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More general all-purpose verbs in children with specific language impairment? Evidence from Greek for not fully lexical verbs in language development

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ABSTRACT
This paper addresses verbal performance and overuse of “not fully lexical verbs” by children with specific language impairment (SLI) and peers with typical language development (TLD). Experimental data come from picture-naming and retell narratives. Fourteen school-aged children with SLI (mean age = 6 years, 9 months) participated alongside 50 language- and age-matched peers with TLD. The results revealed that children with SLI do not use light verb constructions but only general all-purpose (GAP) verbs when unable to produce single-word, specific lexical verbs. Moreover, they do not differ from language-matched TLD children in this respect. As such, GAP verbs should be viewed as symptoms of immature language or absent representations rather than impaired language. Consequently, when discussing not fully lexical verbs productions in (a)typical development, researchers should make the fundamental distinction between GAP verbs and light verbs, and focus on GAP verbs as the relevant category in SLI.

Over the past decade or so, evidence has accumulated that language development depends on multiple, underlying faculties that are distinctly specified genetically. Children presenting with specific language impairment (SLI), for example, exhibit variable deficits in different components of the grammar (syntax, morphology, or phonology) as well as other aspects of language competence and performance (e.g., vocabulary, starting with the lexicon and access to it) in the absence of other factors that typically accompany language problems (such as hearing impairment, low nonverbal IQ, neurological damage, or socioemotional deprivation; see, among others, Bishop, 2006, for details and further references).

This paper addresses verbal performance and the often-noted overuse of semantically empty, general all-purpose (GAP) verbs by children with SLI (Rice & Bode, 1993). The results from two studies, one picture-naming task and one narrative retell, are compared with language and chronological age-matched children with typical language development (TLD). This will in turn lead us to a discussion of such entities in the theoretical context of so-called light verbs (Grimshaw & Mester, 1988). We will suggest a categorical distinction between the former and the latter types of such not fully lexical verbs (NFLVs). This allows us to keep the two distinct for descriptive purposes: among NFLVs, there are GAP verbs and there are light verbs. We will capitalize on this distinction and suggest a first approximation on how to integrate this in a derivational model of linguistic computations. The categorical distinction also enables us to characterize children who exhibit problems with producing single-word, fully lexical verbs as atypical users of GAP verbs rather than light verb constructions. Here our findings from bilectal Cypriot Greek-speaking children do not support a diagnostically relevant distinction between children with SLI and their typically developing peers.

VERBS IN LANGUAGE DEVELOPMENT AND LINGUISTIC THEORY

A growing body of literature has focused on verb learning in preschoolers and school-aged children with SLI based on semantic and syntactic accounts of verb acquisition (see references cited in Table 1). Verbs may be considered a catalyst for early grammatical development in language learning, because the conceptual roles specified by verbs (e.g., who does what to whom) can be argued to serve as the "architectural centerpiece of the sentence" (Pulverman, Hirsh-Pasek, Golinkoff, Pruden, & Salkind, 2006, p. 134); certainly in terms of expressing argument structure fully, verbs are crucial (Pinker, 1989). The typical "function" of verbs in all languages is to predicate by denoting, for example, mental and physical actions (states and events) in which an agent (person or animal) makes something happen using bodily movement or mental activity (see, among others, Croft, 1991, for detailed discussion from a functional perspective, Baker, 2003, for a modern generative exposition, and the collection in Hirsh-Pasek & Golinkoff, 2006, for current views from language development). On the basis of its core denotation, the term "verb" is subsequently used interchangeably with "action (name)." Children need to understand both the agent that is undertaking an action and the patient that is receiving the action, if there is one, in order to completely understand any sentence.

NFLV in theory

Throughout the literature, various terms or descriptions are used to refer to what we call here NFLV, such as pro-verbs (Bloom, Lifter, & Hafitz, 1980), composite predicates (Cattell, 1984), light verbs (Grimshaw & Mester, 1988), hypernymic verbs (Miller & Fellbaum, 1991), and semantically weak (Butt, 2003) or even bleached versions of main verbs (Szabolcsi, 1986). The term "light verb" itself is due to Jespersen (1954; see also Wierzbicka, 1982, for early discussion as well

Table 1. *Studies investigating NFLV errors in children with SLI*

	Rice & Bode (1993)	Watkins et al. (1993)	Conti-Ramsden & Jones (1997)	Kelly (1997)	Thordardottir & Ellis Weismer (2001)	de Jong (1999)	Stavrakaki (2000)
N (SLI)	3	14	3	15	50	35	4
Gender	3 M	7 M, 7 F	3 M	Not reported	26 M, 24 F	26 M, 9 F	2 M, 2 F
Language	English	English	English	English	English	Dutch	Greek
School age	Preschoolers	Preschoolers	Preschoolers	Preschoolers	School aged	School aged (mean age = 7;8)	Preschoolers and school aged
Terminology	GAP verbs	GAP/high-frequency verbs	GAP/high-frequency verbs	GAP/high-frequency verbs	GAP/high-frequency verbs	Hypernymic verbs	Light verbs
Methodology	• Spontaneous speech • Longitudinal data • TTRs • % of total word roots	• Spontaneous speech • Cross-sectional data • TTR measure of lexical diversity	• Spontaneous speech	• Online elicitation task (using video scenes of motion and change of state verbs)	• Spontaneous speech • TTRs • Number of different verbs • Number of different words	• Verb picture-naming task	• Picture-description task (production) • Picture-pointing task (comprehension)
Error types	• Heavy use of NFLVs: *want, go, get, do, put, look, make*, *got*	• Heavy use of NFLVs: *want, go, get, do, put, look, make*, *got* • No significant group differences between SLI and LA + MLU-matched children	• SLI children: smaller verb lexicons and less diverse verb lexicons • NFLV production similar to MLU-matched children	• Heavy use of NFLVs: *make, bring, take, get, give, have, go, do, put, got, come, change, went, move, play, leave* • Preference for NFLV production not specific to SLI	• SLI children: slightly smaller NFLV repertoires than CA-matched TLD peers • No differences for NFLV production between SLI and TLD groups	• Verb diversity not different between SLI and MLU-matched children	• SLI children: less diverse verbs used • No difference between SLI children and TLD peers for verb comprehension • Overreliance on NFLVs with *kano* (make), *pao* (go), *ime* (be)
Explanation	• No control group comparison	• No significant group differences	• No significant group differences	• No significant group differences	• No significant group differences	• Difficulty matching action with proper verb for SLI children	• Impaired lexical retrieval

Note: NFLV, not fully lexical verb; SLI, specific language impairment; M, male; F, female; GAP, general all purpose; TTR, type–token ratio; LA, language age; MLU, mean length of utterance; CA, chronological age; TLD, typical language development.

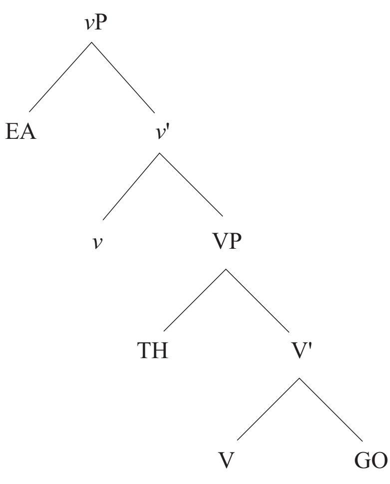
as much work since Pinker, 1989, on NFLVs qua GAP or light verbs in language acquisition).

In all cases, the lexical–semantic specification of the verb is so general that it can be used in a multitude of contexts. Furthermore, the argument structure of NFLVs is assumed to be less complex than that of more specific, fully lexical verbs, yet through inflection even GAP verbs may provide some details on event semantics, including aspect, mood, or tense. In contrast, the head or primary component of the *light verb construction*, which may be a verb, noun, or even adjective, usually determines the semantics and the argument structure, with the light verb itself specifying only the morphosyntactic information, including aspect, mood, or tense (Hornstein, Nunes, & Grohmann, 2005, pp. 98–109).

