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קבוצת המחקר הבינתחומית לחקר התפתחות היסטורית וסמנטיקה פורמלית:

קטגוריות משמעות אוניברסליות ודפוסי שינוי משמעות נפוצים

**The interdisciplinary research group on diachrony and formal semantics:  
Universal meaning categories in recurrent patterns of semantic change**

**1. שנות הפעילות**

תשע"ה-תש"פ (אוקטובר 2017-ספטמבר 2020)

**2. החוקרים הראשיים**

נורה בונה, המחלקה לבלשנות, האוניברסיטה העברית בירושלים  
אליצור בר-אשר סיגל, המחלקה ללשון עברית וללשונות היהודים, בית הספר למדעי הלשון,  
האוניברסיטה העברית בירושלים

איתן גרוסמן, המחלקה לבלשנות, בית הספר למדעי הלשון, האוניברסיטה העברית בירושלים  
עינת רובינשטיין, מרכז מגדל סכוליון למחקר רב תחומי במדעי הרוח והיהדות, האוניברסיטה העברית  
בירושלים

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### 3. תקציר

קבוצת המחקר מבקשת לקדם ולהרחיב את ההבנה של טבע השפה אנושית בעזרת שילוב של שני ענפי מחקר בבלשנות שעד כה טרם הוצע שילוב ביניהם: בלשנות היסטורית, העוסקת בשאלות איך שפות משתנות לאורך זמן ומהן הסיבות לשינויים אלו; וסמנטיקה פורמלית, החוקרת את המשמעות הלשונית. שני ענפי המחקר הללו התפתחו מתחומים אינטלקטואליים רחוקים: הראשון בא מהעולם הפילולוגי, ואילו השני מקורותיו נטועים בעולם הלוגיקה המתמטית. לפיכך אין זה פלא שתחומים אלו לא התחברו זה לזה באופן טבעי מבחינת מטרותיהם, שיטות העבודה ושאלות המחקר. במחצית השנייה של המאה ה-20 חלה אמנם התקרבות בין התחומים בשאלות העוסקות בחקר שינויי משמעות וגרמטיקליזציה (התהליך המורכב שבו משמעות דקדוקיות מתפתחות משמעות לקסיקליות). חרף המאמצים הללו שינוי סמנטי עדיין אינו מובן כהלכה, וזאת לאור שלוש סיבות: (1) היעדר בחינת מקרי מבחן ממבחר גדול של שפות; (2) היעדר תיאוריה סמנטית מפורשת העומדת בבסיס הטענות לשינוי סמנטי; (3) הבנה מצומצמת של יחסי הגומלין המתקיימים בין סמנטיקה, פרגמטיקה ותחביר בשינוי לשוני.

תכליתה של קבוצת מחקר זו היא ליצור פרדיגמת מחקר שמשלימה את החוסר הזה. הקבוצה תעבוד בשיתוף פעולה ותבחן בשיטתיות כיצד בכוח שני התחומים - בלשנות היסטורית וסמנטיקה פורמלית - לתרום האחד לשני, מתוך שאיפה להסיק מסקנות על תכונותיהן של מגוון קטגוריות סמנטיות (כדוגמת שלילה, זמן, מודאליות), האוניברסליות שלהן, והמנגנונים העומדים מאחורי הדפוסים המצויים בשינויי המשמעות לאורך זמן הנשנים בתולדות השפות.

לאור זאת, המטרה של הקבוצה המוצעת היא כפולה: (1) לבחון השערות בנוגע למניעים של שינויים סמנטיים והאילווצים הפועלים על סוג שינוי זה; (2) לחקור באיזו מידה שינוי לשוני נוסך אור על טבען של קטגוריות סמנטיות סינכרוניות.

