Holmstedt-Abegg Hebrew Syntactic Database

Principles and Parameters

v. 5.0 (rev. October 2014)

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INTRODUCTION

In 2008 Robert D. Holmstedt and Martin G. Abegg Jr. began collaborating on the development of a syntactic database for all ancient Hebrew texts. Morphologically-tagged databases of the Hebrew Bible have existed in some form for well over two decades. Within the last few years databases for the epigraphic Hebrew texts, Qumran texts, Ben Sira, texts from the Judean Desert, and the Mishna have been released. In contrast, syntactically-tagged databases, while they have been in production for decades, have only been made publicly available in the last five years: the *WIVU Emdros* database of the Werkgroep Informatica of the Vrije Universiteit in Amsterdam (wivu.dans.knaw.nl/) and the *Andersen-Forbes Analyzed Text of the Hebrew Bible* (www.andersen-forbes.org).[1] While both existing databases were produced by noted Hebraists and are ground-breaking in distinct ways (and so immensely valuable), we saw a need for a third database: one that was focused more narrowly on syntax and covered both biblical and extra-biblical texts. As the project design matured, it was clear that there are, in fact, four features that make the Holmstedt-Abegg database unique.

First, our project covers all ancient Hebrew in the first millennium B.C.E. This will not only provide access to the non-biblical texts, it will also facilitate comparative and historical syntactic analyses (e.g., comparing the syntactic features of 'late' biblical books to select Qumran texts).

Second, our project has not been designed as a stand-alone database, but is native to the Accordance Bible database software. Although the data files are simple enough so that they could be easily incorporated into any existing database software, the advantages of working with an existing software package have been manifestly clear: access to programming expertise at every step of development and the luxury of not needing to use any existing mark-up language (e.g., *html*, see Kroeze 2002; *xml*; see, e.g., Kroeze 2006, 2008) or database engine such as Emdros (see, e.g., Petersen 2004).

Third, our database is focused very tightly on clause syntax: we build on existing morphological databases (which also facilitates our schedule) and do not address semantic or discourse-pragmatic features of the Hebrew texts. In contrast, the Andersen-Forbes database, for example, includes such non-syntactic issues as semantic categories (e.g., as 'purpose', 'result', even 'undesired outcome') and additional issues of less grammatical import such as the time, region, dialect, register, and/or source of the biblical texts (Andersen and Forbes 2003:44).

Fourth, our approach to the parsing and analysis of the syntax is alone in its generative syntactic theoretical orientation. Thus, our database will also serve as a necessary counterpart to the other databases, which represent different theoretical approaches to the nature of syntax and syntactic analysis.

The remainder of this introduction will address the interaction of generative

1 Yet another syntactic database remains in production: the *Westminster Hebrew Syntax* database (www.grovescenter.org/GC/projects/westminster-hebrew-syntax; see also Lowery 2009). Our understanding is that it will also be limited to the biblical corpus.

linguistic theory and the pragmatics of a linear tagging scheme and so describe the principles of the database.

There are numerous complexities involved with such a project. They range from issues of *audience* t o *theory* to *programming*. Among other questions, we asked ourselves (repeatedly, in many cases):

- *who will use this database and what will they expect to see?*
- *how much can we draw upon linguistic theory — and which one? — while still making the modules usable for the broadest audience?*
- *how much theory-internal structure can we set aside yet not produce a scientifically naive and theoretically flawed database?*

Our primary goal for the creation of the database is to produce a usable research tool for the academic community. Determining syntactic relationships, though, not only require judgment, which is necessarily subjective, but also depend on one's theory of grammar. To think that such a project can be accomplished "without" a theory would be like saying that exegesis can happen without an explicit methodology or that interpretation can exist in a vacuum, without a hermeneutical theory. It is simply not scientific reality — even if an exegete or interpreter is unaware or ignorant of theories and methodologies, there is always a framework in which analysis occurs (however coherent that framework may or may not be).

