf. *mevushal* ‘cooked’  
‘Mom, the rice (is) already cooked?’
- d. *tir’i, ima, ha-sefer merutav* [Smadar, 2;11]  
meCuCaC: cf. *ratur’vet*  
‘Look, Mom, the book (is) wetted?’
- e. *axšav ze mešutaf (al matbea še šafra)* [Hagar, 2;10]  
meCuCaC: cf. *šarf* ‘rinsed’  
‘Now it (is) rinsened’ (about a coin she had put in water)
- f. *ani me’od me’ulevet minex* [Yael, 4;6]  
meCuCaC: cf. *me’elav (ti)* ‘got-insulted’  
‘I (am) very insulted from = by you’
- g. *ani kvar muxlelet* [Rona, 2;9]  
muCCaC: cf. *xalcu li* ‘removed (shoes)’  
‘I (am) already unshoed’
- h. *ha-raglayim sheli yilyyu mukfot mikor* [Shay, 4;10]  
muCCaC: cf. *kfu’ot* ‘frozen+Fem,PL’  
‘My feet will be frozen from-cold’

These examples from young preschoolers reflect both general conceptual and language-particular knowledge of form-meaning mappings: (1) the idea of a resultant endstate deriving from a change-in-state activity; (2) the fact that this is typically encoded in Hebrew by means of one of three possible morphological patterns – CaCuC as in (4a) to (4c), meCuCaC (4d–4f), or muCCaC (4g, 4h); and (3) how to alternate these forms correctly by inflectional marking of agreement for gender and number (e.g., by the feminine singular ending *-et* or the feminine plural ending *-ot* in (4g, 4h). What these children still need to acquire is the morpho-lexical convention that stipulates which of the three passive participial forms matches the particular active verb pattern associated with it in the established lexicon, knowledge which typically consolidates with increased vocabulary in the early school years.

The third class of adjectives – denominative adjectives like those illustrated in (3c) and examined in detail by Ravid (this volume) – correspond to words like English *industrial*, *military*, *mountainous*. In Hebrew, these are formed by addition of a single invariant suffix, the stressed syllable *-i*, a highly productive device for forming adjectives.<sup>5</sup> These are derived not from verbs, as in the case of passive participles, but from nouns, and they are a much later, typi-



cally school-age acquisition. A large corpus of unconventional lexical usages of preschool children (Berman 2000) contained very few such forms, mostly from older children. For example, Ran, aged 5;4, describes his father's metal gun as *barzel-i* 'iron-y', and Tal, aged 6;1, refers to a glass bottle as *zaxxit-i* 'glass-y' = 'made of glass, transparent'. And in the structured elicitation tasks described by Ravid (this volume), 5- to 6-year-old preschoolers produced such forms only two-thirds of the time, and even first-graders made structural errors in around two-thirds of their responses, while denominal adjective formation was found to be difficult for even older normally-developing gradeschoolers and quite beyond the abilities of their SLI peers. This was supported by findings for extended discourse; in informative texts produced orally and in writing by 6th graders, 11th graders, and adults, denominal adjectives were rarely used before high school age (Ravid & Zilberbuch 2003a). Both spontaneous usage and structured elicitations thus show that denominal *-iy* suffixed adjectives are a very late acquisition, they emerge in Hebrew child language mainly with the onset of literacy, around age 6, and they are mastered as a productive lexical option even later, in marked contrast to the *u-* marked participial adjectives which, as noted, emerge much earlier.

This contrast between the early and robust mastery of resultative adjective formation with the later, only occasional, use of denominal adjectives is not immediately obvious in terms of structural complexity or the principle of 'formal simplicity' (Clark 1993). Morphologically, resultative participles are marked by a stem-internal vowel (*-u*) compared with the linear formation by a stressed suffixal vowel (*-iy*) added to a stem in denominated adjectives. Then, too, the form of a resultative participle depends on which active conjugation pattern it is derived from, in contrast to the invariant adjective forming suffix *-iy*. Besides, in terms of derivational processes, the surface form of resultative participles diverges from the verbs or nouns that they derive from far more than denominal adjectives differ from their source nouns. This contrast between the internal *u*-marked resultative adjectives and the superficially more transparent denominals is shown in (5a) and (5b) for items from the established lexicon, while the unconventional forms in (5c) through (5e) include examples of *-u* marked resultatives that were coined by preschoolers (*iced* from Hila, aged 2;9, *flowered* from Sivan, aged 4;0, and *lemoned* from Vered, 5;2).<sup>6</sup> (In the examples (5), the stem-internal resultative marker *-u-* and the stem-external denominal suffix *-i* are bolded).

