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Norbert Hornstein
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Introduction

This book is entitled *The Merge Hypothesis: A Theory of Aspects of Syntax*. The educated reader (all of you) has no doubt picked up the homage to Chomsky (1965). Please excuse the self-aggrandizement. Truth be told, I could have also called the book *Minimalism: Footnotes to GB*, though I am not sure the Cambridge University Press marketing department would have approved. Nonetheless, the second title would have tickled my fancy in two different ways. How so?

First, it would have honored the tradition I was raised in, a tradition in which footnotes and marginalia are the locus of intellectual excitement. Nobody who has reveled in Chomsky's footnotes can be immune to their charms. Chomsky came by this literary form honestly. And it has served him well. It is where he lets his imagination roam most freely.

Second, the title would emphasize a main (negative) theme in what follows. It is that much (most) research that flies under the minimalist flag has misconstrued the explanatory goal of the Minimalist Program. Worse, this misunderstanding has been at the root of much of the skepticism concerning the success of the program and has also fertilized much of the negativity concerning the vitality of the larger Generative Grammar enterprise of which Minimalism is the most recent stage. It is not hard to find obituaries that insist that the Generative Program in linguistics is both (whew!) finally dead and deservedly buried. Often a paragraph therein is dedicated to the minimalist phase that, it is often claimed, demonstrates the sterility of the whole Generative approach, the implicit argument being that Minimalism is the self-evident reductio of the Generative absurdum.

All of this is bunk. But it is bunk that rests on a (possibly[1]) honest mistake about the goals that the Minimalist Program has set for itself. I intend to show that once these ambitions are clarified, these harsh conclusions prove groundless.

[1] I don't exactly believe this. Much (to most) of the "death of Generative Grammar" literature is advanced by those that know little about *any* of it. A lot of it is done in bad faith without even a thin sprinkling of interpretive charity. So, the one way of reading the bracketed modal above is indicating logical (rather than real) possibility. That said, I also believe that there is

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Or, to put this point another way, this book has a simple positive message. It is going to argue that the research program of modern Generative Grammar has been a resounding success. More particularly, it argues that the most current stage of this more general enterprise, the Minimalist Program (MP), has provided profound insights into the structure of the faculty of language (FL). This conclusion will strike many as obtuse. The word on the street (at least many words on many streets close to my ears) is that the MP, despite a few additions to the technical armamentarium of grammatical research (e.g. Probe-Goal/Agree technology), has been at best overhyped, and at worst a failure. Many, both within and without the Generative community of scholars, look at MP and see a program unmoored from data and overegged with theoretical pretension. They often take the perceived airiness of MP to be the *reductio* that suffices to discredit the whole Generative enterprise. This book argues that they are wrong, very wrong, dead wrong. What follows argues for two broad conclusions: (i) that MP is the logical next step within the very successful Generative research program and (ii) that MP has considerably pushed forward our understanding of the fine structure of FL. Furthermore, like any good program, MP has encouraged novel explanations, pointed to new research questions, led to the discovery of new data, led to the postulation of new kinds of grammatical dependencies and has offered up a diverse group of interesting new anomalies and puzzles worthy of solution. In other words, MP has all the (Lakatosian) marks of a lively, healthy, and robust research program. Or so this book argues.

The book is organized as follows.

First, it identifies and briefly describes the central questions of Generative research.[2] It then reviews some high points of *theory* within the Generative Program. This is important, for whereas programs are fecund or sterile, their products (namely theories/hypotheses) are intended to be truth evaluable. Indeed, the only useful measure of the fecundity of a research program is the verisimilitude of the theories that its perspective and central questions generate

sufficient conceptual confusion to engender skepticism even in the absence of bad faith. The discussion that follows is mostly directed to the latter group (a group for whom argument will matter (remember the useful adage: "You cannot argue someone out of a position that they were not argued into")), though I cannot say that I regret the joyous potshots I aim at the former. You know who you are.

[2] More accurately, the Chomsky program in Generative Grammar. The technology that Generative Grammar spawned is now widely adopted and not all the work that uses it aims to answer the questions that the technology was first deployed to address. This is fine. One of the great things about successful programs is that they overrun their banks and fertilize domains of inquiry that are (even many steps) removed from the questions and problems that initially motivated them. As I said, this is fine. What is not fine is confusing the technology with the questions of interest. That is why I identify the topic of discussion in what follows as grounded in the version of Generative inquiry that Chomsky has done so much to motivate and advance. If asked, I would say that this book should be understood as a long footnote to this work.