קבוצת המחקר תהיה פרום לשיתוף פעולה בין סמנטיקאים, בלשנים היסטוריים, טיפולוגים, בלשנים תיאורטיים ופילולוגים. השפות שייבחנו כוללות גם שפות מודרניות וגם שפות עתיקות ממספר משפחות נפרדות: שפות שמיות (עברית, ערבית, ארמית, אכדית), מצרית עתיקה וקופטית, שפות רומאניות (למשל, צרפתית, ספרדית, רומנית), שפות גרמאניות (אנגלית, יידיש), שפות אוסטרונזיות (אינדונזית, מיננגקבו). חברי הקבוצה מתמחים בשפות הללו, ואלו הן שפות המתועדות לאורך תקופה ארוכה, כך שאפשר לבחון בדיוקנות את ההיסטוריה שלהן. באופן ספציפי, לשפות המצריות והשמיות יש 4500 שנה של תיעוד. מגוון שפות זה יכול להתרחב בהתאם לתלמידי המחקר שיצטרפו לפרויקט.

מבחינה מתודולוגית, הקבוצה תשתמש בשיטות הבאות: (1) ארגו הכלים של הבלשנות התיאורטית, כלומר שיטות אנליטיות של סמנטיקה פורמלית, פרגמטיקה ותחביר, לצד המתודות העדכניות בחקר הבלשנות ההיסטורית; (2) קורפוסים דיאכרוניים שבאמצעותם ייאספו נתונים בנוגע לאורך כל ההיסטוריה של השפות המתועדות; (3) השוואה טיפולוגית המבקשת לנסח הכללות סינכרוניות על התפוצה של מבנים לשוניים בשפות העולם, ובכך מאפשרת לנסח השערות על אודות תהליכי השינוי שהביאו למבנים המתוארים; (4) סמנטיקה ופרגמטיקה ניסויית, תחום הנמצא בחיתוליו, ודרכו בלשנים חותרים להציג מודל של סוגי המצבים שמשוער שהם האחראים לשינויים בלשון.

המחקר המדובר מבקש לעצב מתודולוגיה חדשה בחקר השפה. אנו סמוכים ובטוחים שלהצעת המחקר שלנו יש מקום טבעי בשערי סכוליון.

## Abstract

The proposed research group sets out to better our understanding of natural language by combining two areas of linguistic research that have not been integrated so far: **historical linguistics**, the study of how and why languages change over time, and **formal semantics**, the study of linguistic meaning. These two subfields have developed from remote intellectual disciplines, the former from the philological world, and the latter from mathematical logic. Rooted in such different backgrounds, these two subfields of linguistics do not naturally converge in terms of their goals, methodologies, and research questions. These subfields of linguistics have drawn closer in the second half of the 20<sup>th</sup> century in the study of semantic change in grammaticalization, i.e., the complex process through which grammatical meanings develop from lexical meanings. Despite these endeavors semantic change is still poorly understood, primarily due to three factors: (1) a lack of in depth case studies from a wide range of languages; (2) a lack of an explicit theory of semantics underlying claims about semantic change; and (3) a poor understanding of the relationship between semantics, pragmatics, and syntax in language change.

Our proposed research group sets out to create a research paradigm that will fill this gap. The group will jointly explore in a systematic manner how studies in historical linguistics and in semantics can contribute to one another, in an attempt to draw conclusions about the properties of a variety of semantic categories (e.g. negation, temporality, modality), their universality, and the mechanisms underlying recurring shifts in meanings over time, or paths of semantic change, within these categories.

Therefore, the goal of the proposed group is twofold: first, to formulate and test hypotheses about the motivations for and constraints on semantic change; and second, to investigate the extent to which language change sheds light on the nature of synchronic semantic categories.

The research group will be a forum for collaboration between semanticists, historical linguists, typologists, theoreticians, and philologists. The languages under investigation will include both modern and ancient languages, from a number of distinct language families: Semitic (in particular, Hebrew, Arabic, Aramaic, and Akkadian), Ancient Egyptian-Coptic, Romance (e.g., French, Spanish, Romanian), Germanic (e.g., English, Yiddish), Austronesian (e.g., Indonesian, Minangkabau). The group members have research expertise in these languages, which, importantly, have a documented historical record that allows study of language change. In particular, Semitic and Egyptian give us a historical perspective of 4500 years of documented texts. Other languages may be added, depending on the research students that will take part in the group's work.