- (5) Verb-based (resultative) vs Noun-based (denominal) adjectives:
- |    |                     |                    |   |                    |                       |
|----|---------------------|--------------------|---|--------------------|-----------------------|
| a. | <i>le-ta'es</i>     | 'to-industrialize' | > | <i>met'us</i>      | 'industrialized'      |
|    | vs. <i>ta'asiya</i> | 'industry'         | > | <i>ta'asiyat-i</i> | 'industrial'          |
| b. | <i>le-cayev</i>     | 'to-draw'          | > | <i>me'cyar</i>     | 'drawn, painted'      |
|    | vs. <i>ciyur</i>    | 'picture'          | > | <i>ciyuri-</i>     | 'picturesque'         |
| c. | <i>ke'rax</i>       | 'ice'              | > | <i>krux-ot</i>     | 'iced, icy, Fern-Pl'  |
|    | vs. <i>ke'rax</i>   | 'ice'              | > | <i>kraxi-</i>      | 'ice-like'            |
| d. | <i>pe'rax</i>       | 'flower'           | > | <i>me'furax</i>    | 'flowered'            |
|    | vs. <i>pe'rax</i>   | 'flower'           | > | <i>pixoni-</i>     | 'floral'              |
| e. | <i>limon</i>        | 'lemon'            | > | <i>me'liman</i>    | 'lemoned, with lemon' |
|    | vs. <i>limon</i>    | 'lemon'            | > | <i>limoni-</i>     | 'lemony'              |

Internal *u*-form resultative participles are clearly structurally complex compared with denominal *-i* ending adjectives. Besides, it is not obvious that in *semantic* terms attributing resultant end-states to an object is more accessible to children than attributing associated properties to nouns. The notion of 'resultant end-state' implies mastery of a conceptually complex causal chain leading from an object in an initial state (say, *whole, complete*) to an activity applied to that object (e.g., someone *breaks, cuts, or tears* it) to a change-of-state which results in a different end-state (*not whole, incomplete, in pieces, in parts or broken, cut, torn*). As evidence, note that English-speaking children produce denominal adjectives with the (unstressed) suffix *-y* freely from as young as age two, both conventional forms like *dirty, rainy, sandy* and innovative forms like *cracky, jummy, mighty* (Clark 1993).

How account for this contrast between early versus late acquisitions in the two languages? Two apparently distinct factors play a role – the one structural and the other pragmatic: linguistic typology and language use. As regards the first, typologically, Hebrew and English both distinguish adjectives from the two other major lexical categories, nouns and verbs. As a result, acquisition of the basic, morphologically nonderived type (3a) adjectives follows a similar developmental pattern in the two languages, governed by semantic complexity common to both languages and lexical conventions specific to each. Acquisition of such items is determined by factors like what kinds of attributive meanings young children are able to encode, how these become more specialized as a function of general vocabulary expansion, and what form-meaning mappings happen to be encoded by lexical adjectives in the target language. For example, in the class of dimensional adjectives, Hebrew *gavola* is equivalent to both English 'high' and 'tall', in contrast to the antonymous terms *naniux*

'short in height' and *katsar* 'short in length', for which English has the single adjective 'short'.

But Hebrew and English differ considerably in their *derived* adjectives: from verbs as in (3b) and from nouns as in (3c). Why would Hebrew-speaking children acquire the complex alternations involved in forming -*u* marked verbal adjectives at the same time that English-speaking children gain command of the more transparent, linear addition of final -*ed* in past participial resultatives like *closed*, *washed*, *fixed* or -*en* in words like *broken*, *eaten*, *written*? The answer lies partly in the impact of typological structure: Hebrew as a Semitic language typically creates new words synthetically, by assigning affixal patterns and alternating vowels to shared consonantal skeletons (Ravid, this volume; Shimron 2003). For children, this means that deriving words by means of verb-pattern alternations is a highly productive and hence accessible option, one that they command by age 3 to 4 years (Berman 1993b). Besides, their everyday wordstock includes many items with the same surface forms as resultative participles (e.g., *rativ* 'wet', *mesudar* 'tidy', *mufra* 'crazy'). These words illustrate the initial alternations of a few familiar items defined as step (b) in the developmental progression delineated in (2) above. That is, knowledge of the form-meaning mapping of such adjectives is still pre-grammatically 'item-based' rather than productively associated with a lexico-grammatical category (specifically, resultative end-state attributes / *u*-marked passive participles). These 'initial exemplar' items form the basis for subsequent abstracting out of the categorical form-meaning relation. In contrast, children's early vocabulary, at the phase when they are first adding type (3a) 'basic' adjectives to their repertoire, is lacking in denominal adjectives that end in -*i*.