Arguably the most developed theoretical analysis is that for light verbs within generative modeling (starting with Grimshaw & Mester, 1988), which is why we choose this term (and general approach) for the remainder of this paper. It is also the entity compared to, and ultimately contrasted with, GAP verbs, where we aim for a formal and functional distinction as two instantiations of NFLVs. To our knowledge, no finer classification has been advanced to date. That is, we know of no account that assumes, for example, a class of hypernymic verbs alongside a group of semantically weak verbs. As concerns work on language development, the terms "GAP verb" and "light verb," in particular, seem to be used interchangeably. In this respect, one aspect of our contribution is a quite modest but perhaps useful one of ontology: (a) GAP verbs and light verbs are two distinct instantiations of NFLVs, and (b) children's overuse of NFLVs are best categorized under GAP verbs rather than light verbs.

For starters, a modern version of Larson's (1988) original proposal for the derivational expression of verbal argument structure is provided in (1):

(1) syntactic realization of argument structure in lexical verbs



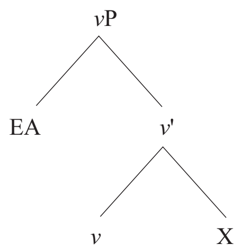
The lexical verb V may discharge up to two internal thematic roles, what is prototypically known as the "theme" (TH; direct object) and the "goal" (GO;

indirect object), notwithstanding more specific characterizations of such theta roles (cf. Dowty, 1991, and the discussion plus additional references in Hornstein et al., 2005, p. 342). The thus projected verb phrase (VP), in conjunction with the "transitivizer" or "predicator" (*v*), the functional light verb, assigns the external argument (EA) its specific theta role, such as the prototypical "agent." It is in this sense that all thematic roles are assigned within the immediate argument structure of a verbal predicate, consisting of the projections of the lexical verb itself plus *v*.

This should be contrasted with light verb constructions, in which a light verb *v* combines with the semantic predicate X to form a complex predicate. The predicate formed this way is verbal in nature, but in the form of a composite (see the terms given in the literature cited above). X itself may be verbal, nominal, or even adjectival, as in, for example, *go fish*, *take a bath*, or *make thick*, corresponding to the single-word fully lexical equivalents *fish*, *bathe*, and *thicken*, respectively. However, not all light verb constructions have such single-word equivalents (e.g., *do homework* or *take a bus*); likewise, there are languages with a very limited repertoire of lexical transitive verbs, such as Basque, where the equivalent of English *kiss* comes out literally as "give (a) kiss" or *hurt* as "do (a) hurt" (cf. Laka, 1993).

This state of affairs may be represented as in (2):

(2) syntactic realization of argument structure in light verbs



Here the "transitivizing" or "predicating" light verb *v* assigns the external theta-role in conjunction with the lexical predicate X (more often than not a noun in English, but it may also be a verb or adjective). It is this configuration that linguists typically call "light verb construction" (for extensive theoretical and empirical discussion on types of light verb constructions, see Kearns, 1988).

The light verb itself is not very specific in its lexical–semantic denotation and seems to coincide with many of the GAP verbs identified in the literature, so much so that researchers seem to frequently conflate the two concepts and refer to them interchangeably (e.g., Ingham, 1994; Rice & Bode, 1993; Stavrakaki, 2000). We will address the differences between observed GAP verbs and their purported light verb status as well as a more relevant discussion of such NFLVs as we go along, in particular in the discussion of our own experimental study.

NFLVs in (a)typical language development

Studies investigating acquisition and processing of verbs by children with SLI over the past 20 years have highlighted that particular problems learning and properly using verbs may be a clinical marker of SLI, certainly for English (Rice, 1991, 2003). Moreover, verb knowledge and use have been employed to differentially diagnose school-aged children with language impairment from children with TLD (Oetting, Rice, & Swank, 1995). This finding was supported further by evidence that children with SLI show serious difficulties learning and recalling (new) verbs; they also often require lengthy exposure to new items prior to fully understanding and using the same verbs in their own vocabularies (Oetting, 1999).

A smaller body of literature indicates that children with SLI persistently maintain a limited repertoire of verbs, and fewer in number. They do so over a longer period of time and consequently show differences in verb-learning trajectories from peers with TLD such as semantically less specific verbs. Not only have children with SLI been argued to have limited or reduced verb lexicons (Conti-Ramsden & Jones, 1997; de Jong, 1999), but they are also reported to rely more heavily on a subset of nonspecific verbs to describe events and actions that are often termed GAP verbs, such as *do*, *get*, *have*, *make*, *put*, *come*, *give*, *look*, *play*, *see*, *take*, or *want* (Conti-Ramsden & Jones, 1997; Kelly, 1997; Rice & Bode, 1993; Watkins, Rice, & Moltz, 1993; but see Ingham, 1994, for pertinent if somewhat ignored criticism, which is briefly presented below, and their counterparts across languages, e.g., Stavrakaki, 2000, for Standard Modern Greek; see also Table 1). According to Rice and Bode's (1993) original description, GAP verbs are (a) monosyllabic, at least in English, hence less complex phonological units, (b) of high input frequency, and (c) of a nonspecific semantic and/or syntactic nature.

Developmental and cross-linguistic research on typical language acquisition shows that during the first stages of linguistic development, all children rely on NFLVs to simplify the demands of the information they need to understand while they are becoming more acquainted with other aspects of their language (such as syntax, semantics, and pragmatics). Once children become competent in other domains of language, they begin to widen their (verb) vocabulary to include more specific verbs (see Thordardottir & Ellis Weismer, 2001, on both points) and rely less on such NFLVs, which, we will eventually argue, are best characterized as GAP verbs.

For preschool and primary school children with SLI, however, NFLV use appears to function as a "coping mechanism," self-activated when the speaker, especially a child, is unable to access from long-term memory semantically complex verbs with intricate syntax such as increased argument structure (Stavrakaki, 2000; Thordardottir & Ellis Weismer, 2001). The identification of language-impaired children's use of NFLVs as stand-ins for more specific verbs has been linked to a wide array of difficulties all within the domains of semantics, syntax, and morphology. Previous explanations include difficulties with any of the following (or combination thereof):

- lexical retrieval for verbs (Rice & Bode, 1993; Stavrakaki, 2000),
- reduced verb diversity in spontaneous speech (Rice & Bode, 1993; Stavrakaki, 2000),
- retrieving verbs with increasing verb argument structure (Fletcher, 1991; Ingham, Fletcher, Schelletter, & Sinka, 1998; Rice, 1991),
- semantic verb mapping (Rice & Bode, 1993; Stavrakaki, 2000),
- extracting verb meanings or the greater polysemy of verbs (de Jong, 1999),

- verb stem retrieval (Conti-Ramsden & Jones, 1997; Rice & Bode, 1993),
- online processing difficulties for verbs (Watkins et al., 1993), and
- establishing categorical/semantic boundaries for verbs (Kelly, 1997).

However, it should be noted that the NFLVs reported in the literature are neither uniform across researchers nor homogenous as a semantically or syntactically identifiable group across speakers/children, as Ingham (1994) pointed out already. Concerning the former point, Ingham lists *do*, *go*, *get*, *put*, *want*, *look*, *come*, *did*, *make*, *work*, and *need* (from Rice & Bode, 1993, p. 10) as opposed to *do*, *go*, *get*, *put*, *want*, *look*, *got*, *know*, *open*, *play*, and *see* (from Watkins et al., 1993, p. 10), with only six assumed GAP verbs matching the two studies of Rice and Bode. With regard to the latter, this list already suggests that something is amiss. As Ingham observes, "[W]e see many that do not easily fit [the typical characterization]: *need*, *want*, *work*, *look*, *know*, *open*, *play* and *see*" (Ingham, 1994, p. 83). What we call "typical" here is what Ingham refers to as "'fairly non-specific' in meaning" (Ingham, 1994, citing Pinker, 1989, p. 171, and other aspects along the lines laid out above).

Evidence for NFLV use in SLI across languages

The first study to identify and describe NFLV production in children with SLI in a detailed manner was that by Rice and Bode (1993) for English. The spontaneous conversational speech of three young boys with SLI revealed a reliance on GAP (i.e., not fully lexical) verbs in place of semantically more complex verbs, suggesting either unavailability (vocabulary knowledge gap) or retrieval difficulties (possibly due to discourse and/or processing constraints). GAP verb overuse was also identified as a type of error (e.g., "I'm *doing* two balloons" in place of the verb *juggling*, which also illustrates the frequent multiword strategy of NFLV use). The authors suggested that children with SLI revealed an atypical preference for GAP verb production, but this view has since been contested in the literature (Conti-Ramsden & Jones, 1997; Ingham, 1994; Kelly, 1997; Watkins et al., 1993; see in particular Ingham's, 1994, p. 82, rebuttal based on mean length of utterance, MLU, comparisons).