In terms of methodology, the group will employ (i) the toolbox of theoretical linguistics, i.e., the analytical methods provided by contemporary semantics, pragmatics, and syntax, and in addition updated methodologies in historical linguistics (ii) diachronic corpora in order to collect data from historically documented languages; (iii) cross-linguistic comparison (i.e., linguistic typology), which provides inductively valid statements about the distribution of synchronic structures in the world's languages, and thereby, by inference, hypotheses about the distribution of the processes of change that gave rise to the structures; (iv) experimental semantics and pragmatics, which are nascent fields that allow linguists to model, to an extent, the kinds of situations we think are implicated in language change.

The proposed research aims at shaping a new methodology of linguistic investigation. We are confident that this kind of research can find a natural home at Scholion.

## **4. Detailed description**

### **4.1. Definition of the topic**

The current project sets out to improve our understanding of natural language by combining the subfields of historical linguistics and formal semantics.

Concretely, we propose to jointly explore how studies in historical linguistics and in semantics can contribute to one another, in an attempt to draw conclusions about the properties of a variety of semantic categories, their universality, and the mechanisms underlying recurring shifts in meanings, or paths of *semantic change*, within these categories.

Historical linguistics is the branch of linguistics that studies how languages change over time. Its main goal is to describe documented changes in particular languages and to provide explanatory accounts of regularities of change across languages. Semantics, in contrast, focuses on the meaning of linguistic expressions. Formal semantics, more specifically, seeks to provide representations for every linguistic expression and to capture its logical relations to other expressions, explaining – step by step – how the meanings of complex expressions are derived from the meanings of their component parts.

As will become clear below, scholars from the two subfields have different approaches to how languages should be studied and therefore rarely communicate in their scientific work. The purpose of the proposed research group is to bridge this divide. We believe that semantics and historical studies of language can greatly benefit from each other and wish to establish communication between scholars working in these seemingly distant domains. Concretely, it is our goal to first understand:

- (i) How historical evidence may shed light on understanding universal semantic properties of language;
- (ii) How universal semantic properties of language may stand behind specific developments in the history of individual languages.

Our interdisciplinary perspective will in turn, we hope, shed light on central questions in each of the two subfields:

- (i) In semantics: what are the cross-linguistic universals of semantic primitives?
- (ii) In historical linguistics: can we identify universal paths of change, or are changes simply accidents of a particular constellation of place, time, and interlocutors?

Our main focus of research will be what motivates – or constrains – semantic change. Is it something about the inherent semantics of linguistic expressions, or does meaning change because of the ways in which linguistic expressions are used in discourse? In this investigation it will also be crucial to understand the nature of the interaction between semantics and other aspects of language and communication, in particular, syntax (the structure, or form, of linguistic elements) and pragmatics (language use).

Coming from different backgrounds, as some of us work in formal (i.e., generative) linguistics and others work mainly in historical linguistics, it is our hope

that our small community of relatively young scholars will set an example of collaboration between the study of language change and formal semantics of natural language. In the three years of joint work at Scholion, we wish to set the foundations for joint studies that may last for many years, with the potential of distinguishing the linguistic community of the Hebrew University in the international linguistic arena. We believe that the particular research profiles of the scholars involved place us in a unique position to put our mark on this emerging domain of inquiry.

## **4.2. Scientific background**

Historically, formal semantics and historical linguistics, nowadays two sub-disciplines within linguistics, developed from remote intellectual fields.

Historical linguistics developed out of the philological world. Scholars of ancient texts in the early decades of the 19<sup>th</sup> century sought to map the genealogical relationships between ancient languages. They had, therefore, to develop a methodology to account for how languages evolve over time. The Neo-grammarians, who pioneered the methods of historical linguistics, moreover held a positivist approach according to which the object of linguistic inquiry should be the forms of linguistic expressions and not their (semantic) content. As a consequence, research in this tradition tends to explore sound change, change in grammatical forms, and syntactic changes. In the domain of meaning, relatively little has been done. Studies focused primarily on lexical change: changes in the meanings of words, parts of words, and larger expressions. Historical linguistics in the Neo-grammarian tradition, accordingly, focused on properties of individual languages and did not seek to attain generalizations pertaining to general mechanisms of change (see, for example, Hock 1991) or universal categories that hold across languages.

