A r t i c l e s

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Toward the Ocean
of the Biblical Hebrew Verbal System

Abstract

The present paper offers a more macroscopic and system-oriented analysis of the tense-taxis-aspect-mood (TTAM) semantics of the Biblical Hebrew verbal system developed within the framework of grammaticalization-based maps and cognitive linguistics. By combining the maps (i.e. qualitative compositions of senses) and waves (i.e. qualitative-quantitative complexes of senses) into higher-level dynamic modules, i.e. currents, and by explaining the global system in terms of such currents, the study designs a possible way of expansion of the semantic maps' model from a gram-oriented analysis to a more systemic perspective. Accordingly, higher level properties of the sub-modules of the Biblical Hebrew verbal system are postulated, the environments of grams are expanded from their immediate setting (the adjacent waves on the stream) to other, more distant, regions of the verbal organization, and a tentative dynamic model of the entire Biblical Hebrew verbal system is formulated.

Keywords

Biblical Hebrew, verbal system, cognitive linguistics, semantic maps.

1. Introduction

Professor Andrzej Zaborski with whom I have collaborated during the last three years – and with whom I was lucky to have developed a deep, albeit unfortunately short, friendship – was particularly concerned with the dynamics of the Semitic verbal system, including that of Biblical Hebrew (BH). We spent

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hours discussing this matter in Kraków, where he worked and in Kalwaria Zebrzydowska, where he lived. One of our main concerns was how the recently embraced cognitive model of semantic maps informed by grammaticalization might represent the BH verbal system from a global, systemic perspective.

This problem is one of two well-known questions troubling cognitive linguists who work within the approach of grammaticalization-based semantic maps, the other one being their qualitative orientation. Our concern stemmed from the fact that the semantic-map method is usually limited to the study of grams in isolation from one another – this means that more global relationships regulating the system are ignored and the macroscopic view of the entire system is not developed. If a system is proposed, it is pictured as a mere sum of its more elementary components – it is derived from adding maps without taking into account their interactions and the global forces present in the system itself (cf. Narrog & van der Auwerea 2011).

The present paper aims at providing a possible response to the issue that has emerged from my long debates with Professor Zaborski, offering a more macroscopic and system-oriented view of the tense-taxis-aspect-mood (TTAM) semantics of the Biblical Hebrew verbal system developed within the grammaticalization-map framework. In order to reach this objective, I will begin the discussion with a general presentation of cognitive semantics and semantic maps (cf. section 2.1). Next, focusing on Biblical Hebrew, I will ascend the level of analysis from the description of individual grams – in particular of their semantic maps, first qualitative (clines; cf. section 2.2) and later quantitative (waves; cf. section 2.2) – and their compositions into shared evolutionary channels (streams; cf. section 2.3), to a more systemic view, where not the grams but the dynamic and interactive sub-modules are in focus (currents; cf. section 3.1), which jointly deliver the global picture of the BH verb (ocean; cf. section 3.2).

2. Gram-oriented analysis

2.1. Cognitive verbal semantic

Cognitive linguistics provides one of the most advanced and nuanced approaches to verbal semantics. The approach may be summarized with the concept of 'a semantic map'. Acknowledging the universal polysemous nature of lexical and/or grammatical entities, any verbal construction (henceforth referred to as a gram) has been regarded as a set of multiple senses that are activated on concrete occasions, each one being prompted by and made explicit due to contextual factors (for instance, semantic, syntactic and pragmatic ones). However, this polysemous set encapsulating the range of the meaning of a form – referred to by the term of a semantic potential – is neither an unordered nor an accidental list of values that the form may express. Quite the opposite,

senses of any polysemous set seem to be inherently related. This relationship is visually represented by linking the components of a semantic potential one to another and, thus, plotting maps. The relation between any two components of this network is both cognitive (one sense has arisen from the other due to universal human cognitive mechanisms) and chronological (one sense constitutes the historical input of the other).The reiteration of this relation delivers a map.

Given this cognitive and historical liaison between the components of any polysemous set, the map that portrays the synchronic semantic potential of a form is commonly plotted by employing grammaticalization paths developed in typological studies. Simply put, the senses offered by the gram at a determined period are arranged in such a way that they match a given grammaticalization path, which represents how certain types of grams (and, thus, their polysemy) evolve in languages of the word. This is possible because in an analogical manner to the connection between the components of the polysemous set, the relation between the stages of a grammaticalization path is cognitive and chronological – the cline shows a chronological order of incorporation of new values to the semantic potential of a determined type of grams, achieved by applying cognitive mechanisms typical of humans. This approach is well-established in the description of languages of various families and in the analysis of different parts of the grammar (Haspelmath 2003, De Haan 2004, Zwart 2010, Narrog & van der Auwerea 2011). In its most typical form, the method is qualitative and "isolated". This means that the construction of maps consists of modeling the range of senses that a form can convey irrespective of their frequency, and that the maps are plotted individually – they are treated as if in a grammatical vacuum. Customarily this is done without taking into account the relationships that may exist between the plotted map and the other maps in the language.

Scholars distinguish various grammaticalization clines that regulate the shape and evolution of verbal systems in languages of the world of which three are particularly important for the study of Biblical Hebrew. Given their relevance for the model, let me first briefly explain these three grammaticalization paths. The anterior path schematizes the grammatical life of forms that are 'born' as resultative proper constructions. Such grams gradually acquire senses of a present perfect (or under a broader label, taxis), perfective past and finally non-perfective past (Bybee, Perkins & Pagliuca 1994, Andrason 2014a). The anterior cline also makes room for pluperfect and future perfect senses as well as for performative and gnomic uses, all of them being extensions arising from perfect senses (for details, see Andrason 2011a, 2012a-b, 2013a). The imperfective path shows how progressive and continuous grams acquire senses of habituality, extended duration and gnomicity, and later are generalized in (and/or are limited to) future uses gaining a general modal function at the end (Bybee, Perkins & Pagliuca 1994, Haspelmath 1998, Dahl 2000, Andrason 2010, 2013b). The modal-contamination path determines the way in which indicative

inputs become modal due to their prolonged use in an explicitly modal context. At the beginning, a gram is an indicative formation being typically employed in an indicative environment. However, on certain occasions, it may appear in a modal context, where it acquires a contextually induced modal value. Subsequently, this modal sense becomes strongly associated with the form, to the degree that at more advanced stages, the construction may be employed modally even outside the original environment in which this modal nuance first arose. From a more general and more semantic-oriented perspective, the cline can be viewed as consisting of three macro-stages: an indicative value, a semi-modal value (values that link non-modality with modality, e.g. habituality and futurity) and purely modal senses (Dahl 1985, Bybee, Perkins & Pagliuca 1994, Hopper & Traugott 2003: 82; Andrason 2010a, 2011b, 2012c, 2013c).[1]

2.2. Maps of the BH verbal grams

The use of cognitive linguistics and semantic maps to analyze and model the BH grammar has proliferated in the last five years. The maps have *inter alia* been applied to the verbal system (Andrason 2010, 2011a-b, 2012a-c, 2013a-d,van der Merwe & Andrason 2014, Andrason & van der Merwe (forthcoming)), particles such as prepositions, conjunctions, connectors or discourse markers (Lyle 2013, Andrason & Lyle 2015 and forthcoming) and other grammatical phenomena (e.g. left dislocation; Westbury 2014) and lexemes (De Blois 2001, Bosman 2011).