Kelly (1997) showed that English-speaking children with SLI, same-age peers with TLD, and younger peers with TLD produced a high percentage of NFLVs when naming novel action verbs without a statistically significant difference among the three groups. However, the children with SLI made significantly more semantic error substitutions (i.e., selecting a verb semantically similar to the target verb) and were more likely to produce change-of-state than target motion verbs. She suggested that children with SLI used some intact syntactic knowledge to hypothesize the meaning of novel verbs, but that the semantic representations they formed were underspecified or incomplete compared to those of their peers with TLD.

It has also been found for English that both children with SLI and children with TLD matched for MLU use obligatory arguments and inflectional morphology more consistently with NFLVs than with their more specific single-word verbal counterparts in elicitation tasks (Ingham et al., 1998) and spontaneous speech

(Fletcher, 1991). As the number of obligatory arguments within an utterance increases, children with SLI produce more not fully lexical (i.e., presumably GAP) verbs and fewer semantically specific, fully lexical verbs. This pattern was not found in the TLD group, where both NFLVs and specific verbs are used just as frequently, even with increases in argument structure complexity (see de Jong, 1999, who identifies the NFLVs as hypernymic verbs).

For school-aged children, Thordardottir and Ellis Weismer (2001) reported pupils with and without SLI continuing to use GAP verbs in their spontaneous speech but showing changes in repertoire such as the addition of new GAP verbs and the weaning off from the preschool years of earlier GAP verbs. The authors speculate that GAP verbs may be one medium available to children with SLI who present weak expressive semantics to communicate fluently without serious disruption to the content and cohesion of the intended message.

Despite a growing cross-linguistic interest in verb knowledge and use for SLI (see SLI Consortium, 2004), very few studies have explored NFLV use in other languages. The results of two studies investigating NFLV production in non-English-speaking children with SLI are displayed in Table 1 along with the studies for English.

In the study involving Dutch school-aged children with SLI, de Jong (1999) reported the substitution of specific action names with NFLV alternatives. Nevertheless, verb diversity (measured by type–token ratios) was found not to differ between children with SLI and their language-matched peers with TLD (measured on MLU). In contrast, Greek-speaking children with SLI showed less verb diversity and a lower overall correct performance than that of their chronological age-matched peers with TLD on retrieving verbs (Stavrakaki, 2000). Common examples of NFLVs cross-linguistically, based on the studies in Dutch and Greek, are the verbs *come*, *go*, *take*, *give*, *hit*, *throw*, *give*, *rise*, *fall*, and *do/make*, which, as pointed out above, are difficult to organize under a common denominator.

The specific relationship between lexical retrieval of single-word lexical verbs and (multiword) NFLV substitutions in the presence of (specific) language disorders has not been widely researched. In addition, it is not clearly defined in the available research (see Table 1) what syntactic operations and lexical–semantic features comprise the NFLV construction, because detailed analyses of multiword NFLV expressions are not provided.

Verb-specific or lexical retrieval deficit in SLI?

There is currently no diagnostic consensus as to whether children with SLI have a naming deficit specific to verbs or a more general lexical retrieval deficit (see Andreu, Sanz-Torent, Guardia-Olmos, & MacWhinney, 2011, and references within). A domain-general, cognitive–perceptual deficit (see Leonard et al., 2007, and references within) and a domain-specific, linguistic–representational deficit (Rice, 2003, 2004, and references within) have been postulated to explain the underlying language deficits in SLI. Relating the first account to the suggestion that NFLV use "might be a way to gain automaticity leading to better use of processing resources for sentence formation" (Thordardottir & Ellis Weismer, 2001, p. 242), one could assume that children with SLI relying on NFLVs have deficits in some general cognitive and perceptual processing mechanisms. In particular, operationally dysfunctional nonlinguistic mechanisms (e.g., attention or memory) might hinder children from establishing accurate and distinct phonological representations in long-term memory (Lahey & Edwards, 1996). When compared to their TLD peers, children with SLI need much more time to process verbal information, even after similar length and type of exposure to the language input as nonimpaired children (Oetting, 1999).

In contrast, the prediction made by domain-specific theories regarding the relation between language-matched children with TLD and older children with SLI is that the language-impaired group will not differ from the younger controls on the production of NFLVs in place of fully lexical verbs and that NFLVs should be viewed as symptoms of immature language or absent representations.

In sum, studies setting out to investigate verb error production in SLI through NFLVs (see Table 1) involve either basic methodologies (e.g., spontaneous language samples or naming verbs from pictures and/or video scenes) or clinical populations (e.g., preschoolers or school-aged children with SLI); moreover, few studies have language- and/or age-matched control groups for comparison. In addition, not much is reported about the types of verbs tested on picture-/video-naming tasks, and whether verb stimuli were controlled for psycholinguistic features known to affect the naming process (Masterson, Druks, & Gallienne, 2008). Similarly, no "standard question" has been identified for the spontaneous speech tasks, that is, whether there were questions that provoked more verb use compared to other kinds of questions (such as "What do you do when you go to the park?" versus "Tell me about your favorite movie."), making comparisons between samples pointless. The results in general reveal complex interrelationships among MLU, verb diversity, and verb accuracy across languages and tasks.

NFLVs in Modern Greek

NFLVs have received very little attention in discussions of Modern Greek morphosyntax. So far, only one study has investigated lexical access of verbs in (Standard) Modern Greek-speaking children with SLI (Stavrakaki, 2000; see Table 1). Four children with SLI were requested to describe, as fast as they could, the activity depicted in the picture shown using a sentence. The results suggested that children with SLI used fewer semantically precise verbs and were slower retrieving verbs compared to TLD peers. Moreover, they relied on a very small subset of purported GAP or light verbs (only three: κάνω/*kano*, "do/make"; πάω/*pao*, "go"; and είμαι/*ime*, "be"), whereas children with TLD had a larger lexicon of NFLVs (six in total, see below). Moreover, children with SLI were found to produce nonadult forms of light verb constructions, something not evident in TLD. (For a recent experimental study designed to elicit children's productions of light verb constructions in Cypriot Greek, see Grohmann & Leivada, 2013.)

The NFLVs identified by Stavrakaki (2000), who incidentally refers to them as light verbs, are (in the citation form of the first-person singular indicative present tense): βάζω/*vazo*, "put"; βγάζω/*vγazo*, "take out"; δίνω/*δino*, "give"; είμαι/*ime*, "be"; κάνω/*kano*, "do/make"; πάω/*pao*, "go"; and παίρνω/*perno*, "take." The first noticeable difference is that NFLVs in Greek are bisyllabic in phonemic structure (although all stems are monosyllabic), with stress on the first or antepenultimate syllable.

PRESENT STUDY

The present study reassesses the issue of productions of NFLVs in the language of school-aged children with SLI in a highly inflected language, Cypriot Greek, which differs from the standard variety of Modern Greek (Demotic Greek or Standard Modern Greek, as spoken in Greece) in many interesting ways, yet shares with it a host of grammatical properties, including morphological richness. Because of the dialectal closeness, we characterize Greek Cypriot children as *(discrete) bilectal* speakers of Cypriot Greek and Standard Modern Greek (Rowe & Grohmann, 2013), as we have done in previous work on typical and atypical language development (among others, Kambanaros & Grohmann, 2010; Kambanaros, Grohmann, & Michaelides, 2013; Kambanaros, Grohmann, Michaelides, & Theodorou, 2013, 2014), rather than bidialectal or bilingual (for further discussion, see also Grohmann, 2011; Grohmann & Leivada, 2012). The reasoning behind this new terminology also resonates with Arvaniti's (2006, pp. 31–34) acute observations on the possible misnomer of "bidialectalism" in the context of Greek-speaking Cyprus, which is largely cultural–politically based.

Background

Potential NFLV error production was investigated using confrontation picture naming as a measure of lexical (access and) retrieval for single action words. In this task, using the Cypriot Object and Action Test (COAT; see Materials section), the correct response is one specific lexical verb from different semantic categories (e.g., manners of putting, cleaning, or cutting). Although picture naming can appear deceptively simple, the process is in itself highly complex, with multiple stages involved, yet children as young as 3 years old are familiar with the task and capable of doing it (Cannard, Blaye, Scheuner, & Bonthoux, 2005).