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and nurse. Using this standard, the Generative research program has been an unbelievable triumph, identifying as it has many non-obvious, non-trivial, empirically substantiated features of FL. From where I sit, many critics of the Generative program appear to be ignorant of these successes. They seem to know (next to) nothing of the theories of grammar Generativists have developed, how these theories naturally build on one another or what facts speak on their behalf. Sadly, there will not be room to do justice to this rich history of discovery here. But it will be important to review some illustrative high points as they become *explananda* at subsequent stages of Generative inquiry. Government Binding (GB) theory will be of particular interest. Viewed correctly (i.e. from the perspective elaborated here), the goal of MP is to *explain* the GB principles and generalizations developed from the mid-1970s to the mid-1990s.[3]

Let me reiterate this point as it will be a major theme in what follows. Progressive research programs build on the results of earlier theories that the program generates. In particular, the axioms of the earlier period become the targets for explanation for later theories. These (earlier) axioms are explained by being *derived* from simpler more natural (i.e. deeper) novel axioms. Derivation from "better" starting points is what explanation is all about. The biggest item on any theoretical research agenda is providing reasonable ways of fleshing out notions like "simpler" and "more natural." What this book argues is that MP has provided reasonable explications of these notions (no mean feat, I might add) and has gone a long way towards showing how the axioms of prior theory (what I will refer to as GB's "laws of grammar") can be derived in an insightful and principled way from these simpler more natural starting points. If this is correct (and it is, it really is) then MP, the most recent continuation of the Generative enterprise, is a raging success and should be recognized as such. Or, to put the same point more belligerently, many of MP's skeptics have failed to appreciate the *point* of the Minimalist Program and have been disappointed because MP has addressed its own questions rather than ones that (usually hostile) critics think it should have tackled.

Nor has this critical failure been because critics have demonstrated that these MP questions are ill-conceived. No, criticisms of MP have generally failed to understand the problem that Minimalism has set for itself and thus they fail to take the program on its own terms. As a result, the criticisms leveled against MP denigrate it not for failing to pose interesting questions (indeed, I will show that MP's questions are very good ones) or failing to

[3] Yes, I know that this is anachronistic. *Lectures on Government and Binding* (LGB) after all was not published till 1981. However, LGB is the mature statement of a line of investigation starting with Chomsky (1973). I will list the principles and generalizations of interest in Chapter 1.

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answer the questions the program takes up but for failing to answer questions at right angles to the program (and, hence, irrelevant to it). Let me clearly stipulate that there are many, many, many questions that MP does ***not*** address. And this has zero significance when it comes to evaluating the success of the program. So, if the aim is to evaluate how far MP has come (and that is a prime ambition of this book) then it is going to be very important to get the questions that MP poses clearly in focus, for it is success in answering *these* questions that we are (or should be) interested in evaluating.

Before getting the MP problem straight, I want to rant a little (or maybe I should say "a little more"). I believe that the "misinterpretation" of MP's goals is not due only to inattention or malice (though, to be sure there is some (much?) of both). Rather, it is rooted in an endemic fissure in the practice of Generative Grammar, one that was (prior to MP) relatively innocuous, easily managed and therefore benign but that the Minimalist project has widened and deepened. The fissure separates the philologically inclined (whose main interest lies in the (surface/observable) properties of languages) and the cognitively/biologically inclined (who, following Chomsky's formulation of the Generative agenda, understand the object of study to be the mental capacities that underlie linguistic facility). I have previously called these different Generative investigative strands l***a***nguistics vs l***i***nguistics (the 'a' signaling a focus on language, the 'i' highlighting the interest on I-language).[4] This distinction is intended to be clarificatory rather than invidious. Both forms of investigation have their charms. I, however, am interested in the Chomsky version (i.e. the one that focuses on I-language) and wish to defend its integrity against l***a***nguistic methodological precepts. To my mind, the idea that l***i***nguistic investigations must honor l***a***nguistic goals and standards lies behind much of the mooted disappointment with MP.

Second, the chapters that follow illustrate how MP is the natural extension of earlier Generative results, most particularly, those of GB-style theories developed from about the mid-1970s to the mid-1990s. I argue that MP begins the theoretical job of *explaining* the principles of grammar (i.e. universals of FL) that GB discovered. To put this crudely, MP builds on the results of this earlier GB research and MP's insights cannot be appreciated unless projected against a GB screen. MP aims to understand *why* FL has the kinds of properties Generative research (especially the GB variety) identified. In other words, the fundamental MP question is *why does FL have the properties that Generative/GB research over the last sixty years has discovered it to have?* Please note that

[4] This nomenclature is not original with me, sadly. I heard someone else use it but I cannot remember who or where. So thanks to the originator and sorry for the memory gap.