As far as the semantics of the BH verbal system is concerned, the model has in principle been qualitative and isolated, just like the usual approach to semantic maps used in cognitive linguistics. In general terms, it has been recognized that that qatal and wayyiqtol should be mapped by means of the resultative path, in particular of the anterior cline which constitutes the major trajectory within the resultative path, while yiqtol and qotel could be mapped by means of the imperfective path. In addition, weqatal and Syiqtol (i.e. 'short yiqtol' traditionally referred to as 'jussive') are modeled by means of the modal-contamination path (Andersen 2000, Cook 2012, Joosten 2012, Andrason 2013d).

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[1] This cline corresponds to the processes of 'conventionalization of implicature' (Dahl 1985: 11; Bybee, Perkins and Pagliuca 1994: 25–26, 296), 'context-induced reinterpretation' (Heine, Claudi and Hünnemeyer 1991: 71–72), and 'semantization' (Hopper and Traugott 2003: 82). It is important to note that the modal contamination cline is an overarching scenario encompassing various possible semantic extensions in which different non-modal inputs develop into distinct types of modality. These different shades of modality usually depend on the value of the initial locutions from which forms, travelling along the path, have emerged and on the context in which they have appeared. Thus, the cline may be applied to constructions whose semantic potential is quite dissimilar as a type of a meta-trajectory. In this aspect, it differs from the resultative and imperfective paths discussed previously.

Wayyiqtol (resultative path):	perfect	→ perfective	→ non-perfective	
Qatal (resultative path):	resultative proper	→ perfect	→ perfective	→ non-perfective
Yiqtol (imperfective path):	ongoing	→ habitual	→ future	→ modal
Qotel (imperfective path):	ongoing	→ habitual	→ future	
Syiqtol (modal-contamination path):	semi-modal	→ modal		
Weqatal (modal-contamination path):	non-modal	→ semi-modal	→ modal	

Figure 1: Qualitative maps of the BH grams

These mappings – schematized in Figure 1, above – have been plotted given the following composition of the semantic potentials of the six BH grams and their correspondence with the stages of given evolutionary templates. Wayyiqtol offers the values that correspond to the three stages of the resultative path, i.e. taxis (see example 1.a), perfective past (1.b) and non-perfective past (1.c), while qatal spans the entire cline from the stage of a resultative proper to the non-perfective past, additionally providing the sense of a resultative proper (1.d; for a detailed discussion see Andrason 2011a, 2012a-b, 2013a, 2013d, forthcoming (a-b), Andrason & van der Merwe (forthcoming)).[2] Yiqtol spans the entire imperfective cline, being able to express the senses of ongoingness (2.a), habituality (2.b), futurity (2.c) and modality (2.d), whereas qotel is restricted to the first three values offered by this path (ongoingness, habituality and futurity; Andrason 2010, 2013b, 2013d, 2014b). Lastly, Syiqtol offers two senses available on the modal-contamination path, i.e. semi-modality (in particular future; 3.a) and modality (3.b), while weqatal is compatible with all the three sections of this cline (indicative 3.c, semi-modality (apodotic futurity and habituality 3.d) and modality (Andrason 2011b, 2012c, 2012d, 2013d).

(1) a. וַיֹּאמֶר לָבָן לְיַעֲקֹב מֶה עָשִׂיתָ **וַתִּגְנֹב** אֶת־לְבָבִי **וַתְּנַהֵג** אֶת־בְּנֹתַי כִּשְׁבֻיוֹת חָרֶב
Laban said to Jacob, "What have you done? You **have deceived** me, and **carried** away my daughters like captives of the sword. (Gen 31.26)

b. **וַתֵּלֶד** שָׂרָה אֵשֶׁת אֲדֹנִי בֵן לַאדֹנִי אַחֲרֵי זִקְנָתָהּ
And Sarah my master's wife **bore** a son to my master when she was old (Gen 24.36)

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[2] The senses of a resultative stative, stative and a general present that can be conveyed by qatal and wayyiqtol have been omitted in this paper. These values have been mapped by means of the simultaneous cline and as a result are related to the resultative cline and its main extensions such as perfect, perfective and past (Andrason 2011, 2013).

c.   וַיִּתְאַבֵּל עַל־בְּנוֹ יָמִים רַבִּים

He **mourned** for his son many days (Gen 37.34)

d.   כִּי אֵל דֵּעוֹת יְהוָה וְלֹא נִתְכְּנוּ עֲלִלוֹת

For the Lord is a God of knowledge and by him actions **are weighed**
(1 Sam 2.3)

(2) a.   וַיִּמְצָאֵהוּ אִישׁ וְהִנֵּה תֹעֶה בַּשָּׂדֶה וַיִּשְׁאָלֵהוּ הָאִישׁ לֵאמֹר מַה־תְּבַקֵּשׁ

And a man found him wandering in the fields and the man asked him:
"What **are you seeking**?" (Gen 37.15)

b.   מֵקִים מֵעָפָר דָּל מֵאַשְׁפֹּת יָרִים אֶבְיוֹן לְהוֹשִׁיב עִם־נְדִיבִים וְכִסֵּא כָבוֹד יַנְחִלֵם

He **raises up** the poor from the dust; he **lifts** the needy from the ash
heap, to make them sit with princes and inherit a seat of honor (1 Sam
2.8; NRSV)

c.   אֶעֱבָדְךָ שֶׁבַע שָׁנִים בְּרָחֵל בִּתְּךָ הַקְּטַנָּה

I **will serve** you seven years for your younger daughter Rachel (Gen
29.18)

d.   וַיְצַו יְהוָה אֱלֹהִים עַל־הָאָדָם לֵאמֹר מִכֹּל עֵץ־הַגָּן אָכֹל תֹּאכֵל

And the Lord God commanded the man: "You **may** freely **eat** of every
tree of the garden" (Gen 2.16)