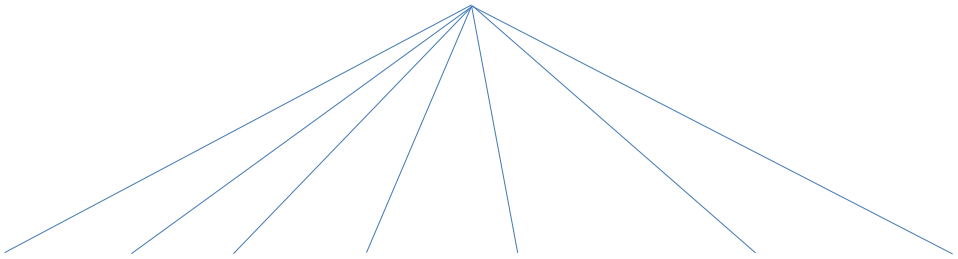
And yet, although I have situated my particular research on Hebrew syntax within generative grammar, specifically as it is articulated within the program of Chomskyan minimalism (Chomsky 1995; Radford 1997; Boeckx 2006, 2008), we knew that to base the database and its underlying tagging scheme on a fully articulated minimalist framework would be wildly inappropriate. Not only would its usability be severely limited, since it is unlikely that most users of the database will subscribe to Chomskyan linguistics, but given the ever-changing nature of linguistic theory, the database would become obsolete before it was finished.

To keep our balance on a very narrow beam, we sought to develop a tagging scheme that reflected what became our motto: “data primary, theory wise.” That is, while I (and others on our team) have read broadly in linguistics, from various types of functionalism and typology to generative grammar, it was important for the project that the usability and accessibility dictated our use of linguistic theory. Three decisions will illustrate our balance beam act.

A. Hierarchical, Non-Binary Phrase Structure

There are two basic options for clause structure: a flat clause structure and a hierarchical clause structure. The flat clause structure is based on a finite state model, the ‘Markov Model’ (Malmkjaer 2002:138-39) in which it is argued that a clause is constructed word-by-word in a linear fashion; clauses in this model are also called ‘word chains’. In this model, which is

often associated with computational linguistics, it is proposed that the speaker has a simple mental system that allows him to make a decision about the appropriateness of each word as it is added to the clause-in-making and, when all the given words are added, the product is either accepted or rejected based on a final analysis. An example of a flat-structure clause is given here:



[Indeed,][my son,][God] [made][the firmament][of the heavens][yesterday]

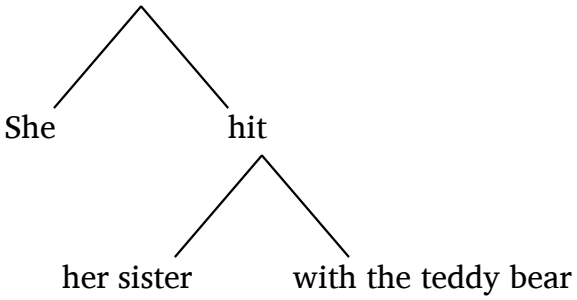
[Excl] [Voc] [Subj] [Verb] [Complement] [Adjunct] [Adjunct]

The central problem with this flat structure model of the clause is the inability to account for long-distance syntactic relationships, in which two syntactic elements that somehow depend on each other are separated by an arbitrary number of words. For example, in the first two examples below, the subject and verb are adjacent and so the subject-verb agreement is immediate, or 'local'; in the third example, though, the agreement is non-local or long distant.

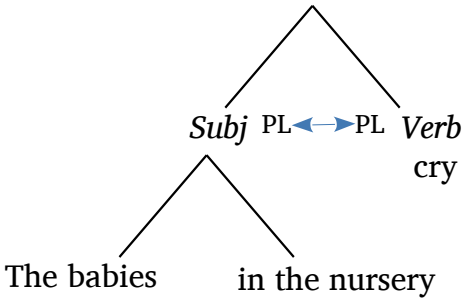
- The [baby $_{SG}$] [cries $_{SG}$].
- The [babies $_{PL}$] [cry $_{PL}$].
- The [babies $_{PL}$] <u>in the nursery</u> [cry $_{PL}$].