In contrast, formal semantics began at the end of the 19<sup>th</sup> century, with the enterprise of the German mathematician Gottlob Frege, to set the foundations of mathematics on logic. For this purpose, he proposed a new formal way to represent the meaning of propositions. Logic, by its nature, is universal. Accordingly, formal semanticists, in their examination of meaning, aim at understanding the universal logical representation of linguistic expressions in different languages. After the Chomskyan turn that brought formal methods into syntax, the logician Richard Montague proposed a formal approach to semantics that assumes a systematic relation between syntax and semantics. In this approach, natural language is a formal language in the same sense that predicate logic is a formal language. The important feature of the theory is its adherence to the principle of compositionality—that is, the meaning of the whole (e.g., the sentence) is a function of the meanings of its parts (e.g., noun and verb phrases) and their mode of syntactic combination. Naturally, semanticists who hold similar assumptions consider only synchronic data and do not look into the diachrony of the languages they study.

Coming from such different backgrounds, these two subfields of linguistics do not naturally converge in terms of their goals, methodologies, and research questions. However, it is possible to see various ways in which they can draw closer; and indeed, they have. The study of semantic change has evolved, since the second half of the 20<sup>th</sup> century, as an important subfield of historical linguistics, with works that deal explicitly with semantic change in grammaticalization, i.e., the complex process through which grammatical meanings develop from lexical meanings (Bybee et al.

1994, Hopper & Traugott 2003, Narrog & Heine 2011). This research tradition has turned up a large body of data regarding cross-linguistically recurrent patterns of language change. Concomitantly, an interest in recurring patterns of semantic generalizations across languages – semantic universals – has emerged from cross-linguistic research in formal semantics. In the domain of grammaticalization, numerous regularities of change have been identified, and several hard-won insights have been gained: first, there are cross-linguistically recurrent “pathways” of change; second, semantic change often goes hand in hand with phonological and morpho-syntactic change.

However, in order to get at the nitty-gritty of what is actually changing semantically and how this change can plausibly be explained, theories of semantic change can only be developed on the basis of a firm theory of semantics and the semantics-pragmatics division of labor (Eckardt 2009, Grossman & Polis 2014, Traugott & Dasher 2002). Existing theories most often rely on a naïve semantic analysis, and it is therefore only natural to examine whether tools from formal semantics can play a role in grounding the intuitions of historical linguists that ‘meaning’ is what has undergone change.

**The genuine contribution that our research group proposes to make lies here: If the broader question at stake is what constrains or shapes change (i.e. *how* meaning changes), then it is first of all crucial to determine *what* changes, or in other words, what are universal properties of semantic categories that stand the course of time.** In order to do so, we examine whether considerations of development that took place in specific languages affect the semantic analysis of a given semantic phenomenon. In so doing, we will explore whether the history of a language can be relevant to the study of its semantics. For example, if we discover that a certain development affected certain grammatical categories in a language and was blocked in others, it may tell us something about these categories; if we know the historical origin of a certain form that functions at present in a peculiar semantic way, it is worth examining whether its origin reveals something about its current function.

### 4.3. Research plan and interactive activity

The research group will be a forum for collaboration between semanticists, historical linguists, typologists, theoreticians, and philologists. The project concerns several subfields of linguistic inquiry in that historical linguists and philologists as well as, potentially, corpus linguists and experimentalists interact to understand the possible range of motivations of and constraints on language change. The languages under investigation will include both modern and ancient languages, from a number of distinct language families: Semitic (in particular, Hebrew, Arabic, Aramaic, and Akkadian), Ancient Egyptian-Coptic, Romance (e.g., French, Spanish, Romanian), Germanic (e.g., English, Yiddish), Austronesian (e.g., Indonesian, Minangkabau). These are languages in which the group members have research expertise and which, importantly, have a documented historical record that allows study of language change. In particular, Semitic and Egyptian give us a historical perspective of 4500 years of documented texts, with Semitic branching into many dialects that may be explored for the purposes of the group. Other languages may be added, depending on the research students that will take part in the group’s work.