(3) a.   יְהוָה יָדִין אַפְסֵי־אָרֶץ וְיִתֶּן־עֹז לְמַלְכּוֹ וְיָרֵם קֶרֶן מְשִׁיחוֹ

The Lord will judge the ends of the earth; he will give strength to his
king, and [he will] **exalt** the power of his anointed (1 Sam 2.10; NRSV)

b.   וַיֹּאמֶר אֱלֹהִים יְהִי אוֹר וַיְהִי־אוֹר

And god said: **Let** there **be** light and there was light (Gen 1.3)

c.   וְעֵלִי זָקֵן מְאֹד וְשָׁמַע אֵת כָּל־אֲשֶׁר יַעֲשׂוּן בָּנָיו לְכָל־יִשְׂרָאֵל

Now Eli was very old. He **heard** all that his sons were doing to all Israel
(1 Sam 2.22)

d.   וַיִּשְׁפֹּט שְׁמוּאֵל אֶת־יִשְׂרָאֵל כֹּל יְמֵי חַיָּיו

וְהָלַךְ מִדֵּי שָׁנָה בְּשָׁנָה וְסָבַב בֵּית־אֵל וְהַגִּלְגָּל וְהַמִּצְפָּה וְשָׁפַט אֶת־יִשְׂרָאֵל אֵת כָּל־הַמְּקוֹמוֹת
הָאֵלֶּה

[15]Samuel judged Israel all the days of his life. [16]He **went** on a circuit
year by year to Bethel, Gilgal, and Mizpah; and he **judged** Israel in all
these places (1 Sam 7.15-16)

It should be emphasized that the maps have been corroborated by extensive
diachronic, direct or indirect, data (origin, behavior at earlier evolutionary
stages, posterior development, and the structural properties of a gram) and
comparative evidence (properties of cognate grams in other languages of
the Semitic family). In other words, the qualitative maps plotted for the BH
constructions have not only been inferred from the synchronic ranges of senses
offered by these forms in the Hebrew Bible, but have also been substantiated

by the actual history of these forms (for an extensive discussion of the diachronic, and comparative evidence, see Andrason 2010, 2011a-b, 2012a-d, 2013a-d and 2014b).[3]

2.3. Waves of the BH verbal system[4]

In a more sophisticated approach which aims at responding to one of the concerns expressed by Narrog & van der Auwera (2011; cf. section 1), maps can be rendered quantitative incorporating information related to frequency. In order to represent this quantitative data in the model and, at the same time, avoid a mere addition of numbers to the components of a map, Andrason (forthcoming (a-b)) develops the concept of a wave. A wave is graphic representation of a qualitative-quantitative map in which the qualitative component (which corresponds to the map traced by the grammaticalization path) is expressed by the horizontal x axis, while the quantitative component (which reflects the degree of prototypicality understood as the relative frequency of a sense-stage available on the grammaticalization path) is codified by the vertical y axis. In other words, the vertical y axis ascribes a precise quantitative value to each components of the x axis. Consequently, a unidimensional vector (a directional map that is organized by means of a grammaticalization path) becomes bidimensional, adopting the shape of a directional curve or a wave. The curved shape of the map derives from the areas that are lifted at the prototypicality peaks, while its kinetic properties (and a wave motion) derive from the direction traced by the grammaticalization path underlying the x axis.

If counted from the most global perspective, where all the types of texts and syntactic contexts are summed up jointly, the corpus based on the book

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[3] The three clines and the maps plotted for the six BH grams are developed from the most coarse-grained perspective where various sub-senses are grouped into broader categories. It should be noted that each domain may be made more fragmentary and split into a number of more atomic values (for example the domain of perfect encompasses more elementary values such as inclusive, resultative, experiential, frequentative and indefinite perfect). Moreover, at a more fine-grained level of analysis, every cline is a network characterized by a number of branches (for instance, the resultative path also contains simultaneous and evidential sub-clines, as well as gnomic extensions or future perfect trajectory). For the sake of simplicity, all the networks are envisaged from a macroscopic perspective, where more detailed clines merge into the most dominant evolutionary current. In addition, once more for the sake of simplicity, the various senses of Syiqtol and weqatal have been encapsulated into three large domains (non-modality, semi-modality and modality), even though from a more microscopic viewpoint, both semi-modal and modal nuances offered by these grams are not identical (cf. Andrason 2011b, 2012b, 2012d, 2013d).

[4] The discussion of waves in this section and the presentation of streams in section 2.3 summarize the main results of my articles "Semantic maps, waves and streams – A pilot model of grammaticalization approach to BH verbal semantics with the inclusion of quantitative data and maps' interaction" (Andrason forthcoming (a)) and "The complexity of verbal semantics – an intricate relationship between QATAL and WAYYIQTOL" (Andrason forthcoming (b)).

of Genesis and 1 Samuel delivers the following quantitative structure of the semantic potentials of the six BH grams: wayyiqtol (resultative proper 0%; taxis 6%; perfective past 84%, non-perfective past 10%); qatal (resultative proper 3%; taxis 64%; perfective past 20%, non-perfective past 13%); yiqtol (ongoing 7%; habitual 15%; future 54%; modal 24%); qotel (ongoing 28%; habitual 71%; future 1%; modal 0%); Syiqtol (non-modal 0%; semi-modal 5%; modal 85%); weqatal (non-modal 1%, semi-modal 78%; modal 21%). This statistical data in turn yields the following shapes of the waves of these constructions (Andrason forthcoming (a-b)):
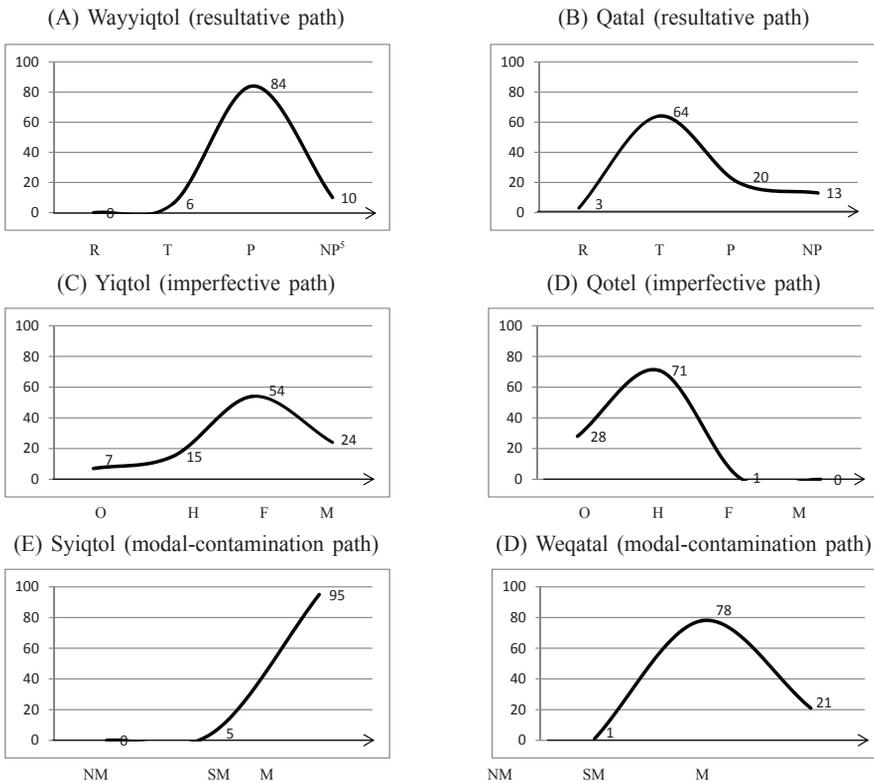