During the process of naming a picture, children first must identify the action, for example, see a picture of someone performing an action and recognize it as something familiar (e.g., someone sweeping, someone mopping, or someone cleaning). At this presemantic or visual identification level of processing, pictured stimuli are recognized as actions. Second, children must assign an action name, having distinguished the action from all other visually and semantically similar items (e.g., sweeping, mopping, or cleaning). This is the stage where lemma information is retrieved, that is, the word's lexical–semantic specifications and grammatical properties. Third, the word form is retrieved from memory from among the thousands of words known (e.g., *sweep*, *mop*, or *clean*). This is the phonological stage of naming or where the word's lexeme is retrieved. The corresponding representation of the sound of the word is stored in the phonological output lexicon where the picture name can be retrieved or assembled and then instructions are given to the oral motor system to assemble the sounds in order to articulate the verb (i.e., the output part of the articulatory–perceptual or sensorimotor systems in recent biolinguistic terminology; cf. Chomsky, 2000).

In this modular system, each component operates independently, and there is no interaction or cascading of activation between them (even with the common generative disclaimer that the matter of investigation is a theory of competence rather than performance, which we will briefly return to below; cf. Chomsky, 1965). Each of the three processing components contains a number of procedures that make up a child's procedural knowledge. The procedures operate on the declarative (or factual) knowledge that is stored in the child's mental lexicon (Levelt, 1989).

Word retrieval itself can be divided into two discrete stages, *lemma selection* and *lexeme retrieval*. The lemma is an abstract, language-specific form of the intended word. At the level of the lemma, semantic and syntactic properties of the word, including attachable inflections and full argument structure, are specified, but not its phonological form. Lemma retrieval is conceptually driven, and lemmas are both amodal and shared within the sensorimotor system, that is, in production as well as in comprehension (Levelt, 1989; Levelt, Roelofs, & Meyer, 1999).

In response to an action picture depicting "sweeping" a verb lemma SWEEP is activated, specifying lexical–syntactic information about the verb's argument structure (e.g., noun phrases that go with the verb to saturate its subcategorization frame) as well as inflectional information concerning tense, person, and number, for example. As a transitive verb that takes a direct object, *sweep* takes two semantic arguments, an agent and a theme (even if the object is often left implicit and sweeping is used "intransitively," it is understood as such).

At the second stage of word retrieval, the lexeme or word form corresponding to the selected lemma is morphophonologically specified. Lexemes contain information about the sound structure of a word (e.g., number of syllables, prosody, and segmentation) and its word formation (such as verbal and nominal inflections).

Selective impairments accessing and retrieving action names may arise at a number of relatively distinct levels or components postulated within such a psycholinguistic framework of lexical retrieval. For children with SLI, this could be when

- accessing/retrieving the conceptual or semantic information for the target verb,
- retrieving the lemma information for the target verb, or
- accessing/retrieving the phonological representation of the target verb within the phonological output lexicon.

In the second study reported in this research, the Cypriot Greek adaptation of the Bus Story Test (Renfrew, 1997) was administered. We chose this tool because we have collected normative data for Greek Cypriot children on the bus story (for first results, see Theodorou & Grohmann, 2010) and because it serves as a more "standardized" method of collecting connected speech for our purposes compared to conversational data. In addition, children with (and without) SLI have been shown to produce longer utterances when retelling stories than in conversation (see Thordardottir, 2008).

Table 2. *Participant details for the naming study*

Group	*N* (Gender)	Age Range	Mean Age (*SD*)
SLI	14 (4 F, 10 M)	5;5–9;9	6;9 (1;8)
TLD–LA	20 (8 F, 12 M)	3;5–5;5	4;7 (0;6)
TLD–CA	30 (15 F, 15 M)	6;0–6;11	6;3 (0;3)

Note: Ages are in years;months. SLI, specific language impairment; F, female; M, male; TLD, typical language development; LA, language age matched; CA, chronological age matched.

Research questions

With this background on the relevant existing literature and theoretical perspectives, five questions drive the present study:

1. What kind of NFLVs do children with SLI produce on a verb production test when the target verb is unavailable: a light verb or a GAP verb construction?
2. Do children with SLI substitute semantically complex verbs with NFLVs more often than age- and language-matched peers with TLD?
3. Can error type (light verb or GAP verb construction) differentiate children with SLI from nonimpaired children?
4. Is there an effect of context (e.g., naming vs. narrative speech) on NFLV production?
5. What kind of verb deficit do children with SLI really have: is it lexical–semantic or lexical–syntactic in nature, is it word-finding or impaired verb entries?

METHOD

Study 1: Verb naming

Participants. A total of 64 children participated in this study. They were divided into three groups, one group of children with SLI and two control groups of children with TLD, matched on language and chronological age, respectively. Details of all participants are provided in Table 2.

Following recent work within the Cyprus Acquisition Team (e.g., Grohmann & Leivada, 2012; Kambanaros, Grohmann, & Michaelides, 2013; Kambanaros, Grohmann, Michaelides, & Theodorou, 2013, 2014; Rowe & Grohmann, 2013), Greek Cypriot children are understood to be bilectal in Cypriot Greek (from birth, and uniquely in the family environment) and Standard Modern Greek (through media and especially schooling). The children with TLD were recruited from three public primary schools and one kindergarten in the Nicosia district after approval from the Ministry of Education and Culture and upon written parental consent. No typically developing child was or ever had been receiving speech and language therapy or special education services. The children with SLI were recruited from speech and language therapists in primary education and/or private practice. All children with SLI were in mainstream education and in the corresponding grade for their chronological age. The groups of children reported in Study 1 are also reported in Kambanaros et al. (2013) and Kambanaros, Grohmann, Michaelides, and Theodorou (2014).

Subject selection criteria for the participation of typically developing children included the following:

- a bilectal Cypriot Greek-/Standard Modern Greek-speaking background,
- no history of neurological, emotional, or behavioral problems,
- hearing and vision adequate for test purposes,
- no history of speech and/or language difficulties, including a diagnosis of "late talker" (for the typically developing children only),
- no obvious learning difficulties (teacher report),
- normal performance on a screening measures of nonverbal intelligence or as reported by school psychologist,
- normal articulation, and
- no gross motor difficulties.

All children came from families with a medium to high socioeconomic status as measured by mothers' education using the European Social Survey Database (2010). Because mothers' education was measured on an ordinal scale, Kruskal–Wallis was used to examine for differences among the three groups. The result was significant, χ^2 (4) = 14.41, p = .006. Pairwise Mann–Whitney tests revealed that significant differences existed only between the bilectal SLI and the older TLD group (z = –3.35, p = .001) as well as the younger TLD group (z = –3.43, p = .001). In both cases, the mothers' education level was lower for the SLI group.

The children with SLI were diagnosed prior to the study using a battery of norm-referenced tests for Greek by two speech and language therapists (one being the first author) as part of a larger investigation (Theodorou, 2013). Testing included measures of receptive and expressive morphosyntax, receptive and expressive vocabulary, and sentence recall from the Diagnostic Verbal Intelligence Quotient test (Stavrakaki & Tsimpli, 2000). The SLI group scored significantly lower than (chronological) age-matched peers with TLD on all language measures. Children's nonverbal performance was assessed using the Raven's Coloured Progressive Matrices (Raven, Raven, & Court, 2000). Receptive vocabulary was also assessed through the Greek version of the Peabody Picture Vocabulary Test (Dunn & Dunn, 1981) developed by Simos, Kasselimis, and Mouzaki, (2011). The preschool children with TLD serving as the language controls were matched with the SLI group based on their scores on the standardized Greek version of the Renfrew Word-Finding Vocabulary Test (Renfrew, 1997) developed by Vogindroukas, Protopapas, and Sideris (2009). Descriptive information about the background testing of participants is presented in Table 3.