This suggests that the contrast between early versus late acquisition of denominal adjectives in Hebrew and English cannot be attributed to structural complexity per se – whether semantic or morphological. Rather, the explanation lies in two interconnected socially embedded factors of language use: lexical productivity and linguistic register. Here, 'productivity' refers to speaker preferences for encoding novel form-meaning mappings in the lexicon (and see, further, endnote 5); and 'register' refers to the accepted ways for expressing established form-meaning mappings in different contexts of usage, in different types of discourse, and at various levels of style. In English, many denominal adjectives are formed regularly from basic, monosyllabic, everyday words of Germanic origin, for example, *windy*, *dirty*, *soapy* (similar to familiar non-derived adjectives like *pretty*, *ugly*, *silly*). Children use these early on, as a preferred, highly transparent method for attributing properties to nouns. In contrast, English denominal adjectives with Latin-based stems, e.g., *military*,

*characteristic*, or *industrial* are associated with later, school-age vocabulary. In Hebrew, denominal adjective-formation in general is typical of academic and journalistic discourse, types of language usage that are neither relevant nor accessible to preschool children. Adjectives with the surface form of passive participles like those in (3b), e.g., *šavur* 'broken', *patuax* 'open', *mesudar* 'tidy', or *metulax* 'dirty' are common items for Hebrew preschoolers. But denominal adjectives like those illustrated in (3c) are not at all typical of either the input or output language of young Hebrew-speakers. As a result, they have little recourse to the device of adding suffixal -*i* in order to innovate or use denominal type adjectives, even though the device itself is structurally productive and semantically transparent.

In sum, factors of typologically motivated structural preferences (for word-internal vowel alternation in Hebrew compared with linear suffixation to a stem in English) interact across development with socially determined, language-specific patterns of lexical productivity and level of linguistic register, on the one hand, and the more universal factor of conceptual complexity, on the other. Together, these factors may outweigh more 'obvious' perceptual or processing factors of relative structural complexity in determining the order in which children acquire and use various classes of adjectives in different languages.

### 3.2 Adjectival versus syntactic passives

A second example of the multiple factors that both drive and delay acquisition concerns syntactic alternations of voice and valence in Hebrew. These are illustrated in (6) for the two verb roots *š-b-r* 'break' and *t-k-n* 'fix, repair':<sup>7</sup>

- (6) a. Active Tensed Verb with Accusative Marker *et*:  
*Ron šavar ve Boaz tiken et ha-bérez*  
 'Ron broke and Boaz fixed ACC the faucet'
- b. Resultative Participle = Adjectival (Perfective) Passive:  
*ha-bérez lo haya šavur, hu haya metukan*  
 'the faucet was not broken, it was fixed'
- c. Syntactic Passive:  
*ha-bérez nišbar (al yadey Ron) ve tukan (al yadey Boaz)*  
 'the faucet was-broken (by Ron) and fixed (by Boaz)'

Consider the different developmental history of these three related constructions. First, in simple-clause active sentences like (6a), children master use of the prepositional *et* as a unique marker of accusative case by the young age of



2;6, even though this involves complex, abstract knowledge which is not always semantically motivated since, first, the accusative marker *et* is used with verbs that refer to both states and activities; second, it is confined to definite objects (compare *Ron ohev baxurot* 'Ron likes girls', *Ron ohev et ha-baxurot* / *Rina* 'Ron likes et the girls / Rina'); and third, many transitive activity verbs govern prepositions other than *et*: Compare *Ron šavar et ha- berez* 'Ron broke et the faucet' with *Ron ba'at ba-berez* 'Ron kicked in [=at] the-tap', *Ron hika et ha-kelev* 'Ron beat et the-dog' with *Ron hirbis la-kelev* 'Ron hit to-the-dog'.

Use of accusative *et* is thus a morpho-syntactic phenomenon that is both early to emerge and rapidly mastered, in a way that cannot be accounted for by one-to-one form/meaning mapping. Rather, its early acquisition is explainable by a combination of universal patterns of acquisition and linguistic structure, on the one hand, and the language-particular factor of 'typological imperatives', on the other (Berman 1986b). Across languages, children gain command of simple clause case-marking relations between ages 2 to 3 (Perdue & Bowerman 1990) and transitivity is most typically associated with definite object NPs (Hopper & Thompson 1980). In language-specific terms, Hebrew non-subject NPs generally take a case-marking preposition, so that the typical surface form of a Hebrew simple clause construction is {N V Prep N}. The early mastery of the accusative marker *et* can thus be attributed to its centrality in Hebrew syntax and the regular marking of direct objects in simple active clauses as in (6a).