Over the course of three years we intend (I) to create a 'baseline' of shared knowledge of contemporary semantic and historical linguistic theories, (II) to conduct

a number of case studies investigating the role of formal semantics in historical change, and on the basis of these case studies (III) to formulate and test hypotheses regarding recurrent patterns of change and the ways in which syntactic and pragmatic factors are implicated in shaping them.

One or two PIs will lead the investigation of each case study, as detailed below. They will be responsible for introducing all members of the group to the state of the art in research on the topic, from both the formal and the historical literature. In line with the goals of our project, cases will be examined to uncover where a semantic analysis can help provide a better understanding of the historical change, and where the history of given languages can provide a better understanding of the relevant semantic phenomenon. The case studies range over a variety of central conceptual categories that are encoded in the grammar of natural language, including, but not limited to: Negation (Elitzur Bar-Asher Siegal & Aynat Rubinstein); Temporality (Nora Boneh & Eitan Grossman); Modality (Eitan Grossman & Aynat Rubinstein); Reciprocals (Elitzur Bar-Asher Siegal & Aynat Rubinstein); Possession (Elitzur Bar-Asher Siegal & Nora Boneh).

Three representative cases are presented in what follows.<sup>1</sup>

#### a) **Reciprocals**

Reciprocal constructions are often defined as grammatical means for encoding symmetric relations: a relation, like hugging, in which there are two participants A and B, and both A stands in the relation to B and B does to A (Lichtenberk 1985:21, Kemmer 1993:102, Nedjalkov 2007a:6). Reciprocal constructions have received much attention over the last decade, especially within the typological literature (the five volumes of the seminal typological study by Nedjalkov in 2007; Frajzyngier and Curl 2000 and König and Gast 2008, and the following articles: König and Kokutani 2006, Evans *et al.* 2007 and Wierzbicka 2009). They have also received much attention in the formal syntactic literature (Dougherty 1970, 1974, Chomsky 1973, Belletti 1982 and Heim *et al.* 1991) and in the formal semantic literature (Dougherty 1974, Langendoen 1978, Higginbotham 1980, Lichtenberk 1985, Williams 1991, Beck 2001, Filip and Carlson 2001, **Rubinstein 2009**, Winter and Sabato 2012).

Despite an abundance of information, few studies have focused on the diachronic aspects of how reciprocal constructions develop. Some exceptions are Heine and Miyashita (2008), Maslova (2008), Plank (2008), Vezzosi (2010) and Haas (2010). **Bar-Asher Siegal (2011, 2012 and 2014a 2014b)** has studied the evolution of some pronominal constructions from nominal expressions in the Semitic languages.

In this project we focus on a specific puzzle regarding these constructions: It has been repeatedly noted that cross-linguistically the same expressions that encode symmetric relations (e.g., *each other*) express other relations where strong reciprocity is impossible (Fiengo & Lasnik 1973, Dougherty 1974, Lichtenberk 1985, Dalrymple *et al.* 1998, Williams 1991, Beck 2001, Haas 2010, Evans *et al.* 2011). For example, the sentence *They were hiding behind each other* does not express a symmetric relation (if person A is behind B, B cannot be behind A). Typological discussions begin with prototypical symmetric relations and examine which constructions denote them (Lichtenberk 1985, Kemmer 1993) and consequently consider their usage in asymmetric relations as an "extended use of a

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<sup>1</sup> Contributions by members of the proposed research group are marked in bold face.

reciprocal marker" (Nedjalkov 2007a: 9). Based on an examination of the entire range of functions that these constructions fulfill across languages, we would like to pursue the opposite position: that symmetric meanings of reciprocals are an "extended use" of a construction that does not encode symmetry. It is a matter of fact that *most* of the constructions that denote reciprocal constructions do not contain quantifiers (like *each*) or anything that leads directly to a symmetric reading. Therefore, we believe it will be revealing to examine what exactly grammaticalized in these constructions. This may shed light on the diachrony of these constructions and would help us to better understand their semantics.