Materials. The COAT, which was adapted by Kambanaros, Grohmann, and Michaelides (2014) from Kambanaros (2003), was administered to assess retrieval of verbs. The verb-naming subtest includes a total of 39 colored 10 × 14 cm photographs, depicting (single) common concrete verbs such as "driving." All verbs are monotransitive, that is, they can be combined with a direct object in

Table 3. *Mean (standard deviation) scores of children with SLI, age-matched peers (on tests administered), and language-matched peers on word-finding vocabulary test*

Tests	TLD–CA	SLI	*p*
Raven's Coloured Progressive Matrices	19.5 (4.9)	19.1 (2.8)	*ns*
DVIQ			
Production of morphosyntax (23 items)	19.9 (2.11)	12.3 (2.09)	<.05
Comprehension of morphosyntax (31 items)	26.4 (2.46)	22.4 (1.84)	<.05
Sentence repetition (16 items × 3 points)	46.8 (1.80)	40.8 (2.70)	<.05
Vocabulary (27 items)	22.3 (1.58)	15.7 (2.20)	<.05
Metalinguistic abilities (25 items)	20.1 (2.45)	17.5 (1.29)	*ns*
Peabody Picture Vocabulary Test (204 items)	79.3 (32.02) 30.2 (7.90)	69.3 (16.63)	*ns*
	TLD–LA		
Word-Finding			
Vocabulary Test (50 items) mean score	26.8 (2.72)	27.5 (3.83)	*ns*

Note: SLI, specific language impairment; TLD, typical language development; CA, chronological age matched; DVIQ, Diagnostic Verbal Intelligence Quotient (test); LA, language age matched.

the form of a full noun phrase, with either simple internal word structures of [root + suffix] (e.g., *vaf–i*, "paint–3SG.PRES," the single-word lexical verb response for "(he/she is) painting") or more complex ones of [root + suffix + suffix] (e.g., *skoup–iz–i*, "ROOT–VERBALIZER–3SG.PRES" for "sweeping").

A total of 28 action names corresponded to an instrumental verb (IV), where an instrumental noun (i.e., not a body part) was part of the action (e.g., cutting). Of these, 14 shared a homophonous name relation (NR) to the noun (IV+NR), such as *xtenizi* ("combing"), which incorporates the noun *xtena* ("comb") in its word form, while the other half were IVs without a noun name relation (IV–NR), such as *kovi* ("cutting") or the frequently produced Cypriot Greek variant *kofki* (see also Procedures below). In contrast, 11 action names corresponded to a noninstrumental verb (NIV), such as *aneveni* ("climbing"). We consider IVs to be semantically complex because the instrument (e.g., scissors) is part of their conceptual representation. Correspondingly, NIVs are semantically simple. Target verbs were measured on the number of syllables, (written) word frequency, rated age of acquisition, rated imageability, and rated picture complexity values. For a detailed discussion of the psycholinguistic measures obtained, see Kambanaros, Grohmann, Michaelides, et al. (2014). For example, frequency measures were based on written corpora for Standard Modern Greek (Hatzigeorgiou et al., 2000), given that there are no frequency measures (spoken or written) for the Cypriot Greek dialect, whereas age of acquisition measures were calculated on native speakers of Cypriot Greek.

The Kruskal–Wallis test showed that the verb types differed significantly on word frequency, χ^2 (2) = 18.622, p < .001, and age of acquisition, χ^2 (2) =

6.469, $p < .05$. Pairwise comparisons on word frequency and age of acquisition was carried out using the Mann–Whitney test with a level of significance equal to .05/3 = .017 (Bonferroni correction). The difference between IV–NR and IV+NR was not significant according to the corrected level of significance ($z = -2.027$, $p = .043$). NIVs were significantly higher on word frequency than IV–NR ($z = -3.012$, $p = .003$) and IV+NR ($z = -3.920$, $p < .001$). Pairwise comparisons on age of acquisition revealed no significant difference between IV–NR and IV+NR ($z = -1.749$, $p = .080$) nor between IV–NR and NIV ($z = -0.851$, $p = .395$). IV+NR verbs appear to have a significantly higher age of acquisition than NIV ($z = -2.412$, $p = .016$).

Actions are restricted to stereotypical roles of the past, that is, a woman is shown performing household activities such as "sweeping," while a man is performing more manly duties such as "hammering." The stereotypical roles depicted in the pictures are deemed to be appropriate for this age group in this particular cultural setting (see also Durkin & Nugent, 1998).

Procedures. Participating children with and without SLI had to score at least 90% correct (i.e., a maximum of four errors) on the comprehension verb subtest of the COAT in order to be included in the naming study. The verb comprehension subtest of the COAT comprises the same 39 photographs used in the production task; comprehension was tested 10 days prior to production. The verb-naming task was presented in one session. Testing was conducted in a quiet room at the school. Children were shown one photograph at a time and asked to name the verb represented in the photograph, prompted by the instruction: "Tell me in one word: What is he/she doing?" Photographs were presented in random order; testing took a maximum of 30 min per child.

Verbs were required in the third-person singular (without the subject, as the inflected verb form in Modern Greek, a null subject language, implicitly expresses the subject). The lexical item produced could come from either Greek variety, that is, responses from Cypriot as well as Standard Modern Greek were treated equally. Two examples were provided before testing. The stimulus question was repeated once for children who did not respond. If no response was given, the item was scored as incorrect. No time limits were placed, and self-correction was allowed. Responses were recorded and transcribed verbatim.

Relevant for the current analysis is the protocol followed when children produced multiword responses, especially those with an NFLV. In such instances, the experimenter praised the child for identifying the action but asked whether the child could say this in one word (discounting the earlier multiword response with an NFLV). However, as it happened, no child was able to "correct" an NFLV multiword response with a single fully lexical verb; they repeated their original response (with an NFLV), modified it slightly (still with an NFLV), or did not produce a new response (e.g., "I don't know").

Results

All responses for the 39 verbs were collected and counted for the three groups. This resulted in a total of 2,496 responses for accuracy and/or error type analysis.

Table 4. *Percentages of correct and incorrect responses and error types produced by children with SLI and TLD on the verb naming task (i.e., COAT)*

Group	SLI (*SD*)	TLD–LA (*SD*)	TLD–CA (*SD*)
Correct target verbs (%)	63.20 (9.1)	62.40 (12.1)	77.40 (8.2)
Semantic error	*11.20 (7.8)*	*11.20 (7.1)*	*5.00 (3.4)*
Semantic description	*17.00 (8.3)*	*17.90 (8.5)*	*14.30 (6.3)*
Phonological error	—	0.11 (0.6)	—
Word-form related errors	*7.90 (7.4)*	*6.80 (6.9)*	*2.30 (3.4)*
Unrelated response	0.2 (0.7)	0.3 (1.1)	0.26 (0.7)
Visual error	0.4 (0.9)	0.9 (1.3)	0.20 (0.7)

Note: SLI, specific language impairment; TLD, typical language development; COAT, Cypriot Object and Action naming test; LA, language age matched; CA, chronological age matched.

Errors made for verbs were classified into semantic errors, phonological errors, word-form related errors (e.g., lack of response, “I don’t know”), visual errors, unrelated responses, and other errors. Semantic errors were divided into either semantic types involving a one-word substitution or semantic circumlocutions. The latter involved describing the target action concept using more than one word and thus are clearly NFLVs (e.g., *building* ➔ “making a house”). Visual errors included responses where there was no semantic relationship between the child’s response and the target verb (e.g., *weighing* ➔ “looking at the clock”). Unrelated responses included real-word responses lacking a relationship of any form with the target word. Other errors included responses that were unable to be classified. Table 4 lists the percentages of correct responses, incorrect responses, and error types across participating groups.

To rule out plausible confounding effects on verb-naming accuracy, mean age of acquisition, imageability, picture complexity, and frequency of the lemma were correlated: mean age of acquisition was negatively correlated with word frequency ($r = -.329$, $p = .041$) and imageability ($r = -.386$, $p = .015$), while imageability was positively correlated with picture complexity ($r = .383$, $p = .016$). Multiple linear regression models for verbs (separate for each of the participating groups) to predict word-naming accuracy using the psycholinguistic variables mentioned above as independent variables were performed in a previous study (see Kambanaros, Grohmann, & Michaelides, 2014). Imageability, picture complexity, and frequency of the lemma were not significant predictors. Only the mean age of acquisition of a word was significant in predicting accuracy for lexical retrieval of verbs for children with and without SLI. See Table 5 for details.

Production of lexical versus NFLV. For every lexical verb in the verb subtest of the COAT, there is an alternative correct adult-form synonymous, NFLV construction in V + N form, obviously similar in form to light verb constructions. For example, the verbs “building,” “cooking,” and “drilling” could all be legitimately referred to as “making X”: as in “making a house,” “making food,” and “making a hole,” respectively. Hence, semantic errors produced by children with and without SLI

Table 5. *Standardized multiple regression beta coefficients in the models predicting verb performance using psycholinguistic variables by group*

Predictors	SLI Verbs	TLD–LA Verbs	TLD–CA Verbs
Mean age of acquisition	−0.516*	−0.573*	−0.573*
Mean imageability	0.104	−0.014	−0.024
Mean picture complexity	0.132	0.217	0.175
Frequency	−0.013	−0.141	−0.075
Adjusted R^2	.273	.269	.255
Total number	39	39	39

Note: SLI, specific language impairment; TLD, typical language development; LA, language age matched; CA, chronological age matched.
$*p = .01$.