Next, as noted in the preceding section, children show productive command of *u-* marked passive participle forms encoding resultative end-states, akin to English *broken*, *mended*, *written* – as illustrated in (3b) and again in (6b) – by age 3 to 4 years. In marked contrast, syntactic passives like those in (6c) are largely avoided by children even at early school-age. This was shown by a range of structured elicitations with different designs and from different populations. Thus Ravid (this volume) reports on studies showing that acquisition of passive morphology is not fully mastered as late as age nine years. Further, in a test administered to schoolchildren at different ages, six-year-olds consistently gave non-passive responses when presented with obligatory contexts for passive-formation, although they performed morphological alternations to give causative responses (e.g., changing *hi-crok* 'laugh' to *le-hacrik* 'make laugh, amuse') on other items in the same test (Berman 1993b; 1997c). In this, they differed from 11- to 12-year-olds who regularly provided passive constructions where required on the same test. A third source of evidence is the paucity of innovative verbal passive forms recorded in children's spontaneous speech output compared with other coinages relying on manipulation of verb-pattern

morphology (Berman 2000). Finally, a cross-linguistic study of passive usage in texts written by 9- to 10-year-old schoolchildren compared with adolescents and adults showed that Hebrew speaker-writers rely on passive constructions significantly less than their English, Dutch, and French-speaking counterparts (Jisa et al. 2002): The two canonic passive verb-patterns do not occur at all in the texts of Hebrew grade school and junior high students, and they occur only rarely, although significantly more, in the high school (1% of all verb forms) and the adult texts (2% altogether), indicating that this is a 'late developing' form of expression in the language.

This difference between resultative participles (adjectival passives) compared with syntactic or verbal passives is noteworthy for several reasons. First, both sets of forms derive from alternations in verb-pattern morphology, a system that children apply productively by age 4 years. Second, both the resultative participles like those in (3b) and passive-voice verbs like *tukan* 'was-fixed' in (3c) are formed with the same passive-marking vowel *u*. Third, passive constructions are relatively structurally unconstrained in Hebrew, although more so than in English, in the following ways: (1) Hebrew passives are typically confined to verbs that govern the accusative marker *et* but not other prepositions (Hebrew has no construction parallel to, say, English *he was laughed at*); (2) nonfinite verbs lack a passive form, so that a construction like English *may be fixed* needs to be paraphrased; and (3) passives tend to be avoided with stative verbs like *hate*, *smell*. Apart from these constraints, passivization is a syntactically productive process in Hebrew. Besides, Hebrew-acquiring children should be able to cope easily with syntactic passives, since the language has numerous constructions in which a non-agentive noun phrase functions as grammatical subject.

The well-recorded delay in use of passives into school-age thus cannot be attributed to semantic opacity, morphological difficulty, or syntactic complexity in the expression of verb-argument relations. As noted, young preschool children show early command of form/function relations in direct object marking as in (3a) and in use of resultative participles as in (3b). Nor can the delay be due to formal constraints in the target-language syntax, since structurally, syntactic passives are as productive as resultative participles. Rather, it can be attributed to the fact that Hebrew affords speakers a range of readily accessible *alternative means* of expressing the discourse functions associated with passive voice: downgrading of the agent and presenting an 'undergoer perspective' on events (Keenan 1985; Tolchinsky & Rosado 2004). Several of these options are illustrated in (7), to show that, in addition to the passive construction illustrated in (7a), Hebrew speaker-writers can downgrade agency by

using *middle-voice* verb-morphology to provide a patient rather than an agent perspective as in (7b), an option that shows up increasingly with age (Berman & Slobin 1994: 515–538); they can focus on the predicate by using *subjectless impersonal* constructions as in (7c), common in the naturalistic speech output of children as young as 2 years of age, and even earlier in child-directed speech input (Berman 1980, 1990; Berman & Nir-Sagiv 2004); or they can topicalize nonagentive nominals by *fronting* to pre-subject position or by left-dislocation, as in (7d).

(7) Alternatives for Agent Downgrading or Patient Perspectives:

- a. Syntactic passive: *ha-balon pucac (al yd'ey Ron)*.  
'the-balloon was-burst (by Ron)'
- b. Middle voice: *ha-balon hiipoec*.  
'the-balloon burst'
- c. Impersonal: *pocacu et ha-balon*.  
'(they) burst-PL ACC the-balloon'
- d. Topicalization: *et ha-balon lo ani pocacit*.  
'ACC the-balloon I didn't burst'

Findings from spontaneous speech output, oral narratives, written narrative and expository texts, and from structured elicitations all show that Hebrew-speaking children well on in school-age prefer means other than syntactic passives to meet the discursive functions of passive voice in a language like English. This can be explained by a combination of three converging, usage-based factors. One is that speakers of Hebrew in general, not only children, tend to avoid passive constructions in their colloquial usage and even in more literary style, showing that usage preferences or 'speaker productivity' (Berman 1987c; Clark & Berman 1987) outweigh considerations of structural availability in children's as in adult Hebrew. Relatedly, as noted for denominative adjectives, linguistic register plays a role in syntax, too: Passive voice is typical of the academic discourse of learned journals and lecture podia and of journalistic reporting in the media, contexts where activities are said to be 'conducted' and events are 'caused' or 'expected' rather than described in more personalized terms. These contexts are accessible to educated, literate speakers, but they are inappropriate and so irrelevant to the everyday colloquial discourse that governs the speech input and output of young children. Besides, in terms of what Jisa et al. (2002) define as 'competition',<sup>8</sup> Hebrew speaker-writers have a rich range of alternative means for expressing the discourse functions of passive voice – downgrading of agency and focusing on the undergoer as in (7b) or on the event as in (7c).