## b) Modality: Possibility, necessity, and everything in between

Modal expressions constitute the vocabulary of a language that is used to entertain potentially non-actual states of affairs (e.g., what *may* happen tomorrow, or who *must* be the winner). They have been the focus of much formal (Kripke 1959, Lewis 1973, 1981, 1986, Kratzer 1981, 1991, 2012, Veltman 1996, Frank 1996, Condoravdi 2002, Portner 2009, and many others), typological (e.g., Bybee et al. 1994, Narrog 2012), and historical (e.g., Traugott 1989, van der Auwera & Plungian 1998, Warner 1993, Traugott and Dasher 2002) research in recent years, but the results of this research have not yet been integrated into a uniform theory of how modal words are represented semantically across languages and how they change over time. Two specific topics that are ripe for investigation from a more integrative perspective concern *modality types* and *modal strength*.

Recent work on the expression of different modality types (such as deontic, epistemic, or teleological modalities; see Palmer 2001, Portner 2009 for an overview) has suggested that certain types (in particular, epistemic modality) are somehow reflective of properties of speech events, while others (in particular, teleological modality) are anchored to events described in a sentence. As has been pointed out (Rubinstein 2013), this idea has been proposed in different garb in both the formal semantic literature (most recently in Hacquard's event-relativity model; Hacquard 2006, 2010) and the typological-historical literature (Narrog's 2012 orientation dimension of modal meaning). The first goal of this case study is to investigate to what extent these two perspectives converge, specifically by testing the application of the formal model, with its proposed set of universal semantic ingredients, to a wide range of cross-linguistic and historical data on the expression of epistemic and non-epistemic modalities. Taking the analysis a step forward, a second goal is to extend the (unified, formal) model to two domains that remain understudied: (i) the so-called "low" modalities (e.g., ability and circumstantial modalities), and (ii) the volitive modalities (deontic, teleological, and bouletic modalities). Each group seems to form a natural class, as evidenced, for example, in the results of modality annotation tasks (Hacquard & Wellwood 2012, Ruppenhofer & Rehbein 2012, Hendrickx et al. 2012, Rubinstein et al. 2013, Cui & Chi 2013), yet both would be classified formally as anchored to events described in a sentence. Based on an examination of recurring pathways of change between the different categories, we hope to arrive at an extended formal model that will account for the grammatical properties of this wider range of modality types.

A second topic of investigation will be the apparent ability of modal expressions to change their strength, e.g., from expressing possibility to expressing necessity, through history. A well-known example is Old English *\*motan*, the predecessor of

English *must*. This modal seems to have originally been capable of expressing both possibility and necessity, becoming the necessity modal it is today only at a later stage of development (Van Herreweghe 2002, Narrog 2012: 187ff., Yanovich 2013). Hebrew presents צריך *carix* ‘need’ as another interesting test case: a modal that some claim was ambiguous between strong and weak necessity patterns today with strong necessity modals on many tests (Novick 2009, Rubinstein 2014). This project will investigate the hypothesis that Hebrew *carix* is a variable-force necessity modal, exploring various theories of variation in force that have recently been developed for modals in other languages (Rullmann et al. 2008, Peterson 2010, Deal 2011, Kratzer 2012, Matthewson 2013, Yanovich 2013). On a broader theoretical level, it will address the question of how – through what mechanisms: syntactic, semantic, or pragmatic – variable-force modals change their strength over time.

### c) Temporality: the Perfect

Another point of convergence between researchers in this project has to do with the complex temporal category ‘Perfect,’ (e.g., English *I have loved*, Latin *amāvī*, Spanish *he amado/acabo de amar*, Coptic *aiouō eisōtm*). This phenomenon is of particular interest in the framework of the proposed project, since it clearly exemplifies how the two subfields of linguistics under discussion can contribute to resolving standing issues.