Table 6. *Total number of NFLVs produced (%) by children with and without SLI on the verb naming subtest (COAT)*

	SLI	TLD–LA	TLD–CA
Single NFLV	0.18	0.51	0.43
NFLV construction	8.79	11.03	8.12
NFLV			
βάζει/*vazi* “put”	4.40	5.38	5.56
κά(μ)νει/*ka(m)ni* “do, make”	2.38	2.69	0.43
παίρνει/*perni* “take”	1.47	0.90	0.60
φέρνει/*ferni* “bring”	0.37	0.13	0.26
φτιάχνει/ftiaxni “make”	0.18	0.51	0.68
δίνει/δ*ini* “give”	—	0.26	0.17
πιάνει/*piani* “catch”	—	0.64	0.09
βγάζει/*bγazi* “put”	—	0.26	—
πάει/*pai* “go”	—	0.13	—
έχει/*echi* “have”	—	—	0.09
βγαίνει/*bγeni* “come out”	—	—	0.09
Total numbers	5	9	9

Note: NFLV, not fully lexical verb; SLI, specific language impairment; COAT, Cypriot Object and Action naming test; TLD, typical language development; LA, language age matched; CA, chronological age matched.

were further analyzed for substitutions of the main target verb with a single NFLV synonym and/or a verb description/circumlocution in the form of a purported GAP or light verb construction. The quantitative results are presented in Table 6.

Of the 39 lexical verbs attested in the COAT, a total of 23 verbs (58.9%) prompted NFLV alternatives. Specifically, the chronological age-matched children with TLD produced NFLVs for 12 actions (30.7%), the language-matched children

Table 7. *English translations of all action names (verbs) and corresponding NFLVs produced across groups on the naming task*

Verb	Type	SLI	TLD–LA	TLD–CA	NFLV
Serving	IV–NR	+	+	+	*Take*
Weighing	IV+NR	+	+	+	*Put*
Building	IV–NR	+	+	+	*Put, make, do*
Ironing	IV+NR	+	+	+	*Do*
Posting/sending	NIV	+	+	+	*Put, make*
Gluing	IV+NR	+	+	+	*Put*
Grating	IV+NR	+	+	+	*Do, make*
Stirring	IV–NR	+	+	+	*Put, make*
Drilling	IV+NR	+	+	+	*Make, put*
Raking	IV–NR	+	+	–	*Do*
Drawing	IV–NR	+	+	–	*Make*
Hammering	IV–NR	+	+	–	*Make, put, do*
Painting	IV–NR	+	+	–	*Do*
Tying	NIV	+	+	–	*Put*
Combing	IV+NR	+	+	–	*Do*
Washing	IV–NR	+	+	–	*Make, do*
Blowing	NIV	+	+	–	*Make*
Ringing	NIV	+	+	–	*Do*
Sewing	IV–NR	–	+	–	*Put, make*
Cooking	IV–NR	–	+	–	*Make*
Fishing	IV–NR	–	–	+	*Put*
Shaving	IV–NR	–	–	+	*Make*
Climbing	NIV	–	–	+	*Come*

Note: NFLV, not fully lexical verb; SLI, specific language impairment; TLD, typical language development; LA, language age matched; CA, chronological age matched; IV–NR, instrumental verb without a noun relation; +, NFLV alternative; IV+NR, instrumental verb with a noun relation; NIV, noninstrumental verb; –, no NFLV alternative.

for 20 actions (51.2%), and the children with SLI for 18 actions (46.2%). Nine target verbs (23%) with NFLV substitutions were common to all three groups of children: the Standard Modern Greek equivalents of "serving," "weighing," "building," "ironing," "posting/sending," "gluing," "grating," "stirring," and "drilling." Similarly, nine other target actions were replaced with NFLVs by the SLI and language-matched TLD groups only: "tying," "ringing," "raking," "drawing," "hammering," "painting," "combing," "washing," and "blowing." Individual children in the chronological age-matched TLD group produced NFLVs for three target actions ("fishing," "shaving," and "climbing"); a similar result was found for two other verbs only in the language-matched TLD group ("cooking" and "sewing"). Table 7 provides the target verb types substituted by NFLV alternatives for the three groups of children. The predominant NFLV alternative produced is also recorded.

Table 8. *Participant details for the narrative retell study*

Group	*N* (Gender)	Mean Age (*SD*)
SLI	13 (3 F, 10 M)	6;3 (1;2)
TLD–CA	13 (7 F, 6 M)	6;2 (1;2)

Note: Ages are in years;months. SLI, specific language impairment; F, female; M, male; TLD, typical language development; CA, chronological age matched

Study 2: Narrative retell

Participants. A total of 26 children participated in this study: 13 children diagnosed with SLI and 13 children with TLD matched with the impaired group on chronological age, socioeconomic status (as measured by mother's education), and language background (bilectal Cypriot Greek). All children participating in Study 2 had taken part in Study 1 reported above. Descriptive information about the participants is reported in Table 8.

Materials, procedures, and coding. The Cypriot Greek adaptation of Renfrew's (1997) Bus Story Test (Theodorou & Grohmann, 2010) was administered to all 26 children in their schools or homes for a single session lasting approximately 30 min. The session was audiotaped for later transcription and scoring. Participants listened individually to a spoken story with picture support (sequenced cartoon strips of 12 pictures in total) about the antics of a naughty red bus. Upon completion of the narration, they had to retell the story that they had just heard using the pictures as prompts.

Each transcript was divided into sentences and evaluated with respect to five measures based on the original English test manual but adapted for Greek: the amount of original story information included (information); the total number of subordinate clauses used (subordinates); the mean sentence length of the longest five sentences produced (A5LS); the mean length of utterances based on words (MLU–word); and the total amount of sentences used (sentences).

Results

Specifically, for the purposes of the present study, the following lexical information was coded from the narrative retell samples of both groups of participants: number of types and tokens of verbs, and verb diversity by dividing the total number of verbs produced with the total number of verb types to express a type–token ratio.

An independent *t* test between groups revealed a significant difference in the total number of tokens (words) produced by children with SLI and TLD controls in connected speech based on the narrative retell task, t (24) = –2.584, $p = .016$, with impaired children producing considerably fewer words. However, the total number of verb tokens produced between the two groups of children was not significantly different, t (24) = –1.327, $p = .197$. A similar pattern was observed in relation to the different verb types produced, that is, typically developing age-matched controls and children with SLI did not significantly differ on the number of verb types produced, t (24) = –1.638, p = .114. With regard to verb diversity in spontaneous language expressed in type–token ratios, there was no significant difference between the two groups, t (24) = 0.122, p = .904.

Production of lexical versus NFLV on naming versus connected speech. To provide additional information about NFLV production in naming and in connected speech (narrative retell), an analysis involving the proportion of lexical versus NFLVs was undertaken. Both naming and narrative samples were analyzed for number of fully lexical verbs, which was divided by the total number of verbs produced (i.e., lexical + NFLV) and multiplied by 100 to yield the percentage of lexical verbs (%LexV), a measure adapted from the "percentage of substantive verbs" reported in Mayer and Murray (2003).

The narrative sample underwent reliability analyses. Two raters, one certified speech-language therapist and one postgraduate student of linguistics, were provided with written instructions regarding the application of %LexV and asked to independently apply the scoring rules as written. Point-to-point interrater agreement was calculated, which ranged from 98% to 100%. An independent t test between groups revealed a nonsignificant difference between children with SLI and their TLD peers on NFLV production, t (24) = –0.671, p = .508, as well as lexical verb production, t (24) = –0.021, p = .983. In contrast, children with SLI performed significantly different to TLD peers on the verb-naming subtest (COAT) by producing considerably more NFLVs, t (24) = –2.159, p = .041, and fewer correct lexical verbs, t (24) = –2.765, p = .011. Individual results by group on the production of lexical and NFLVs on the narrative retell task and on the naming subtest are presented in Table 9.