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this question *presupposes* that FL does indeed have these properties, and, in this sense, MP builds on the (perceived) success of this earlier inquiry. Thus, MP takes earlier Generative inquiry to have discovered key features of FL (i.e. MP assumes that GB is (more or less) empirically accurate), but rather than taking these to be fundamental features of FL, MP assumes that they are in need of deeper grounding. Thus, MP builds on the accumulated insights of earlier inquiry (as all decent science does). *How* it does so is the main technical theme of the book.[5]

It is worth noting that *if* a minimalist theory of grammar can derive the principles of Universal Grammar (UG) as articulated in GB it is *then* possible to answer two questions regarding FL that are in apparent tension. The first question is the one that the GB theory of FL specifically addresses and that Chomsky has dubbed "Plato's Problem." Plato's Problem is how it is possible to acquire one's native grammar despite the poverty of the linguistic input used to build that grammar. The GB answer to Plato's Problem rests on a rich, linguistically bespoke theory of Universal Grammar, the principles of which describe the fine structure of FL. The idea is that a rich FL compensates for the poverty of the linguistic stimulus the language acquisition device (LAD, aka the child) has access to in building its particular grammar (G). The richer the FL, the less the LAD needs to be guided in its grammatical choices by the data available to it.

Conceptually, this is the right kind of answer to Plato's Problem in the domain of language. The problem is that this answer raises an equally serious question: How did this richly structured linguistically dedicated FL arise in humans to begin with? We can call this "Darwin's Problem," as it involves the evolvability of FL. The problem is that the richer and more linguistically special the FL, the wider the distance between the cognitive wherewithal of our ancestors (who, by assumption, were not linguistically adept like we are) and our cognitive economy (which, again by assumption, includes FL). And the wider the distance between our minds/brains and those of our ancestors, the harder is the problem of explaining how the linguistically richer human mind arose from the linguistically poorer primate ancestor mind. Darwin's Problem strongly prefers a modest FL while Plato's Problem strongly favors a richer one. They thus pull in opposite directions, the tension between them setting the scene for a minimalist resolution. Here is the basic idea.

[5] Observe one important consequence of this perspective on MP: The theories it generates *presuppose* that earlier GB results are essentially correct. As such, MP accounts are not direct competitors of earlier GB accounts given that they take them to be roughly accurate. 'Accurate,' however, does not mean 'fundamental.' MP proposes that we understand GB results as largely correct (i.e. good but imperfect) empirical boundary conditions on a more basic theory that has them as consequences.

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Minimalism is the conjecture that it is possible to sail comfortably between the Scylla of Plato and the Charybdis of Darwin. How so? By deriving the fundamentals of GB theory within a framework of minimalist assumptions. The program is to simplify the GB picture of FL so that the remaining principles are either cognitively/computationally general or they are bespoke but very few in number (in the best case just one!) and very simple (in a way to be determined). The idea is that simple principles could arise through adventitious mutation. And if there is really only *one* difference between a linguistically capable mind and one that is not, and if this difference is "simple," and if this principle in combination with other cognitively/computationally general (i.e. non-linguistically specific) principles yields the laws of grammar as articulated by GB, then we can solve both Plato's Problem and Darwin's Problem. In other words, the simpler, more elegant, and more basic assumptions that can *explain* why FL has GB properties can also serve to explain how our FL with its useful "learnability" features could have arisen in the species. In other words, once we ask about FL's evolvability and we take GB as giving a reasonable (but not fundamental) description of FL, and we take these principles to be the explananda of an adequate minimalist theory, we are addressing the question of how to resolve the Plato/Darwin conceptual tension noted above.

Or, saying this another way: just as GB took FL's role in learnability to be a boundary condition on any theory of FL, MP takes evolvability of a GBish FL to be a boundary condition on an adequate FL. Simple and elegant are not *just* methodologically important features of the right FL (though they are this as well), they are also empirically required to solve Darwin's Problem.[6]

Third, the book identifies some MP novelties. Fecund research programs generate theories that manage to balance three demands: they save the results of the past, they discover "novel" data and mechanisms, and they point to new research questions. I have already mentioned that one goal (maybe the

[6] This is not to deny that quite often the methodological strictures regarding simplicity can also be interpreted in terms of evolvability, and vice versa. For example, many of Chomsky's (1993) arguments against theory-internal constructs like D-structure and S-structure can also be interpreted as removing linguistically bespoke structure from FL and thus making it less cognitively peculiar (and thus advancing efforts to explain its evolvability). Similarly for a host of grammar-internal formatives like traces, PRO, and, in my view, reflexives, bound pronouns and R-expressions. There are good methodological reasons for not taking these constructs as theoretically basic. Interestingly, evolvability considerations support these same conclusions. That said, the notions, I believe, need not always pull in the same direction, at least as a matter of emphasis. Simplicity relevant to Darwin's Problem peeks at the cognitive/computational capacities of our non-linguistic ancestors and asks what we must add *to them* to get FL. This notion need not track more generic methodological conceptions. I return to this issue in Chapter 7 in discussing labels.