### 3.3 Nonfinite forms and nominalizations

Two interrelated 'operating principles' (MacWhinney 1985; Slobin 1985) will be invoked to explain the final example of early emergence yet late mastery of linguistic knowledge. These are the factors of structural complexity, in the sense of degree of deformation of simple clause-structure, and the fact that later language development builds on earlier acquired, more basic materials as prerequisites, which enable children to use what they know 'to learn more' (Shatz 1987). The domain selected to illustrate these principles is nominalized constructions, which combine features of both the lexicon (the focus of Section 3.1) and of syntax (Section 3.2). Consider the examples in (8).

- (8) a. Simple Clauses with Finite Verbs [Hebrew root b-r-y 'build']:  
He'll build / construct the castle. It'll be easy for him to-do so.  
*hu yivne / yakim (et) ha-migdal. yihye lo kal la'asot zot.*
- b. Infinitival Complement / Extrapositioned Subject:  
It will be easy (for him) to build / construct the castle.  
*yihye (lo) kal li-vnot / le-hakim (et) ha-migdal.*  
(For him) to build / construct the castle will be easy.  
*(bishvil) li-vnot / le-hakim (et) ha-migdal yihye kal.*
- c. Gerundive Complement / Adverbial:  
He proved himself in-building / constructing the castle.  
*hu hoxi'ax (et) acno bi-vnot-o / be-hakim-o (et) ha-migdal.*  
In building / constructing the castle, he proved himself.  
*bi-vnot-o / be-hakim-o (et) ha-migdal, hu hoxi'ax (et) acno.*
- d. Nominalized Objects / Subjects:  
He'll succeed with (his) building / constructing / construction of the castle.  
*hu yachli'ax bi-vniyat (-o) / hakamat (-o) (et) ha-migdal.*  
(His) building / constructing / construction of the castle will be easy.  
*bniyat (-o) / hakamat (-o) (et) ha-migdal tihiye kala.*

Space does not permit detailed analysis of these constructions. Note, only, that the examples in (8) are ranged in Hebrew as in English on a cline of descending *transparency*, in the sense of increased distance from the simple-clause structure illustrated in (6a) and (8a). Moreover, this scale largely reflects the order in which these constructions are acquired. In Hebrew as in other languages, simple-clause structure with a tensed verb and direct object is acquired between age 2 to 3 (See Section 3.2). Infinitival complements with modal or aspectual verbs like *want to build*, *start to build* are mastered slightly later, but they are also an early acquisition. In these contexts, development takes the form

mainly of increased semantic and lexical variation of the range of tensed verbs that take infinitival complements and the extent these will be concatenated (e.g. *want to be able to start to build / building*).

In contrast, gerundive and nominalized forms corresponding to those in (8c) and (8d) are relatively late, school-age acquisitions. In our cross-linguistic narrative study (Berman & Slobin 1994), we defined as 'late acquisitions' forms which were absent from the narrations of the preschool 3- to 6-year-olds in our sample, which appeared only occasionally in those of 9- to 10-year-old schoolchildren, and which were well represented in texts of the adults. The children's texts were quite typically lacking in nonfinite and nominalized verb-forms in four of the five languages we studied: English, Hebrew, German, and Spanish (the exception being Turkish, which requires nonfinite, nominalized subordination). In English, for example, participial *-ing*, used widely for progressive aspect by the youngest children, and in complement constructions by the older children, appeared in an adverbial or other modifying function only in mature narrations (e.g. *And the deer carried him off to the edge of a cliff, with his dog chasing after*). In Hebrew, high-register gerundive forms like *be-hagio likte ha-matsok* 'in-reaching-his to-the-end the cliff = on reaching the edge of the cliff' did not appear in a single text, as expected in the colloquial style suited to a children's adventure story. And only a few adult narrators made use of the highly productive, morphological mechanism of Hebrew for deriving abstract nominals from activity verbs (e.g. *ha-yeled haya asuk be-xipus axarey ha-tsfardea* 'The-boy was busy in-search after the-frog = in searching for the frog'; *hem mansixim bi-merua-tam* 'They continue in-flight-their = with their flight, fleeing'). Subsequent research on Hebrew narrative and expository texts of schoolchildren, adolescents, and adults, reveals that nonfinite gerundive constructions (e.g. *be-vo'enu la-dun ba-nose* 'in-coming-us to-consider the-topic = when we come to consider') are confined to the expository texts produced by high-school and university students in writing, and not before them (Berman & Nir-Sagiv 2004).