Figure 2: Waves of the BH grams[6]

[6] In all the charts in sections 3.1 and 3.2, the numbers indicate the statistical contribution (%) of each sense-stage to the overall semantics of a given path. Thus, the relative frequency of a sense is measured not in comparison to all the other values, but only in relation to the values available on the cline on which this sense is located. The continuous line (or curve) makes reference to a gradualness of

2.4. Streams of the BH verbal system

The notion of a stream – proposed by Andrason (forthcoming (a-b)) and Andrason &Visser (forthcoming) – constitutes a possible response to the other weakness of classical semantic maps, i.e. the lack of the relationship between maps or the portrayal of maps as isolated from one another. A stream is a grammaticalization channel, recursively activated in a language and travelled upon by several grams of this language. The difference between a path and a stream is that the former is specific (each gram travels its concrete path which can be slightly different from other typologically similar paths) while the latter is a meta-concept in which a variety of concrete paths can be accommodated even though they are not entirely identical due to language specific idiosyncrasies. In general terms, a stream makes it possible to place in the same conceptual frame (and thus to compare) grams whose semantic potentials have been mapped by analogical or similar (depending on the adopted granularity level) grammaticalization paths. It accommodates formations that share the horizontal x axis.

The location of grams on the shared stream not only renders the comparison of maps more feasible (as they can be contrasted in terms of topological progressor conservatism as more or less advanced), but also makes it evident that maps become sensitive to the environment. In other words, a wave does not exist on its own. On the contrary, it propagates in the company of other waves that travel along the same stream. In this manner, a wave is hindered by a preceding wave and/or pushed by the succeeding one. As a result, certain semantic properties of a form are not only dictated by its own inherent atomic properties (qualitative and quantitative, i.e. the senses and their frequency), but are likewise conditioned by the structure of the stream in which it is embedded.

Given the path- and wave-mapping presented in section 2.2 and 2.3, it is possible to distinguish three streams in the BH verbal system: resultative, imperfective, and modal-contamination stream. The resultative stream hosts grams mapped by means of the resultative path, i.e. wayyiqtol and qatal – the former being more advanced and the latter more conservative (see Figure 3.A). The imperfective stream accommodates grams whose x axis correspond to the imperfective path, i.e. yiqtol and qotel of which the former is more advanced, while the latter is more conservative (see Figure 3.B). Lastly, the

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meaning extensions that link the main domains distinguished on the cline as each one of them consists of a great number of more fragmentary stages and thus steps in meaning extensions. The direction of the cline – and its wave orientation – is imposed by the directionality of the grammaticalization path that presupposes the origin (input) and objective (attractor) of the development. Moreover it is important to note that the waves adopt different shapes for different types of texts, e.g. narrative and discourse (cf. Andrason (forthcoming (a-b)). The models developed above make use of the most global type of statistics, where all the instances were counted jointly.

modal-contamination stream contains grams whose semantic potential has been organized along the modal-contamination path: the more advanced Syiqtol and the more conservative weqatal (see Figure 3.C; Andrason forthcoming (a-b)).

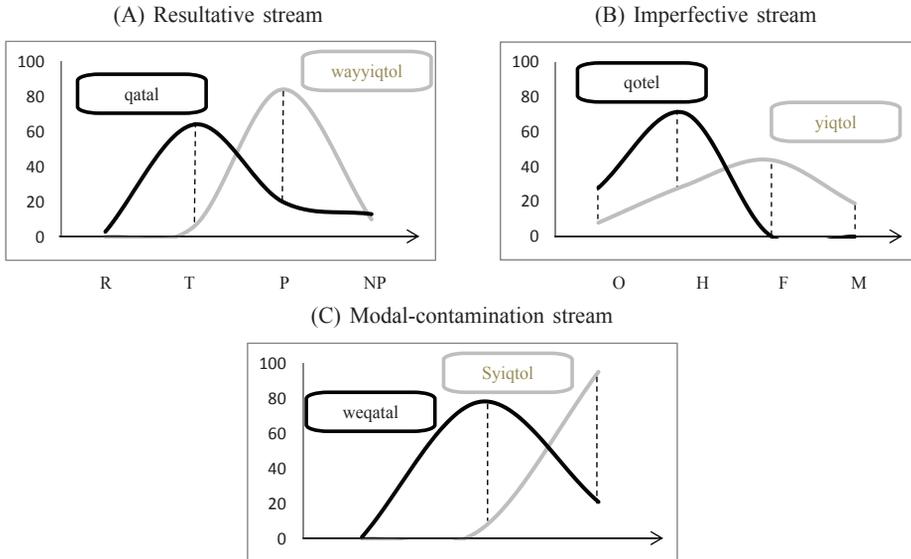(A) Resultative stream   (B) Imperfective stream

(C) Modal-contamination stream

Figure 3: Streams in the BH verbal system[8]

As mentioned above, the notion of a stream not only allows one to compare the grams in terms of their advancement, but may also provide some insights into their mutual interaction. This relationship of the BH waves on the stream, in turn, has impact on the nature of the grams and their possible perception by speakers. With respect to the resultative stream the following may be postulated. Even though the perfective past value of qatal is important in its semantic potential (it constitutes 20%), the fact that wayyiqtol in the perfective form *par excellence* (it occurs in 84%), prevailing over qatal by 64 points, might have triggered the association of qatal as the expression of perfect/taxis, an area in which it greatly surpasses wayyiqtol. Inversely, the dominance of qatal in taxis zone, where it overcomes wayyiqtol by 58 points, might have hidden a possible compatibility of wayyiqtol with this domain. As far as the imperfective stream is concerned, the fact the qotel predominates over yiqtolin the area of ongoingness and habituality (by 21 and 56 points respectively) may have contributed to the

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[7] The abbreviations used in the charts stand for the respective concepts: R = resultative proper; T = taxis; P = perfective past; NP = non-perfective past; O = ongoingness; H = habituality; F = future; M = modality; NM = non-modal(ity); SM = semi-modal(ity). The figures are adapted from Andrason (forthcoming a-b).