In contrast to the flat structure, the hierarchical approach to clause structure is not primarily linear but, as its name signals, hierarchical. The syntactic elements relate to each other in terms of how they 'cluster' together. For example, in the clause "*she hit her sister with the teddy bear*," we might suggest that 'she' and 'hit' relate to each other non-hierarchically, as the two basic halves of the clause. But we would not put rest of the clause on the same level: the words 'her sister', which seem to belong together, and the words 'with the teddy bear', which also seem to form a group, both seem to form a group with the verb 'hit'. These hierarchical relationships are typically represented by brackets or trees:

[She] [hit [her sister] [with the teddy bear]].



This hierarchical clause structure can also account for how long-distance dependencies exist, illustrated below:



In this example, the element 'in the nursery' is hierarchically dominated by 'the babies'. This allows the plural 'the babies' to be hierarchically adjacent to the plural verb 'cry', thus providing an explanation for how the subject and verb may agree even though they are separated by other words.

The process of formation is from the bottom-up, that is, as each lexical item is introduced into the 'clause-in-the-making' (called a 'derivation'), the lexical items merge with each other and project a larger structure, a phrase. The lexical item that gives the phrase its syntactic identity is the phrasal head. Thus, a prepositional phrase is the projection of the hierarchy around a preposition, a noun phrase is the projection of a noun, a verb phrase the projection of a verb, etc.

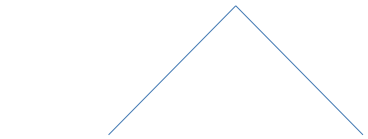
The highest level constituent is a clause. A clause is a single constituent consisting of a subject phrase and a verb phrase. Main clauses (or 'independent') are self-contained and thus do not function within a larger *syntactic* hierarchy, while subordinate (or 'dependent') clauses are contained within a phrase, typically a verb phrase in a higher clause.

1. Binary versus Non-Binary

The point of this discussion of hierarchical clause structure has been to establish that we designed our database on a well-known linguistic theory of phrase structure, in which it is argued that constituents *are contained within* larger constituents, all the way up to the clause

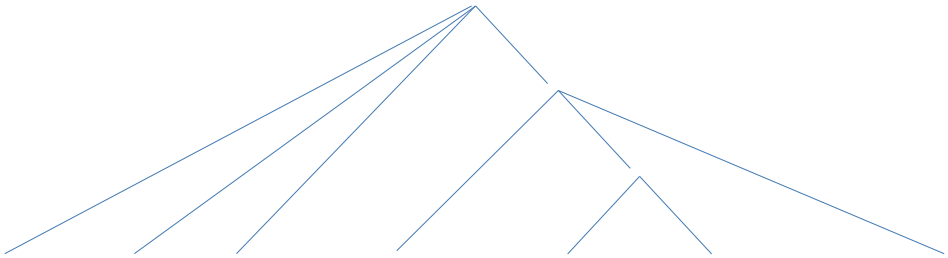
level. For each word, we and our tagging team have had to make a decision regarding the word's location in the syntactic hierarchy—within what other constituent does it reside? And for that resulting complex constituent, the same question must be answered, until there are no more constituents and one is left with a clause.

The clause itself seems to consist of two basic parts: a subject phrase (no matter how simple or complex) and a verb phrase (no matter how simple or complex). Thus, at a basic level the hierarchy that we have followed is binary in nature.



[$_{\text{SUBJ}}$ God] [$_{\text{PRED}}$ made the firmament]

Binary-branching is a basic principle to the minimalist program of Chomskyan generative linguistics, as well as many other generative frameworks. But the addition of clause-edge constituents, such as dislocations (casus pendens), vocatives, and exclamatives results in a tree that is not easy to fit into a binary structure and to do so requires a good deal of theory-internal arguments.



[Indeed,][my son,][God] [made [the firmament [of the heavens]][yesterday]]

[$_{\textbf{Clause}}$ [Excl] [Voc] [Subj] [Pred [Complement [Adj to Comp]] [Adjunct]]]

Thus, we made the decision to depart from a basic principle of this particular theory in favor of presenting hierarchical data in a manner that is not so theory dependent, even at the risk of analytical error. Here, data-presentation outweighed analytical preference.