This more current research reveals that use of abstract verb- and adjective-derived abstract nominals (e.g. *construction, adaptability*) is a hallmark of mature narrative and more especially of expository discourse, and that these occur more in written than in oral texts (Ravid in press; Ravid & Cahana-Amity 2004). Children's avoidance of derived nominals in monologic text construction is consistent with findings from structured elicitations, as detailed in Ravid (this volume). Late preschool 5-year-olds generally understand such forms in context, 9-year-olds produce them consistently in a completion task, but only older children are able to coin novel nominalizations from unfamiliar

verbs. This avoidance of derived nominals until well into adolescence is not due merely to morphological complexity. Although alternations between source verbs and their related action nominals are not fully regular or predictable in form/meaning mapping, these are similar to other derivational processes in Hebrew which, as noted for the other domains considered in this chapter, are largely mastered by children as young as age 4 (Berman 1995b).

I suggest, rather, that difficulty with nominalization has several sources. One is syntactic complexity, defined here by 'degree of deformation' of simple clause structure entailed by a particular syntactic process. Compare the three different levels of complexity illustrated for English nominalizations and their Hebrew counterparts in (8a) to (8d). In English, the nominative-initial, SVO order of the simple clause is violated in (8c) by omission of overt subject and of tense marking, and in (8d) by a possessive pronoun followed by a gerundive or nominalized form, with genitive *of* and no overt tense marking. Besides, in the Germanic wordstock, gerunds and derived nominals take the same *-ing* form as in *building*, whereas the Latinate *construct* splits between *constructing* and *construction*. In Hebrew, normal SVO word order is further violated, since the possessive suffix *-o* 'his' follows the nominalized form; it is required in the gerundive form in (8c) but optional in action nominals as in (8d); and in both cases, accusative case-marking is retained, but verb-tense is neutralized in the feminine-form derived nominals *bnaya* 'building', *hakama* 'construction'.

These various types of structural complexities are one explanation for why children defer use of these forms till a later, more literate stage in their development. Besides, in pragmatic terms of language use, nominalizations tend to be restricted to formal registers of expository and academic discourse in many languages (Comrie & Thompson 1985). Here, too, structural complexity – in the sense of both syntactic density and semantic opacity – interacts with language typology to determine what options children will select for combining two or more tensed clauses in a single syntactic package. In our elicited narratives, preschool children typically string simple, tensed clauses one after another across their texts. School-age children use the typologically most accessible options for syntactic packaging. In Hebrew, although rather less than in Spanish, they rely on subordination with *še-*, *que* 'that' for this purpose, while Turkish children use the obligatory nonfinite nominalized forms from preschool age (Berman 1998; Slobin 1988). English-speaking children, who use both *to* infinitives and *-ing* forms of verbs correctly in simple clauses by age 2, fail to exploit these same constructions for the complex purposes of nominal embedding illustrated in (8b) through (8d). These represent more formal, literate rhetorical options for English speaker-writers.

This again points to the multiplicity of factors affecting 'what comes later' in language acquisition and development. In developing form/function relations for clause linkage and discourse connectivity, the factors of syntactic complexity and typological preferences interact with the expressive options available to speaker-writers of different languages. Textual cohesion can be achieved by strings of simple clauses, as in (8a), favored by young children, and common in casual speech; by infinitivals, which are readily available to children by late preschool age, although not when extrapolated, as in (8b); or by finite subordinate clauses as used increasingly by schoolage children, more so in Spanish and Hebrew than in English and German (while structurally largely unavailable to Turkish-speakers). These interrelated factors combine to explain the finding from experimental elicitations in Hebrew and from extended texts in different languages, that nominalizations are a late acquisition, not readily accessible to preschool children.

#### 4. Conclusion

The ideas presented in this chapter were motivated by an attempt to demonstrate how linguistic, cognitive, and social factors combine in shaping language development. From this perspective, it appears that the giants of our domain, Chomsky, Piaget, and Vygotsky, are all right about what is involved in learning a language, as a complex enterprise that involves the focal points of each of their concerns: grammar, cognition, and social interaction respectively. The challenge for developmental psycholinguistics is to achieve an integration between these disparate perspectives. Such an endeavor would serve to specify more precisely the 'multiple bootstrappings' that apply at the initial phases and to constrain the many factors involved at more advanced phases. Ideally, this would make it possible to define the relative *weight* of the different factors involved in early acquisition and later mastery across different developmental stages – in various linguistic domains and contexts of use. A tentative first stab at such a weighting – deriving from the phase-based model of Section 2 and the research findings of Section 3 – is proposed in (9).