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key achievement to date) of MP has been to provide more principled foundations for earlier Generative results (i.e. to *explain* what earlier Generative Grammar described). And, let me repeat, doing this, *if it can be done*, is a big f***in' deal (to paraphrase Joe Biden). However, a second mark of a program's fecundity is that it does not leave earlier results entirely untouched (recall, GB's principles are not fundamental, though they are roughly correct). A decent MP account conserves much of what preceded, but it also changes it, rejecting some central premises, making novel "predictions," solving old puzzles, providing principled accounts for previous stipulated description, and so on. This book will identify and lovingly tease out some of the ways that MP has improved the explanatory depth of earlier accounts, for it is in terms of these novelties that theories are compared, evaluated and judged.

In particular, the theoretical unification that lies at the heart of the MP project, if rigorously deployed, leads to a picture of UG and FL radically different from the modular view of FL that is a central feature of GB. More pointedly, the Extended Merge Hypothesis (EMH) implies that FL has *no* internal modules and *that all grammatical relations are Merge-mediated relations* (please observe: **this idea is NOT original to me. To my knowledge, Sam Epstein thought it up first in his** Epstein (1999), **and** Collins (2007) **endorsed it as well**).[7] It thus implies that the articulated modular distinctions embedded in the GB model of FL/UG are actually a mirage. More specifically, if all dependencies are Merge dependencies, then the differences GB identifies between phrase/structure building, movement, construal, control, theta assignment, case assignment and the like are *all reflections of the very same unique generative procedure*. Thus, if the EMH is correct, the formal differences that GB identifies are merely apparent. Of course, this is a big claim, and it will only be partially redeemed here. Still, the hope is that it will be redeemed *enough* to serve as a useful working hypothesis going forward and will suffice to motivate ambitious grad students to solve the remaining reservoir of problems (and discover new ones to be solved). That's the way programs function. Problems *always* remain, and some (elevated to the status of anomalies) hang around for quite a while. Their function is to tantalize, not to discourage.

In service of this, the book (following Epstein (1999) and Collins (2007)) identifies a particular "axiom" and makes it the central feature of the Extended

[7] Hereon in, whenever I mention the Extended Merge Hypothesis (EMH) or the Fundamental Principle of Grammar (FPG) (and I will mention both a great deal) I want the reader to hear in his/her mind's ear my insistent voice plangently intoning that the ideas are not original with me. See the Preface for further admission that I am following Epstein's lead in putting these ideas at the center of Minimalist theory.

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Merge Hypothesis. I dub this axiom the Fundamental Principle of Grammar (FPG).[8] Here it is:[9]

(1) **The Fundamental Principle of Grammar (FPG):** α and β can be grammatically related (G-related) only if α and β have merged.

The FPG states that *if* there exists a G relation between any two elements in a phrase marker, then at some point in the derivation of the phrase marker containing them these elements must have formed a unit/constituent. So, if α theta marks β then at some point in the derivation α and β formed a unit/constituent. If α case marks β then at some point in the derivation α and β were a unit/constituent. If α antecedes β then … . Well, you get the point.[10]

Here's one thing I really like about the FPG: It places *constituency* at the very center of FL's organizing principles. As anyone who has taken an introductory

[8] I was tempted, following the lead of biologists, to refer to it as the Central Dogma of Grammar (CDG). It was hard to choose between the two names, though in some earlier talks I settled on the more modest "Fundamental Principle of Grammar," which I will stick to. But the more brash "Central Dogma of Grammar" has some charms. First, it is useful to identify fundamental axioms and emphasize their axiomatic character. The tongue-in-cheek replacement of "Fundamental Principle of Grammar" with the "Central Dogma of Grammar" would serve to do this nicely (and it may even irritate some thin-skinned party-poopers on the way (one can only hope)). Second, it would emphasize the regulative function of the principle. I hope that the FPG/Central Dogma functions as a boundary condition on MP theory going forward. At the least, in what follows it cleanly encapsulates the empirical oomph of the Extended Merge Hypothesis by strongly restricting the *kinds* of grammatical operations and dependencies FL can license. It really is amazing how sparse the theoretical options are if the Fundamental Principle/Central Dogma is reverenced.