GENERAL DISCUSSION

The overall goal of this study was twofold. First, we wanted to investigate the use of NFLVs by children with SLI and their peers with TLD quantitatively on a verb-naming task from the COAT, primarily to see whether an overuse of general all-purpose and/or light verbs can be detected. Second, we wanted to determine whether children (especially those with SLI) are particularly prone to using NFLVs in connected speech from retell narratives based on the Bus Story Test. The results of the two studies reported provide an interesting picture of dissociation between naming and connected speech in the production of NFLVs for school-aged children with SLI, with a significantly higher production of NFLVs in the former compared to the latter. This asymmetry was not unique to the SLI group; the result was also found for the chronological age-matched control peers with TLD.

With regard to our first research question, investigating the type of verb alternative produced on the verb-naming subtest when the target verb was unavailable (i.e., GAP or light verb construction), children with SLI produced exclusively GAP verbs and no light verb constructions. What this means is that in their NFLV responses, the children do not form a productive construction, possibly as adults might, that clearly designates an unambiguous multiword alternative

Table 9. *Production of lexical and not fully lexical verbs on the naming subtest (COAT) and the narrative retell task (BST)*

	BST					COAT		
Group	Verb Tokens	Verb Types	Verb TTRs	%LexV	NFLVs	Action Naming	%LexV	NFLVs
SLI 1	19	14	73.7	89.4	2	43.6	90.5	2
SLI 2	14	11	78.6	71.4	4	69.2	93.1	2
SLI 3	24	14	58.3	91.6	2	71.8	93.5	2
SLI 4	34	19	55.9	100	0	64.1	86.2	4
SLI 5	32	21	65.6	93.7	2	59.0	88.9	3
SLI 6	19	18	94.7	94.7	1	69.2	93.3	2
SLI 7	16	12	75.0	100	0	76.9	85.7	5
SLI 8	23	20	86.9	95.6	1	69.2	89.6	3
SLI 9	18	12	66.7	100	0	53.8	84.6	4
SLI 10	16	14	87.5	100	0	59.0	85.2	4
SLI 11	30	22	73.3	100	0	69.2	79.4	7
SLI 12	22	15	68.2	95.4	1	61.5	77.4	7
SLI 13	8	7	87.5	100	0	51.3	76.9	6
Mean	21.2	15.3	74.8	94.7	1.0	62.9	86.5	3.9
(*SD*)	(7.5)	(4.4)	(10.0)	(7.9)	(1.2)	(9.4)	(5.8)	(1.8)
TLD 1	20	18	90.0	84.2	3	69.2	90.0	3
TLD 2	36	24	66.7	91.4	3	87.2	97.1	1
TLD 3	31	17	53.1	93.5	2	82.1	91.4	3
TLD 4	35	25	71.4	92.0	2	82.1	94.3	2
TLD 5	22	17	77.3	100	0	82.0	94.1	2
TLD 6	27	18	66.7	92.6	2	80.1	96.9	1
TLD 7	17	16	94.1	100	0	74.4	90.3	3
TLD 8	23	17	73.9	95.6	1	79.5	96.1	1
TLD 9	15	12	80.0	93.7	1	79.5	91.2	3
TLD 10	17	15	88.2	100	0	84.6	94.4	2
TLD 11	27	22	81.5	96.3	1	60.0	80.0	6
TLD 12	22	15	68.2	100	0	66.7	87.8	4
TLD 13	32	17	53.1	93.7	2	76.9	94.1	2
Mean	24.9	18.0	74.2	94.8	1.3	77.7	92.2	2.5
(*SD*)	(7.0)	(3.7)	(12.9)	(4.6)	(1.1)	(7.8)	(4.7)	(1.4)

Note: Action naming scores are reported in percentage correct; BST, Bus Story Test (Renfrew, 1997); COAT, Cypriot Object and Action naming test; TTR, type–token ratio reported (%); %LexV, proportion of fully lexical verbs; NFLV, total number of not fully lexical verbs.

with the specific meaning of the expected single-word lexical verb, despite intact comprehension of all actions and corresponding verbs (verified through the comprehension task prior to the naming study). For example, for the target verb *chtizi*, “build.3SG.PRES,” children with SLI produced six different alternatives (the Greek equivalents of “making,” “doing bricks,” “making bricks,” “putting bricks," "making a house" and "put the bricks to the house") and children with TLD a total of seven ("putting clay on the bricks," "putting bricks," "making a house," "making with bricks," "putting clay," "making something," and "putting bricks"). That is, children used a large array of multiword responses to describe an action they were asked to name in one single verb. Recall that if a child produced such a multiword response, the experimenter encouraged him or her to try and use a single verb instead (though this retake was not successful in a single case).

Using a GAP verb (e.g., *make*, *do*, or *put*) to substitute for the more specific target verb revealed that children had some indication of the target meaning (e.g., *chtizi*, "build.3SG.PRES" ➔ *ftiachni spiti*, "makes a house"; *sideroni*, "iron.3SG.PRES" ➔ *kani ta ruche*, "does the clothes"; *kollai*, "glue.3SG.PRES" ➔ *vazi γoma*, "puts glue"). Because even a simple action involves several components (e.g., agent, intention, direction, manner of movement, instrument, patient, and result) and may well be part of a coordinated series of actions (e.g., sweeping is part of pushing [a broom]), several verbs can often be mapped onto it, each emphasizing a different subset of components or a different part of the series.

Yet responses revealed that children's semantic representations were partial (e.g., the instrument, manner, or core meaning) and not rich enough to allow stronger activation levels to produce the target action name. Out of 2,496 responses, there was a single use of what might be classified as a true light verb construction (in the sense of Kearns, 1988, where a light verb takes a nominal complement with a single, unambiguous meaning) in the naming task, produced by a typically developing child matched on chronological age: *kamni kalami* ("(he) does rod" ➔ "(he) fishes").

Repeated encounters with high-frequency, generic NFLVs may result in the formation of stronger representations in the mental lexicon, making them more accessible (see Mainela-Arnold, Evans, & Coady, 2010). Obviously, the large number of semantic description alternatives (NFLVs) for lexical verbs reflects particular challenges in naming: there are just too many ways to interpret them (Gentner, 2006), owing to multiple semantic competitors, given the polysemous nature of lexical verbs (de Jong, 1999), hence the difficulties with resolving lexical competition.

Other explanations could fall under the umbrella of the domain-general account. For example, children with SLI are reported to show difficulties deactivating competing lexical–semantic information owing to an inefficient internal suppression mechanism (Andreu, Sanz-Torent, & Guardia-Olmos, 2012; Seiger-Gardner & Schwartz, 2008). Similarly, children with SLI are slower at simultaneously activating/deactivating phonological and semantic representations, given that lexical access is less automated and demands more resources (Seiger-Gardner & Schwartz, 2008; Mainela-Arnold et al., 2010). Such inhibitory mechanisms are developmentally constrained, that is, as children get older, they become better at suppressing competing lexical items from reaching activation, selection, and later retrieval (Hanauer & Brooks, 2005).

To answer our second question, whether children with SLI produce more NFLVs than age- and language-matched peers with TLD, our results from the naming subtest revealed a significant difference between children with SLI and age-matched controls but a nonsignificant difference with language-matched controls on the number of NFLVs produced. Nevertheless, the preference for NFLV alternatives was not specific to SLI. This finding for naming supports previous research for English by Kelly (1997).

In addition, the total number of NFLV types used by children with SLI on the verb-naming task ($N = 5$) was considerably lower than by each TLD group (total $N = 9$), as shown in Table 6. Nevertheless, the bilectal Cypriot Greek children with SLI showed larger NFLV type repertoires compared to the monolingual Greek SLI children reported by Stavrakaki (2000) in her naming study, who produced a total of three NFLV types (i.e., *kano*, "do"; *pao*, "go"; and *ime*, "be").

Turning to the narrative data, when compared to age-matched peers, children with SLI did not differ quantitatively on NFLV production despite qualitative differences (i.e., smaller NFLV repertoires). Our findings support what has been reported for English (Thordardottir & Ellis Weismer, 2001). In spite of this, it is possible that preexposure to the narrative stimuli may have introduced one source of bias. Children listened to the story before a narrative response was requested. This procedure was employed to guarantee a representative language sample from children with SLI and to allow scoring to be uniform across samples. All the same, it is possible that exposure to the narrative introduced an unintended source of priming for lexical verbs in the retelling condition.