[8] The figures are adapted from Andrason (forthcoming a-b).

association of yiqtol with the domains of futurity and modality, even though the ongoingness and habituality are quite important in the semantic potential of the yiqtol gram (they constitute 7% and 15% respectively, which jointly ascend to 22%, a number that almost equals the frequency of modality). Lastly, concerning the modal-contamination stream, the peaks of the waves traced by weqatal and Syiqtol are quite disjunctive. The former gram locates it in the zone of semi-modality (futurity; 78%) while the latter does so in the sphere of modality (95%). The mutual oscillations are of 73 points (semi-modality) and 74 points (modality). This implies that the wave of Syiqtol diminishes the relevance of the modal domain in the semantics of weqatal (which constitutes 21%). Inversely, the predominance of the weqatal in the domain of semi-modality might have prevented Syiqtol from yielding any regular association with senses related to this area. Accordingly, weqatal might have been associated with semi-modality (apodotic future), while Syiqtol might have been associated with "genuine" modality (Andrason forthcoming (a-b)).

3. System-oriented analysis

The concepts of waves and streams render a qualitative map more adequate and precise as it now contains the information that specifies the quantitative distribution of the senses conveyed by a form and this form's closest grammatical context. However, the accommodation of quantitatively developed waves on a stream can not only be used to compare constructions and to situate them in an immediate environment. It can also be employed to ascend the model of maps to a higher level of analysis, i.e. that of a system, essentially unreachable for this type of modelling, thus far. In the following sections, I will demonstrate how the wave-stream models formulated (Andrason forthcoming (a-b)) can be further expanded to a more system-oriented perspective.

3.1. Combining waves into currents

At the previous level of analysis, waves were understood as the object of study. They could be analyzed in separation (focusing on their individual qualitative and quantitative properties) or they could studied in relation to each other if placed within a common frame, i.e. the shared *x* axis or the stream. However, at a more macroscopic plane, waves can be amalgamated into a higher-level individual and this combination itself can be regarded as the object of study or an acting agent. The amalgamation of waves into a higher-level individual can be achieved in the following way. As explained, each stream hosts certain waves that propagate along it. These are the waves whose qualitative maps are organized along the same horizontal axis. If we imagine that these waves propagating jointly in a common medium are perceived from the distance by an observer,

he or she would notice only their superposed shape.[9] The observer would be unaware of the individual structure of each wave, ranging from 0% to 100% of possible prototypicality expressed by the *y* axis but would only perceive a fused line connecting all the waves – a surface that emerges from adding the peaks of all the waves. To be exact, the wave *x* would disperse under another wave *y* in zones where the latter exhibits higher prototypicality than the former. Simply put, only the wave fronts and curves that are lifted higher than the curve of the accompanying wave(s) are perceivable. As a result, the combination of wave delivers a unified multi-peak curve. This uninterrupted curve, in which the fronts of all the waves travelling along a stream fuse and become indistinguishable, is referred to as a current. The acquisition of this unified shape is a metaphorical indicator that, even though they emerge from waves, currents can be treated as autonomous beings, with their own properties and behaviors.

This introduction of the concept of a current enables us to maintain a qualitative-quantitative dynamic model of semantic potentials in terms of waves – as the current has its own wave-structure – but, at the same time, expand it to the system's level. To be exact, it makes it possible to modularize the system into dynamic sub-parts and to propose more systemic properties where a module has its own characteristics as an individual.

Given the evidence built on the corpus of Genesis and 1 Samuel, the six waves, which travel along the three streams, deliver three currents, with two undulations each: the more advanced one corresponds to an older gram, whereas the less advanced one reflects a younger gram. The resultative current has a two-peak shape, being lifted at the areas of taxis and perfective past, with a slight prominence given to the latter (cf. Figure 4.A). The imperfective current also exhibits a two peak structure, in this case raised at the stages of habituality and futurity, although the prominence seems to be given to the less advanced one (cf. Figure 4.B). Similarly, the modal-contamination current exhibits a two-peak curve with undulations in the areas of semi-modality and, especially, modality (Cf. Figure 4.C). The descending as well as the ascending curve on each figure results from the decreasing *y* values of the less advanced (younger) wave and the increasing *y* values of the more advanced (older) wave that jointly deliver a given current. In this way, the representation provides the information concerning the spheres typical of the waves compounding the current, which are marked on the charts by the dashed line. The area to the left indicates the image traced by the less advanced wave while the area to the right corresponds to the image traced by the more advanced wave.

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[9] The term superposition is used here in a different manner to that used in physics of waves where it signifies a summation of input magnitudes of the waves. In this paper, superposition makes reference to the placement of the geometrical images of waves one on another and their presentation as one uninterrupted cline that link fronts of waves travelling along the same stream.
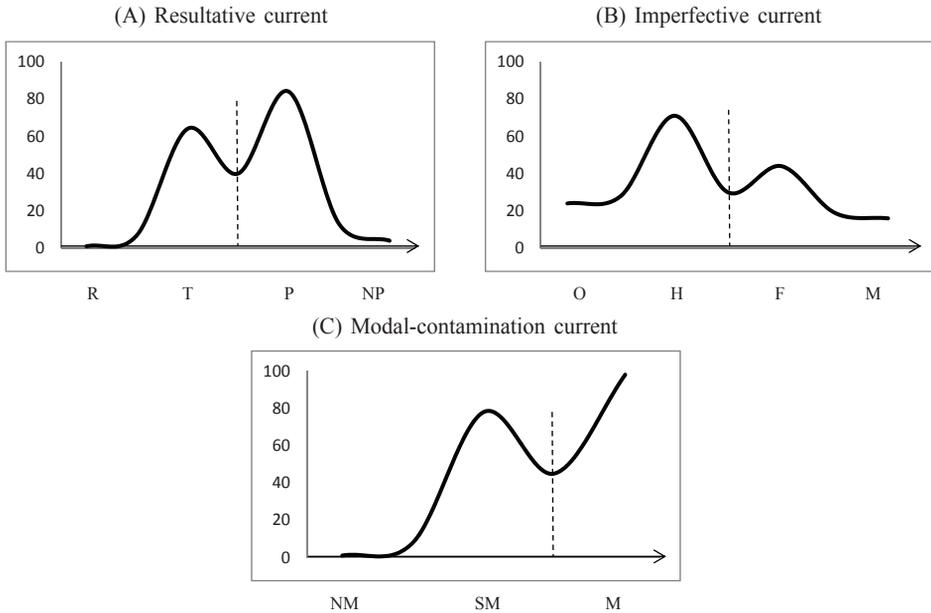
Figure 4: Currents of the BH verbal system (superposition model)