2. 'Constituents'

The syntactic elements at each stage of derivation are referred to as constituents. A constituent is a single syntactic unit that has a place within the hierarchy of a larger syntactic unit. It is important to recognize that morphological words and constituents *may* overlap but are not always identical. That is, a single word may represent more than one syntactic

constituent, such as English *teacher's*, in which the constituent *teacher* has a syntactic role that is distinct from the syntactic role of the possessive *'s*. This is true in Hebrew, too; moreover, the converse is also true: occasionally multiple words represent a single syntactic constituent. This is the case with many proper nouns, such as בֵּית לֶחֶם *Bethlehem* 'House of Bread', but also true of complex prepositions, such as מֵעַל פְּנֵי, which is decomposable morphologically as 'from.upon the.face.of' but syntactically is taken as a single syntactic constituent 'from'.

Constituents within a hierarchical clause structure approach stand in some tension to an analysis based on parts of speech. Parts of speech are inadequate for syntactic analysis. Using the parts of speech labels typically used for Hebrew, some may suffice for syntactic description, so that *verb* and *adjective*, for example, may also describe the syntactic roles those words play; however, the other parts of speech labels, *noun*, *pronoun*, *suffix*, *preposition*, and the umbrella label *particle*, are wholly opaque concerning the syntactic relationships between these words and any others in a given clause. Therefore, syntacticians often use a different set of labels for the various constituents in a clause. The core labels are *subject*, *predicate* (or *verb*), *complement*, and *adjunct*, with the non-core constituents (in our database) *vocative*, *exclamative/interjection*, *parenthesis*, and *appositive*.

3. "Where's the Direct Object?"

No doubt some will look through the short list of syntactic roles above and ask, "Where is the direct object? And what about the indirect object?" The answer is that they are not syntactic relationships that are explicitly tagged in our database. Why? The answer to that is more complex, but here is the beginning of an explanation.

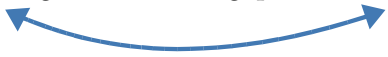
The complement essentially corresponds to 'object', of which there are a number of sub-types. The direct object is the Accusative (to borrow a case term), or non-prepositional constituent that is the person or thing undergoing the (active, transitive) verbal action or process, i.e., the 'patient'. In contrast, the indirect object is limited to a small set of verbs that require a 'recipient' (or 'beneficiary') of the verbal action or process to be specified.

There are two basic problems with encoding the concepts of direct and indirect object in a syntactic database, especially one for Hebrew. First, these concepts are not exclusively syntactic in nature; one must necessarily interact with argument structure (or thematic role) information concerning the predication, information that is explicitly outside the scope of our *syntactic* database (more on this a ways below). Second, whereas direct objects in English are always in the Accusative (i.e., non-prepositional), verbs in Hebrew (and Greek) are varied in their selection of a syntactic constituent as their object: some select a non-prepositional constituent, while others select some type of prepositional constituent. In sum, using 'complement' allows us to capture a greater generalization: regardless of the type of constituent—non-prepositional, prepositional, or even clausal—the 'object' of the verb is labeled a C(omplement).

B. Non-Movement Approach to Constituent Discontinuity

Constituent movement is a hallmark of transformational generative grammar (Brown 2010), although it has been dismissed by much non-Chomskyan generative theory (i.e., 'monostratal' theories). The basic idea is that the linear order of constituents in many actual clauses cannot reflect the 'original' order of those constituents. Neither defending nor criticizing this proposal, we determined that representing it in our database was not desirable or necessary. Yet, we were forced to deal with discontinuous constituents, that is, constituents that are divided into parts separated by un-related constituents. This happens less in English than in Hebrew, although it does occur with some English relative clauses, as below:

[A new king] arose over Egypt, [who had not known Joseph]



In this relative clause clearly modifies the NP 'a new king', and yet it is separated from this NP by the VP 'arose over Egypt'.

In Hebrew, discontinuity is extremely common, since many narrative clauses begin with the *wayyiqtol* narrative verb, switch to a subject, and then continue with the rest of the predicate.