While typological and historical work on the Perfect has been proliferating (e.g. Bybee & Dahl 1989, Dahl 2000), its formal semantic representation is not a settled issue (McCoard 1977, McCawly 1978, Dowty 1979, Mittwoch 1988, 2009, Klein 1992, 2004, Kamp & Reyle 1993, Kiparsky 1998, Iatridou *et al.* 2001, Katz 2003, Pancheva 2003, Portner 2012, among many others),

Semantically speaking, views diverge as to whether the Perfect is a type of stative, denoting a resultant state or a post-state following an eventuality that occurred prior to it (Perfect as a state, e.g., Kamp & Ryle 1993), or whether, in line with the neo-Reichenbachian view, it introduces an additional temporal interval that is ordered with respect to the eventuality time and the reference time (Extended Now theory, e.g. Dowty 1979, Mittwoch 1988, Iatridou *et al.* 2001). Each of these analyses has a different take on the empirical data regarding the Perfect, e.g., the different readings associated with the Perfect (e.g., the experiential reading *I have lost my glasses before*; the resultative reading *I have lost my glasses (and they are still lost)*; the universal reading *For the past week, I have been losing my glasses*, and whether these readings are grammatically encoded, i.e., semantic, or whether they are rather due to pragmatic inferences. Neither of these views fully account for the context-dependence of the perfect (Portner 2003, 2012).

Historically speaking, Bybee & Dahl (1989) enumerate four typical diachronic sources of the perfect in the languages of the world: (i) copula + past participle; (ii) possessive constructions, involving a past participle (iii) main verb + particle meaning ‘already’; and (iv) constructions involving verbs like ‘finish.’ The first two diachronic sources are, at first glance, compatible with the analysis of the Perfect as a state, and lend support to it. However, this approach to the meaning of the Perfect is unable to account for the entire range of readings related to the Perfect.

Considering the different diachronic sources for the evolution of Perfect forms will highlight the merits and shortcomings of the extant accounts of the semantics of

the Perfect. This has been done, e.g., by **Boneh (2004, 2010)** for Syrian Arabic, in **Bar-Asher Siegal (forthcoming)** for Eastern Aramaic dialects and **Grossman (2009)** for Coptic-Egyptian and (**Grossman in preparation**) for Spanish, both of which explore the pragmatic and semantic mechanisms implicated in the evolution of perfects from source constructions meaning ‘finish’ (item iv above). The findings of this research will be considered in light of the hypothesis proposed as the Universal Perfect Cycle (Dahl 2000, Lindstedt 2000), according to which the first perfect reading that emerges is the resultative one, and only later do the experiential and the universal Perfect readings develop, before becoming a general past tense form compatible with narrative uses. Comparing actual documented pathways of change from a variety of unrelated languages, and involving different types of source constructions, will allow us to evaluate both proposed diachronic universals and to settle open questions about the universality of synchronic semantic structures. For recent work on semantic change involving the Perfect, see also Condoravdi & Deo (2014).

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As these sample cases attest, individual research has already been started by members of the group; however, the convergence of the fields of expertise of the members will significantly broaden and systematize the results. In many cases, each one of us focuses on specific subfields of linguistics, as is usually the case in this field, thus some of the group’s members are expert semanticists, while others have knowledge in syntax, and others in historical linguistics. All of these bodies of expertise are crucial for any attempt to provide a comprehensive answer to the question posed by this research group.

#### **4.4. Defining goals**

An investigation of the type proposed here will have two significant outcomes: (i) a better understanding of the universal properties of semantic categories, (ii) hypotheses regarding recurrent pathways of change, which hopefully, will get us closer to an explanatory theory thereof.

Here is a list of the specific goals emerging from the suggested work plan:

- Empirical/historical coverage of central semantic categories: temporality, modality, negation, possession, reciprocity, definiteness, and more.
- Formulating and testing hypotheses about general mechanisms of semantic change and constraints thereon.
- Gaining insight into the interplay between semantics and pragmatics in historical change, on the one hand, and semantics and syntax, on the other.

#### **4.5. Methodologies**

The methodologies to be employed are first and foremost the toolbox of theoretical linguistics, i.e., the analytical methods provided by contemporary semantics, pragmatics, and syntax.

In addition, we propose to make use of diachronic corpora in order to collect data from historically documented languages. For example, corpus studies are planned

to study the evolution of the Perfect construction in Spanish (on the basis of a 100 million word corpus of Spanish from the 13<sup>th</sup>-20<sup>th</sup> centuries) and modality in Hebrew (utilizing the Ben-Yehuda Project and the annotated corpora available from the Hebrew Language Academy). Computational models of language change that rely on historical corpora will be applied once the relevant data has been acquired (see Yang 2000, Deo 2015, Dubossarsky et al. 2014?).