However, the current may yet increase their individuality as its shape can also be viewed as a one-peak wave in which the contribution of the waves become less resultant or simply additive. Namely, the form of the currents may not only be delivered by a superposition of waves, but it can also be counted taking as input values the dominant *y* values distinguished on a stream. In this way, the current would not contain descending periods between its major undulations, but would rather yield a monotonous one-peak wave form (see Figure 5, below). Accordingly, this structure of the current fails to be a simple additive sum of the images traced by the underlying waves. Given this input data, the non-superposed resultative current takes a curved shape with a unique peak at the taxis and perfective past stages (cf. Figure 5.A), while the imperfective current ascends its curve at the stages of habituality and futurity (cf. Figure 5.B). The modal-contamination current also displays one front, located at the stages of semi-modality and modality (cf. Figure 5.C). In this representation the shape of the underlying waves is not straightforwardly recoverable as it is not the shape of the waves themselves but their input data that produce the current.

Nevertheless, the superposed and non-superposed representations of currents are heuristically similar, as they give prominence to the same sections available on a given stream. In the superposed model, the prominence is visualized as two peaks (that stem from the two waves underlying the current), while in the non-superposed model, it can be represented as a one-peak curve that rises above

the (arbitrarily assumed) line of the 50% of the possible total magnitude. For the sake of transparency, this area of prominence has been be marked in grey.

Resultative current

Imperfective current

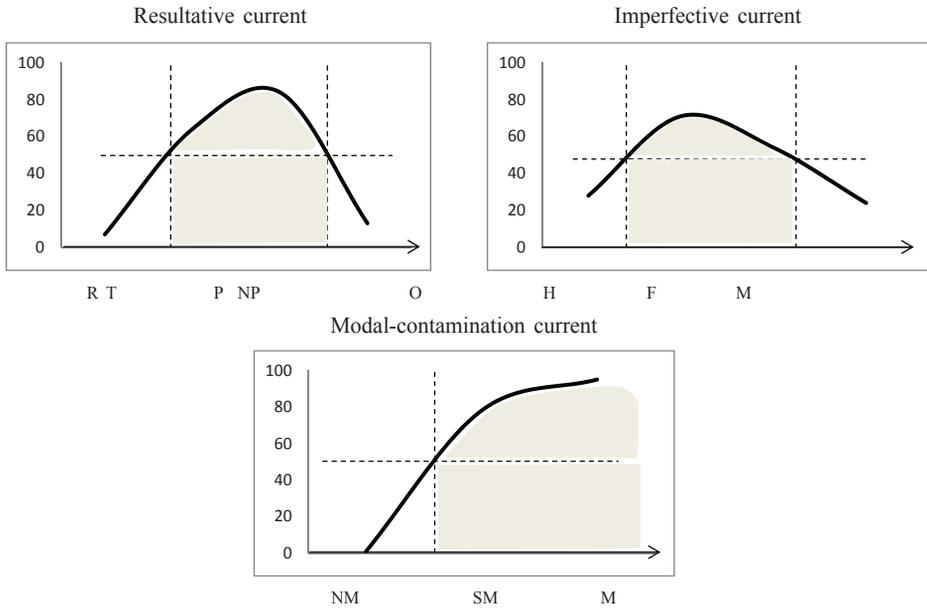Modal-contamination current

Figure 5: Current of the BH verbal system (non-superposition model)

Both the superposed and non-superposed model of the three currents allows us to analyze these currents as individuals with their own properties. In particular, the resultative and imperfective currents can be viewed as semi-advanced as they locate their fronts in the intermediate section of the evolutionary trajectory. The modal-contamination current seems to be more advanced, placing its peak both in the intermediate and, especially, at the final section of the trajectory. Accordingly, the most relevant semantic domains of each current would be taxis and perfective past (resultative current), habituality and future (imperfective current), and semi-modality and modality (modal-contamination current).

3.2. Combining currents into the ocean

The construction of currents enables us to modularize the language into sub-systems, which, in turn, makes it possible to treat the BH verbal organization globally. However, rather than static and disjunctive modules, as usually done in more traditional approaches to the BH verbal system, where grams are arranged in motionless, firm, closed and separated aspectual, temporal or modal blocks, the modularization into currents renders the BH global system and its main sub-sections dynamic, fuzzy, open and relational. Since the system is regulated by three universal evolutionary tendencies encapsulated in the language by the

currents– resultative, imperfective and modal-contamination current – it can be imagined as a fluctuating surface or an ocean on which the three currents pulsate and propagate (cf. Figure 5).

First, the modules make reference to the dynamic potential of language as the currents derive from the combination of waves, themselves propagating along the shared stream. A current is in fact a developing wave itself, a wave whose values indicated by the y axis change over time. It is the stream's actual density attested in the language at a time t. Second, the structure of any module is inherently fuzzy as the current may make use of all possible domains available on the grammaticalization path that determines its x axis, combining them in any possible qualitative and quantitative manner. This means that currents – just like the grams viewed as waves – deliver modules that resist a traditional classification in rigid terms in exclusive taxis, aspectual, temporal or modal terms. There is no aspectual module, there is no temporal module and there is no modal module either. There are modules that may transmute from one type to another by a multitude of intermediate states, so that there is no need to fit them into artificially rigid labels. Third, the modules are open as they presuppose that what is lifted now (the current's peak) may descend subsequently, while the areas that are "flat" may inversely be raised as new waves emerge and expand along the stream. By being dynamic, fuzzy and open, the verbal ocean understood as a combination of currents operates as an auto-regulating organism.[10]

It seems that, in this dynamic, fuzzy and open ocean, the intermediate zones (i.e. the domains of taxis and perfective past, habituality and futurity, as well as semi-modality) and one final area (modality) are particularly active as they correspond to the strongest pulsations or the peak zones of the currents. This may in turn indicate the semantic domains that are the most crucial for the language: taxis (perfect), aspect (perfective and habitual), time (especially, future and past [perfective]). In contrast, values such as a simple (non-perfective) past, resultative proper, ongoing present and/or past seem to be systemically less relevant and, consequently, might have played a lesser role in the cognitive perception of the speakers, even though they could have been expressed by grams available in the BH system, as certain formations are compatible with these domains. All the various semantic domains (certainly the highly coarse-grained) and a greater relevance of certain of them can be easily recovered in Figure 6 designed below, which constitutes a tentative model of the BH verbal ocean. The areas colored in grey make reference to the most prominent

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[10] The picture of the BH verbal system designed here is fully compatible with a continuous process of loss and removal that occurs in languages of the world. On the one hand, the waves of constructions move along the stream so that the current becomes more advanced in general. On the other hand, the advancement of waves and current that hosts them "makes room" for novel forms that may emerge and cause a new wave and thus a new undulation on the current and thus less advanced structure of the current in question.