In relation to our third question, whether error type (light or GAP verb construction) differentiates children with SLI from non-language-impaired children, this cannot be answered on the basis of the two studies presented here. As just summarized, true light verb constructions were all but absent in the narrative retell and extremely rare in the naming productions (with one true light verb construction employed). What seems to be more at stake for the populations tested is the distinction between accurate retrieval of a lexical verb versus the alternative use of NFLVs, which are GAP rather than bona fide light verb constructions.

Regarding our fourth question, the exploratory nature of this study does not permit determination of the mechanism(s) underlying contextual effects on NFLV production on lexical retrieval. However, it should be noted that both children with SLI and typically developing controls demonstrated less NFLV use in narratives than in naming (see Table 9). With regard to verb diversity or specificity as measured by type–token ratios, there were no significant differences between children with SLI and their typically developing age-matched peers. This finding has been reported for English (Thordardottir & Ellis Weismer, 2001) but also when language- or MLU-matched children were used as controls for the SLI group in English (Watkins et al., 1993) and Dutch (de Jong, 1999). Our results do not support earlier findings for Greek (Stavrakaki, 2000) or English (Conti-Ramsden & Jones, 1997), where less diverse verb lexicons were reported in both studies for children with SLI compared to age- and MLU-matched controls with TLD.

Implementing Levelt's (1989) model to determine the type of verb deficit, our fifth question, we can say that based on our results, GAP verb production as stand-ins for fully lexical verbs may be the result of a deficit in lexical retrieval either in the lemma lexicon or in the lexeme/word-form lexicon. The former is related to the greater complexity in the underlying representations of verbs in terms of their conceptual–semantic or syntactic representation, respectively; the latter is based on the assumption that knowledge of word-form properties related to individual verbs is affected. It is unlikely that the difference retrieving action names for Cypriot Greek-speaking children with SLI and with TLD resulted from a central deficit at the initial stages of word retrieval, because both groups of children showed negligible comprehension difficulties for the same target verbs (scores of 90% and above correct). It would be safe to claim, then, that the breakdown was not at the level of conceptual semantics.

Likewise, given the very few grammatical word class substitution errors, lemma (i.e., lexical–syntactic) information about grammatical category could be successfully retrieved. In addition, in the absence of inflectional errors (i.e., suffixation), any impairment at the level of morphological processing is ruled out. In the same way, no phonological errors were made by participating children, which reveals that phonological representations for action names were intact. Nevertheless, we argue that spoken naming difficulties for children with and without SLI for lexical verbs are the result of a breakdown at the interface of the semantic lexicon and phonological representations, or access to them. This is supported by the large number of GAP verb constructions in place of the target lexical verbs. GAP verb alternatives arose when the target word node was relatively unavailable, and semantically related ones were activated and produced instead.

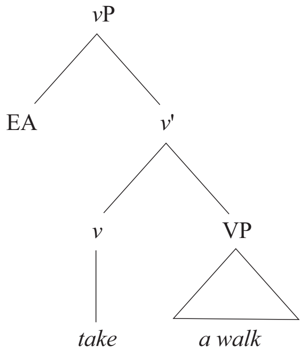
Therefore, based on our findings, the kind of verb impairment demonstrated by participating children with SLI is suggested to be nongrammatical but rather lexical–semantic in nature. Moreover, GAP verbs were produced predominantly for instrumental (i.e., semantically complex) verbs (see Table 7), compared to non-instrumental (i.e., semantically weak) verbs (see also Kambanaros, 2013), a finding which is currently undergoing further investigation. Likewise, children with SLI had intact comprehension of verbs, suggesting that their naming difficulties were word retrieval based and not impaired verb entries. Nevertheless, children with SLI on the narrative retell task appeared to overcome their lexical disorder, possibly assisted by the sentential context in which verbs must be produced. The details of this phenomenon are explored further in a follow-up study (Kambanaros, 2014).

Overall, the results from Greek lend support to a domain-specific linguistic representational account (in line with Rice, 2004, among others), in that children with SLI do not differ from younger, language-matched children with TLD on the production of GAP verbs in place of fully lexical verbs. As such, GAP verbs should be viewed as symptoms of immature language or absent representations rather than impaired language. Nevertheless, a domain-general account to explain the findings may also be plausible, given the purported reduced inhibitory function in children with SLI (Andreu et al., 2012; Mainela-Arnold et al., 2010; Seiger-Gardner & Schwartz, 2008), but further research is needed correlating lexical retrieval of verbs and executive function abilities in children with SLI. In this context, note also a limitation that is typical of SLI research: SLI is a tremendously heterogeneous impairment, with large individual differences on all levels (concerning language components affected, severity of impairment, externalization of errors, and so on), which contributes to the high standard deviations found here (cf. Table 9).

The major point we want to highlight here concerns the question whether children with SLI use GAP or light verb constructions. Our results show that they do not use light verb constructions; they use exclusively GAP verbs when they cannot find the exact lexical verb. Moreover, they do not differ from language-matched typically developing children in this respect on verb-naming abilities. Consequently, when discussing NFLV productions in (a)typical development, researchers should make the fundamental distinction between GAP and light verbs, and focus on GAP verbs as the relevant category.

This leads us to the final aspect of the discussion, the ontological status of "GAP verbs" in addition to or contrasted with "light verbs," and their theoretical capturing. To briefly recap, light verbs are instrumental in deriving light verb constructions. As such, they provide a general, theoretically motivated representation for the thematic layer of syntactic structure, which can, for example, be captured by the *v*P-approach in Examples (1) and (2): combining with an noun phrase, we would thus generate a light verb construction such as *take a walk*. This is schematized in Example (3), where EA stands for the external argument (such as *John* in [$_{v\mathrm{P}}$ John take a walk]) and the noun phrase [*a walk*] is the X-constituent from Example (2).

(3) syntactic generation of a light verb construction



In contrast, GAP verbs look like "failed" or overgeneralized lexical verbs (arguably owing to a temporary distortion or breakdown at the interface of the semantic lexicon and phonological representations, or access to them). However, something else is going on, because these GAP verbs do not generate light verb constructions, that is, they should not be inserted in the *v* slot and combine with their, say, noun phrase complement to form predication. We thus suggest that GAP verbs are generated in the lexical verb slot V (cf. Example (1) above), allowing the full argument structure frame (see also our above discussion of the first research question for some experimental evidence for this suggestion). GAP verbs are thus used semilexically to express predication at the verb phrase level (like V) rather than functionally with a nonverbal predicate (like *v*). What we call semilexical is the inaccurate or overgeneralized meaning that goes hand in hand with such multiword utterances. In this sense, GAP verbs are intended to be used as fully lexical verbs, but this intention is limited by the underspecified meaning they carry, leading to a placeholder use.

If this brief sketch is on the right track, it may represent one potentially interesting aspect of the competence–performance dichotomy (see Chomsky, 1965, and much subsequent discussion in the theoretical literature): light verbs are "ingredients" of a competence model (qua *v*/*v*P), while GAP verbs ultimately follow from performance factors (such as word-finding difficulties, which can be extended to GAP verb use by other populations, of course). Our proposal is that *not fully lexical verbs* come in (at least) two guises, as a true light verb, ontologically rooted in a theoretical construct, namely, the *v* slot in a complex predication structure, and as a generalized all-purpose verb, in which a lexically underspecified verb takes over the function of establishing full (even if infelicitous or semantically weak) predication.

Because our two studies, verb naming and narrative retell, did not provide any evidence for qualitative or quantitative differences in NFLB use between bilectal children with SLI and their typically developing peers speaking Cypriot and Standard Modern Greek, this verb–lexical deficiency is arguably not a hallmark of SLI per se. What an apparent domain-general approach may then contribute to is to anchor the overuse of GAP verbs in a speaker's processing capacities. If this is an issue for the competence–performance system, possible quantitative and qualitative differences in verb naming between a variety of child and adult populations may give us a clue.

Such future research into verb naming may then open a whole new window into the lexical–syntactic interface and transform competence-based research into a performance-sensitive model: it is not an issue of being able to name a particular action with a single verb that is clearly known; it is a matter of activating and retrieving the concept speedily and successfully within the human language faculty and its interface with the performance systems for which there is a model. Put simply, in the current minimalist framework (Chomsky, 2000), there is a well-defined pathway from the lexicon to the conceptual–intentional interface (vocabulary, syntax, and semantics) with the add-on component of sound (phonological structure and instructions to the articulatory–perceptual/sensorimotor system). Our hope is that eventually verb naming may be used as an additional probe into spelling out this model further.

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