(9) Ordering in the developmental route from emergence to mastery:

1. *Language typology*: Universal > Typologically Pervasive > Language-Particular
2. *Social-cultural factors*: Phase I = context-bound, communicatively motivated  
Phase III = context sensitive, discourse-embedded
3. *Structural complexity*: Phase II = structure-dependent, grammaticization

First, in terms of inter-language variation and target language impact, the prediction is that children will start out with linguistic universals, in the sense of properties and categories that are shared across languages, they will subsequently acquire knowledge of processes and features central to and pervasive in a particular *type* of language, and only later will proceed to more highly specific knowledge restricted to particular syntactic contexts, morphological classes, or lexical items in a given target language. That is, when they initially encounter a particular target language, children come equipped with a strong basis of shared knowledge about the structural categories and semantic distinctions that are in principle available to all and any languages.<sup>9</sup>

For example in the domain of *predicate types*, (9.1) implies that children do not have to learn the semantic distinction between states and activities or changes-of-state, since these distinctions are universal and apply across all languages.<sup>10</sup> What they do need to learn is which morpho-syntactic encodings mark these distinctions in their language. Similarly, in the domain of syntactic *transitivity*: Children from the start use predicates that require either one, two, or more arguments, irrespective of their particular target language. But they must learn how verb-argument structure is encoded in their language, by word order, case-markings, and/or the morphological shape of verbs. A third example, in the area of *temporality*: children recognize semantic distinctions of aspect (e.g., duration versus punctuality) very early on; and subsequently they mark distinctions of tense by inflections, before they acquire other verb inflection such as markers for gender, number, and person agreement. From the point of view of 'early' versus 'late' acquisitions, this leads us to predict that, across languages, children will acquire person marking later than tense marking on verbs; they will acquire semantically universal distinctions between classes of predicates before they gain command of the typologically relevant inflectional distinctions for marking grammatical aspect in their language; and in a language which marks transitivity alternations morphologically, command

of verb-form alternations to express these distinctions (cf. the nonproductive alternations of English *rise/raise*, *lie/lay*, *sit/seal*) will emerge later than syntactic encoding of transitivity distinctions through word order alternations, verb-argument configurations, and/or adpositional case-markings.

On the basis of such shared linguistic universals, children soon come to attend to key typological properties of the input language. Even very young children recognize 'where the action is at', so to speak, with respect both to which categories are formally distinguished, and how these distinctions are typically marked. Crosslinguistic research reveals the influence of language-specific effects on speech perception and babbling in the first year of life (Jusczyk 1997:178–179); on children's early encoding of spatial distinctions in languages like English and Dutch compared with Korean or Tzeltal (Bowerman 1996); on their strategies for new-word formation in English compared with Hebrew and other languages (Clark & Berman 1984, 1987); and on their narrative development in different languages (Berman & Slobin 1994; Hickmann 2003). Such findings converge to show that children are early on attuned to the language-particular way of encoding form-meaning relationships in their language. *When* this type of sensitivity finds expression will depend on developmental factors, of the kind that are the burden of this chapter. But in each case reported, the way young 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. That is, young preschoolers reveal strong sensitivity to the 'typological imperatives' of their language.

Second, as suggested in (9.2), social factors of intra-language variability (communicative contexts, discourse registers, genres, and levels of usage) will reveal a superficially U-shaped development. During the period of initial emergence of knowledge, defined as Phase I in Section 2, young children will focus on pragmatic factors of communicative efficacy, and their use of language will be highly context-bound and restricted to the extra-linguistic speech situation. Eventually, with mastery, speakers will again become critically attentive to factors of linguistic appropriateness, manifested in increased sensitivity to discourse-based needs and constraints of different registers, modalities, and genres.

The link between these two periods in development of language knowledge is provided, as suggested in (9.3), by structural command of form/meaning relations in the domains of grammar and semantics. Here, attention focuses on grammaticized knowledge of syntactic structures like passives and nominalizations, of lexical classes like adjectives, of morphological processes of derivation, and of how to structure discourse so that it constitutes a well-formed conver-

sation, narrative, or expository text. Again, in line with the non-monolithic view of acquisition advocated here, these cycles of developmental phases recur across different domains rather than one time across-the-board. And in each case they proceed from both the most general and universal *and* from the most highly specific, item-based, and context-bound knowledge to being both more narrowly constrained by target-language typology and more broadly discourse-sensitive and text-based. So development in linguistic form proceeds from general to specific; while concurrently, in language use, it proceeds from narrowly local to broadly global. And this leaves us with yet another paradox.