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semantic domains in the system, while the zones that are unmarked by any color represent domains the importance of which is systemically lesser. Within the colored areas, the darker ones correspond to the superposed representation (two sections reflect two peak-structure of the current), while the lighter ones stand for the non-superposed representation (one broader area reflects one peak structure of the current).
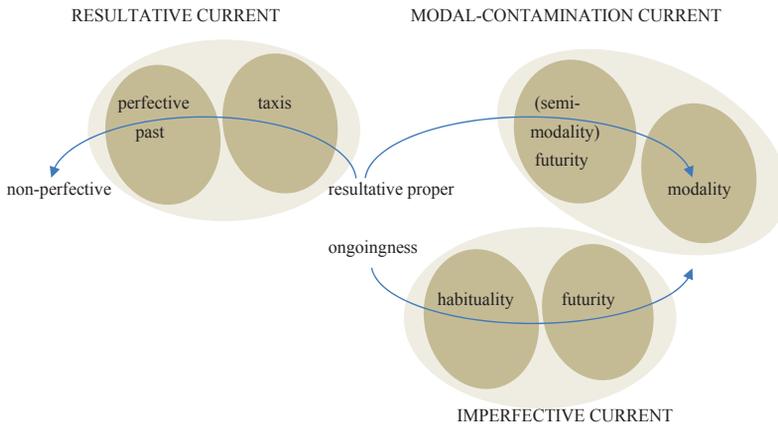

Figure 6: The BH verbal ocean

One should note that this representation offers an entirely different approach to the systemic portrayal of BH verbal semantics. Instead of designing a system of grams, it proposes a system of domains that are organized along the grammaticalization clines and that vary their density in relation to the quantitative data which characterize waves and currents (the prototypicality of senses). It is not a system that presents what the grams can do with senses but rather what the universal semantic domains can do with the grams. In this way, the model almost naturally lends itself for crosslinguistic comparison of systems as the verbal systems of various languages (either Semitic languages or languages belonging to other families) can use the same standardized frame for commensuration.

Nevertheless, the model may also make reference to the BH grams. Namely, if each domain is accompanied by the information concerning the most prototypical means of its expression, the peaks of the currents can be correlated with the wave peaks of the grams. (This however by no means signifies that, for instance, qatal equals perfect/taxis and weqatal is the future – the figure only indicates the correlation between the prototypical zones of each current and the prototypical sense of each gram; cf. Figure 7, below). In this representation, four semantic meta-domains of the greatest importance are each represented by the most prototypical gram: taxis (perfect) – qatal; aspect (perfective [past] and

habitual [present and past]) – wayyiqtol and qotel, respectively; and modality – Syiqtol. The tense (or time) domain of futurity however has two prototypical representatives – weqatal and yiqtol (which usually differ in syntactic contexts of occurrence). The concept of tense is additionally pertinent because certain aspectual values and grams that convey them specialize in past (perfective) and present-past (habituality).

RESULTATIVE CURRENT   MODAL-CONTAMINATION CURRENT

perfective   taxis   (semi-
past   *qatal*   modality)
wayyiqtol   futurity   modality
                                               weqatal   *Syiqtol*
non-perfective   resultative proper

ongoingness

habituality   futurity
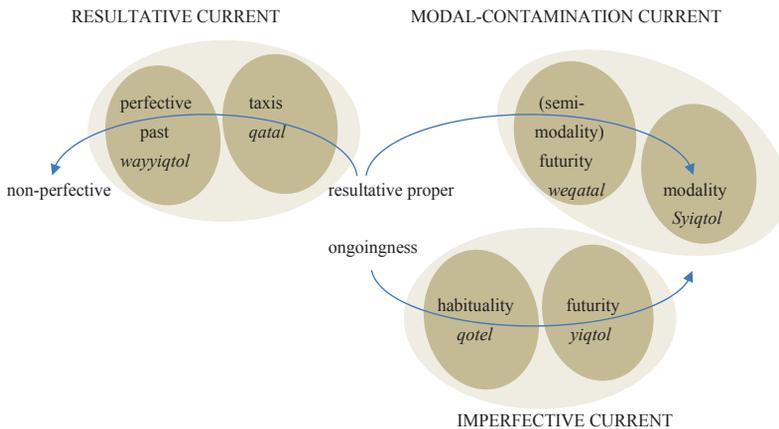*qotel*   *yiqtol*

IMPERFECTIVE CURRENT

Figure 7: The BH verbal ocean – domains and grams' model

The understanding of the BH verbal system in the manner presented in this section has two further implications for the global view of Biblical Hebrew. First, the language would not be (in fact could not be) classifiable as a tense, aspect or mood language exclusively. It is rather (and necessarily) a linguistic system in which four meta-categories (taxis, aspect, tense and mood) are important as indicated by the undulations of the currents. It is impossible to encapsulate Biblical Hebrew in static and rigid chains of idealized abstractions such as "it is an aspectual language", "it is a tense language", or "it is a mood-oriented language". From the system perspective, the senses of a perfect, perfective past, future and modality all together constitute the core of the verbal semantics.[11]

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[11] Indeed, from an evolutionary perspective, it would be strange if a language would be an ideal tense or aspect or mood language because if the prototypicalities of the currents were limited to one of these meta-domains, too much of the surface of the ocean available along the grammaticalization paths would be left uninhabited. Grams expand in a wave-like manner, chasing each other along the path. They interact with other waves of the stream and with other waves in the system (cf. Dahl 2000: 13–14). A possible polarization of the system into a temporal, aspectual or modal system, if it exists, constitutes a by-product of grammaticalization and derives from the relative position of grams on their path. However, due to the multidimensionality of the grammaticalization process and the inherent polysemy of grams, such a polarization (as the formation of an exclusive temporal, aspectual or modal contrast between two or more constructions) is extremely rare. On the contrary – and due