A third methodology is that of cross-linguistic comparison (i.e., linguistic typology). Linguistic typology provides inductively valid statements about the distribution of synchronic structures in the world's languages, and thereby, by inference, hypotheses about the distribution of the processes of change that gave rise to the structures.

A final methodology is that of experimental linguistics. Experimental semantics and pragmatics are nascent fields that allow linguists to model, to an extent, the kinds of situations we think are implicated in language change (Grossman & Noveck 2014+).

#### **4.6. Description of expected research achievements**

As discussed above, semantic change is still poorly understood, primarily due to three factors: (i) a lack of in depth case studies from a wide range of languages; (ii) a lack of an explicit theory of semantics underlying claims about semantic change; and (iii) a poor understanding of the relationship between semantics, pragmatics, and syntax in language change.

As such, the expected research achievements will essentially involve making progress on the above three fronts:

- Our proposed project will significantly expand the body of theoretically-informed case studies of semantic change, by widening the scope of investigation to new phenomena in a relatively broad range of languages.
- Furthermore, the application of an explicit theory of semantics to the phenomena of semantic change will allow us to propose and test explicit hypotheses about the mechanisms of semantic change.
- By basing our work on an explicit theory of the division of labor between semantics and pragmatics, on the one hand, and semantics and syntax, on the other, our project will allow us to deepen our understanding of the interplay of these aspects of language in historical change.
- Finally, the proposed project will provide a better understanding of a largely neglected set of questions – what semantic categories are cross-linguistically recurrent ('universal') and time-stable? What semantic categories are prone to change? What does the relative (in)stability of semantic categories tell us about the universality of semantic structure?

The research results produced by the proposed research group will be useful for linguists of various stripes, ranging from theoretical to descriptive linguists, as well as historical and comparative linguists, and philologists. The theoretical research will be of major international import: there is currently heightened interest in how language evolves, and the time is ripe for formal semantics to 'get in on the game,' joining this

joint intellectual enterprise by contributing the powerful tools of semantic formalization.

We believe that our group will contribute to enhancing the interdisciplinary study of language at the Hebrew University and eliminating its historical compartmentalization in multiple departments (Linguistics, Arabic Language and Literature, Classical Studies, Hebrew Language, English, Philosophy, and others). Writing this proposal has taught us that it is a considerable challenge to create a unified “language of investigation” among ourselves, but that this is also a challenge worth taking up. We believe that only a long-term dedicated intellectual effort, such as the one we are applying for here, can produce the desired result.

## **5. Detailed work plan**

**Year 1:** Presentation of previous work from a cross-disciplinary perspective.

- Learning the distinct research methodologies employed in formal semantics and in historical linguistics by focusing on specific case studies.

**Year 2:** Focus on universal categories in semantics.

- Examination of semantic categories involved in the pathways of change attested in each case study.
- Forming hypotheses about the process of change (with consideration of pragmatic source of change as well as any resulting syntactic change).

**Year 3:** Constraints on semantic change.

- Putting the new hypotheses to the test.
- Publication of results.

## **6. Conferences and joint and routine activity**

- During the three years of the project, weekly meetings that include: a discussion group, a reading group, and talks by invited speakers. The reading group will be devoted to reading central literature on semantics and historical linguistics, while the discussion group will deal with the presentation and discussion of our ongoing research.
- International Graduate workshop on semantic change during the second half of the 2nd year, spring 2019. The workshop will be organized by the group's PhD students.
- International workshop on semantic change towards the end of the 3rd year, summer 2020.
- Publication of a volume summarizing the results of the project, end of 2020.

## **7. Milestones indicative of success**

The first milestone is moving from interdisciplinary dialogue to the articulation of a common language, indicating that we have succeeded in learning from each other. If successful, the results should be tangible in the ongoing individual research projects.

The second milestone is to present in-depth case studies detailing patterns of semantic change across time. These case studies should integrate careful descriptive work with theoretical considerations. This work will start to be published as of the 2<sup>nd</sup> year of activity and will culminate in the planned conference.

Third, we intend to produce a volume integrating the results of the work of the group, in parallel to publications in leading journals.

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