## Notes

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1. This view corresponds closely to Tomassello's observation that there "are three major types of problems that face a language learner: Problems of speech perception and production . . . ; problems of communication and meaning . . . and problems of grammar and creativity" (2001a:1–2).

2. Most of these studies include monolingual, educated adult subjects as criteria for 'mastery' of each of the domains that were analyzed.

3. By Semitic convention, root consonantal elements are represented by C and the intelligible affixal elements by relevant consonants and vowels (Shimron 2003). Thus the abstract form *CaGuC* stands for words like *sagur* 'closed, shut', *katur* 'written', *tafus* 'caught', *meCaCaC* for *mesugur*, *mekatur*, *metufas*.

4. Stop / spirant alternations between *p / f*, *b / v*, and *k / x* are irrelevant in this analysis.

5. The term 'productivity' is used here as accepted in linguistic analysis, to refer to structural productivity or lack of constraints on the application of a rule or process. For example, the Hebrew *-i* suffix is more productive than English denominating suffixes *-al*, *-ic*, *-ive*, *-ary* etc., because it does not have any other counterparts. On the other hand, Hebrew passive formation (Section 3.2) is syntactically less productive than its English counterpart, since it does not apply to verbs which govern prepositions other than the accusative *et*, and only tensed verbs have a passive counterpart, not infinitives or gerunds. Two other, rather different senses of 'productivity' are: (1) in language acquisition, children's knowledge is said

- to be 'productive' when it is rule-bound rather than based on rote-learning of unanalyzed strings; and (2) in language use, processes and structures that are relatively productive are those that are preferred by speakers for expressing particular form/function relations under given circumstances or at a particular point in time (Berman 1987c, 1993b; Clark & Berman 1987).
6. Beard (1993) notes an interesting semantic difference between two classes of denominal adjectives, which he terms 'possessional' and 'simultudinal'. In the former, *a bearded man* is a man who *has* a beard, whereas in the latter, *a friendly man* is one who is *like* a friend. And, more relevant to the contrasts illustrated in (4), compare *buttered toast* 'toast which has butter on it' versus *a buttery cake* 'a cake which is like butter', *iced coffee* / *icy hands*, *flowered material* / *flowery style*.
  7. The role of Hebrew verb-pattern morphology in mastering systems of transitivity and voice, detailed in Berman (1993a, 1993b) is disregarded in the present analysis.
  8. Jisa et al. use the term in a rather different, but complementary sense to that of the 'com petition' model as articulated, for example, in Bates & MacWhinney (1987), MacWhinney (1985:1089-1149).
  9. This is *not* a claim that this knowledge is 'innate' in the strong sense of being genetically encoded in the organism without any interaction with the environment. Rather, this kind of knowledge accords with aspects of brain structure, cognition, and behavior that have been termed 'primal' by some developmental theorists (Elman et al. 1996; Johnson & Morton 1991), in the sense that it is shared by or common to all members of the species, but it develops in interaction with the environment.
  10. The term 'universals' as used here does not refer to a given model of grammar or to formal syntactic principles and constraints (so is not identifiable with a Chomskian model of 'UG'). Examples of what were originally termed 'substantive' universals by Chomsky (1965), akin to Keenan's (1975) 'naive universals' include: the distinction between consonants and vowels, between nouns and other word classes, and the preference for encoding certain distinctions in predicates (like those relating to aspect, tense, and mood) and for marking other categories (such as case, gender, and definiteness) on nominal elements (Bybee 1985).

## Lexical acquisition in the early school years\*

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### 1. Introduction

Children's first words mark the beginning of a lifelong lexical journey. During this journey they move from apprentice word learners to competent vocabulary users at a remarkable rate. The apparent ease of this process has led to the suggestion that "learning vocabulary is a relatively simple affair" (Plunkett & Wood in press). However, we adopt a different stance, to argue that lexical acquisition is a complex and extended process involving the integration of phonological, semantic, and morpho-syntactic knowledge with cognitive and social processes. Vocabulary knowledge is a strong predictor of academic success, and it plays a central role in cognitive development, especially in relation to literacy and learning (Cunningham & Stanovich 1997; Stanovich & Cunningham 1993). The lexicon provides a unique domain for studying the interaction between context and cognition, and the ways in which this interaction changes with development. We address these issues by considering the factors that play a role in early lexical development (Section 1), examining the ways in which different assessment procedures provide contrasting views of children's abilities (Section 2), considering the support for vocabulary learning in school (Section 3), and the challenges and difficulties encountered by later vocabulary learning (Sections 4 and 5).

#### 1.1 What needs to be acquired?

When children acquire a new word, they must identify the sound in the speech stream to encode a phonological representation and then establish a mapping between the word and world; ultimately a detailed semantic representation is developed for the new term with knowledge of its morpho-syntactic features. Inaccurate phonological representations reduce the accuracy of children's lex-