Second, Biblical Hebrew could be viewed as a typologically medium-advanced verbal system. In contrast with languages which contain fully grammaticalized formations that specialize in the initial stage of a stream (for example, the *búinn* construction that is limited to resultative proper and inclusive-resultative present perfect in Icelandic or the *parsāku* in Akkadian that is well-grammaticalized and commonly found in expression of the resultative proper sense) or in its final section (for instance, the *passé simple* in French that only functions as a general narrative past tense or the general synthetic past in Old Polish that arose from the morphological amalgamation of the Imperfect and Aorist), the BH verbal system would put emphasis on the domains located in the intermediate areas of the grammaticalization paths. This understanding of entire verbal systems in terms of typological advancement is related to the previously mentioned suitability of the currents or ocean model to inter-language comparisons, which may shed new light on macro-changes affecting the verbal system of the Semitic family.

Although for the need of transparency the BH verbal system can be pictured as a semantic surface cut up by three independent currents, one that is analyzable as consisting of autonomous modules, it is important to emphasize that the currents interact one with another. They interact because they may lead to identical or highly similar semantic domains, thus sharing the topology of the semantic surface of this language. As stated previously, the imperfective and modal-contamination paths overlap heading to a common final attractor. Accordingly, the imperfective and modal-contamination currents, in parts, traverse analogous semantic domains.

This semantic overlap and connection are even more evident if a more microscopic view is adopted, where the major paths take the shape of multi directional networks. I have previously mentioned that the system-level generalizations developed in this section were possible because an extremely macroscopic view was adopted, a view in which lower-level peculiarities and microscopic disturbances were ignored. As we ascend to the systemic level, small details cease to be perceivable and only the most robust features persist. It is from the macroscopic systemic perspective that the unidirectional and linear shapes of waves, streams and currents emerge. However, from a more fine-grained perspective, waves, streams and currents are multidirectional networks,

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to the fact that grammaticalization clines do not form dichotomies – verbal systems of languages are compositions of more than one meta-domain. The exact structure of the currents is different in different languages, but in most of them, it makes use of two or more meta-domains. Consequently, languages do not display a system of contrasts built in accordance with the principles of economy and symmetry and the structuralist or modernistic claim whereby "each language represents a tidy system in which units are defined by the oppositions they enter into and the object of study is the internal system the units are supposed to create" are untenable (cf. Dahl 2000 and Andrason 2011c).

composed of various sub-clines and branches.[12] It is just for the sake of macro-generalizations that the minor development trajectories are ignored and networks appear as lines.

Once such a multi-branched form of clines is recovered, the semantic overlap and correspondence between currents become evident. For instance, the domain of a past can not only be reached by travelling along the resultative path, but may also be achieved by developing along the imperfective paths, if this cline is located in a past temporal frame. The present domains can not only be reached by travelling along the imperfective paths, but may likewise be incorporated into a gram evolving along the resultative path, as this path includes the simultaneous cline, mostly affecting static roots, that leads from resultatives to present tenses. Moreover, the three paths can lead into futurity, as the resultative-path grams can also be developing in a future time frame yielding future perfects and futures. Lastly, since the resultative path may also produce modal values (which indeed occurs with qatal), the three trajectories are related to the domain of modality.

Due to this semantic overlap between the currents, it is possible that the prototypicality area arising on one current may stimulate the increase of relevance and systemic visibility of a corresponding area on another current even though this zone is less lifted on that other current. In fact, this attraction between the areas of two different currents that are semantically proximate may be so intense that the semantically compatible zones of the two currents (either prototypical or not) may converge and yield a joint two-path grammatical category. This happened in Germanic languages, where the resultative-path morphology (nowadays typically used to express a simple past value, such as *hann rann* 'he slipped, slid' in Icelandic) can be used with a limited set of verbs to form their present tenses (e.g. *hann kann* 'he knows how to, can') merging with the other, much larger, group of verbs whose Present Tense has arisen due to the imperfective path.

Although the attraction among the currents of Biblical Hebrew is probably less strong than in the Germanic case described above, the currents do interact, especially if the grams contributing to them are morphologically similar. For example, there may be a systemic relation between the modal-contamination current and its lifted zone of futurity, prototypically expressed by weqatal, on the one hand, and the resultative current with its rare future value conveyed by the qatal form (1% in the analyzed corpus). Similarly, there is probably a connection between Syiqtol and the modality of the modal-contamination current, on the one hand, and modal uses of yiqtol developed along the imperfective cline, on

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[12] Certainly, some connections in each network are stronger (these usually correspond to the paths viewed macroscopically), while other are weaker.

the other. In both cases, a type of a two-path category may be in the process of being formed.

This means that the environment of a gram and its wave is expanded beyond the limits of its own stream. It also includes the global situation in the system and the properties of other currents and waves. Therefore, the BH verbal system can be imagined as a system where everything interacts with each other. Of course some interactions are more crucial for a given object (e.g. for the qatal wave, the interaction with its immediate neighbor, another wave on the resultative stream is more relevant than the relationship with the wave of Syiqtol), but all the components of the ocean – from the most microscopic to the most macroscopic – somehow affect the remaining ones. It is an organism wherein everything exerts some sort of impact on the remaining parts of the system being at the same time inversely influenced by the system in its totality and by all its components individually.

4. Conclusion

By combining the waves into higher-level dynamic modules, i.e. currents, and by explaining the global system in terms of such currents, the present study has designed a possible way of expanding the semantic maps model from a gram-oriented analysis to a more systemic view. As a result, novel systemic properties of the BH verbal organization were postulated and the environment of a gram – or the environment of a wave – has been expanded from its immediate setting, such as the adjacent waves on the stream, to other, more distant, sections of the verbal system. Even though imprecise due to its robust and coarse-grained perspective, the macroscopic representation of the system as an ocean is, in my opinion, more adequate than traditional systemic models, as it preserves dynamics, fuzziness, openness and relationality of the BH verbal organization.

However, the proposals presented in this paper should only be viewed as first steps in the adaptation of the semantic-map approach to the systemic perspective. Certainly, much more work must be dedicated to the specification of relations existing between currents and to the determination of extra-stream forces influencing waves. Likewise, more systemic properties should be discovered as those presented in this paper only constitute one proposal far from exhausting the set of possible macroscopic features of the BH verbal system. I hope that in coming years a range of solutions to the systemization of semantic maps will be developed, improving this highly promising approach to verbal semantics.

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