וַיַּרְא אֱלֹהִים אֶת־הָאוֹר

and.**saw** God OBJ - **the.light**

'and God saw the light' (Gen 1:4)

The challenge of constituent discontinuity is that, based on the hierarchy and the projection principle that a phrase contains all its complements and/or adjuncts, a verb and its modifiers together make up *a single constituent*. But how, then, can this be represented when they are broken by non-related intervening constituents, such as a subject?

To account for discontinuous constituents we employ a system of cross-referencing, which allows us both to include discontinuous constituents in syntactic searches and display the connection in the tree display. We have used this cross-referencing system to allow us to represent more accurately three additional phenomena: dislocation (casus pendens), resumption in relative clauses, and ellipsis (or 'gapping')

C. Inclusion of Null Constituents

The third illustrative interaction with linguistic theory in our database production is the recognition of null constituents. On the principle that every phrase has a 'head', whether a 'verb' for a Predicate or a noun or similar nominal(ized) constituent for a Subject, we have inserted a null marker (0) in every phrase that lacks an overt head. (On null constituents in

Hebrew, see Creason 1991; Naudé 1991, 2001; Holmstedt 2012.)

The use of null constituents is most common in the Subject position, since Hebrew allows an overt subject to be omitted, as in the first example below, and nearly as common in Hebrew is the use of a null copula in the Predicate position, the so-called verbless clause, as in the second example:

וַיִּשְׁבֹּת ___ בַּיּוֹם הַשְּׁבִיעִי מִכָּל־מְלַאכְתּוֹ
and=rested __ on.the=day the=seventh from=all.of work=his
'and **(he)** rested on the seventh day from all his work' (Gen 2:2)

וְחֹשֶׁךְ ___ עַל־פְּנֵי תְהוֹם
and darkness __ upon face.of deep
'and darkness **(was)** upon the face of the deep' (Gen 1:2)

In addition to null subjects and predicates, Hebrew also allows null complements and null relative clause heads. All of these null items have been included and tagged appropriately in our databases.

D. Final Comment: The Narrow Syntactic Focus of the Database

A final defining principle of the Accordance syntax database that I'll mention here is a *narrow focus* on syntax. That is, the tagging scheme provides phrasal, clausal, and inter-clausal information to the exclusion of semantic judgments, discourse relationships, and implicational pragmatics. For example, when the particle כִּי is a subordinator, we make no distinction between its use as a temporal ('when') subordinator or a clausal ('because') subordinator. Those distinctions are left to the user to determine. What we provide is the distinction between כִּי as an adjunct subordinator (temporal or causal), a complement subordinator ('that'), a conjunction ('but'), and an exclamative ('indeed!').

What we do include is verbal valency information, which we associate with the lexical entry of a verb. The term valency derives from chemistry and has been employed in linguistics for about a half-century. Verbal valency, in particular, refers to the property of a verb that determines the syntactic environments in which it may appear. For example, in the examples below the English verb *snored* requires a subject, *help* requires both a subject and an NP complement and *returned* requires a subject and prepositional (locative) complement:

- She *snored*.
- He *helped* the boy.
- They *returned* to the house.

For the database project, it was necessary that we use valency information to determine

whether the non-subject constituents associated with a given verb were complements or adjuncts. And yet, we do not identify these complements or adjuncts by any semantic categories, such as locative, temporal, means, manner, etc. Moreover, we do not include any discourse-pragmatic judgments, such as whether a complement preceding a verb has a Topic or Focus function.

This decision on the narrow focus of our database was made for two practical reasons:

- *First*, every additional layer adds an increasing amount of subjectivity, and we want this research tool to be as broadly usable as possible.
- *Second*, the additional semantic and pragmatic layers would add a disproportionate number of years to the project. Whereas we are confident that we will finish all our ancient Hebrew texts in the next 2-3 years, it would likely take a decade (or more) to produce a multi-layered database.

A theoretical issue that has *absolutely nothing to do* with the narrow focus of our project is the "autonomy of syntax" debate (Cheng 2007). From the project's perspective, we take an agnostic stance with regard to this debate. Whether or not semantic and pragmatic information is allowed to directly affect syntax or whether they are formulated as functional features and categories that operate within syntax seems to be an irrelevant theoretical argument when it comes to the goals of our project (however interesting it may be in general).

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