[9] As already noted, the FPG is not original with me. I always like being in a large crowd when suggesting something that looks too good to be true. The earliest published precursor to the EMH seems to be in Epstein (1999: 321–22, (2)), where he proposes the following: (i) Syntactic relations are established between syntactic categories X and Y iff X and Y are transformationally concatenated by Merge or Move during the derivation, and (ii) The fundamental structure-building operation is "Concatenate X and Y thereby forming Z." This comes very close, when his technology is translated into modern Merge terms, to the FPG. A related yet earlier version of this that argues for a convergence of Merge with Categorial Grammar can be found in Berwick and Epstein (1995). In addition to Epstein (1999), Collins (2007: 838) deploys a principle virtually identical to the FPG: "*The Merge Assumption*: Every syntactic relation is a function of a binary combinatorial operation."

Given its august origins, it is clear that something like the FPG *must* be correct. At times, arguments from authority are clearly dispositive. As any impartial reader will admit, this is clearly one of those times. For the record, as one reviewer missed this, this last paragraph is not an argument but a way of admitting (i) that I like the FPG a lot and (ii) that I again reiterate that Epstein and Collins proposed it first.

[10] If one makes the further assumption that every grammatical dependency is expressed as a form of checking some grammatical feature, then we can strengthen the FPG into a biconditional incorporating the principle of Greed. I don't do this here, however. Why not? Because it is not clear what a grammatical feature is. The earliest MP attempts to understand features as morphologically expressed elements did not succeed that well empirically. And there are no other really good suggestions on offer that don't trivialize the notion so that it means nothing more than that some grammatical operation took place.

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linguistic course knows, one of the great discoveries ever is the fact that natural language expressions are assemblages of constituents that themselves can contain further constituents. Constituency begets hierarchy.[11] The EMH rests on the premise that what makes language special is the fact that it allows for unboundedly complex hierarchically ordered *constituents*. The FPG recognizes the centrality of the (immediate) constituent and raises its importance another notch by making it the locale/domain for *all* G-dependencies. To say as the FPG does that all G-dependencies are Merge mediated is just to say that all grammatical commerce takes place among constituents (hierarchically organized (labeled) objects).[12]

In what follows, the FPG will play the role of a theoretical "forcing mechanism," meaning an assumption held rigorously constant to open up avenues for theoretical exploration. Where the FPG points I will follow. The EMH is a theory that emerges from the FPG forcing mechanism. Of course, if the EMH proves to be attractive, then the FPG has the right to claim pride of place as a foundational axiom. But, whether you rush to embrace this conclusion or not, in my opinion, the fecundity of the FPG as a forcing mechanism is sufficient reason for taking it seriously, at least for one book-length investigation.

A momentary segue: I should add a warning here to prevent some of my more Minimalistically up-to-date readers from hyperventilating. I am going to *initially* adopt a very traditional conception of constituency and, consequently, a less contemporary conception of Merge. In particular, I will *initially* assume that constituents are categorized units like NPs, VPs, TPs (etc.) and that Merge both puts expressions together *and* labels the resulting combination. This is *not* the contemporary way that (some) syntacticians understand Merge. Some limit the operation to forming units[13] from (pairs of) syntactic objects and treat labels as not visible to the syntax per se but as the products of a labeling algorithm that is part of the Transfer operation that maps syntactic objects to the interfaces (particularly the conceptual–intentional (CI)). The main idea seems to be that labels are not required "in the syntax" but are only necessary for "semantic" interpretation. As the reader will discover in Chapter 7, I don't buy this. I think that labeling is a syntactic operation (i.e. I doubt that labels can be motivated as formal prerequisites of CI interface legibility) and I will argue that the EMH *requires* labeling for its successful operationalization. However,

[11] In Chapter 7, I argue that it really does *beget* it. In particular, labeled units when merged inevitably yield further hierarchically organized constituents. Also, as argued in Chapter 3, given the standard No Tampering Conditions associated with Merge, we must assume that merged units are labeled to operationalize the FPG. This, thereby, gives some theoretical grounding to the standard idea that constituents (i.e. categorized complex units) are the basic units of linguistic computation.

[12] Again, this is very close to the First Law in Epstein (1999).

[13] Akin to sets, but see discussion in Chapter 2 where we will see that the set assumption is more convenience than fact.

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I sympathize with the minimalist sentiment that (I believe) lies behind banishing labeling from the syntax. In the best of all possible minimalist worlds there is at most *one* linguistically bespoke feature of FL. I will suggest that labeling is the true secret ingredient. See the sixth listed point below for some preview.

To return to the FPG, I have yet higher ambitions for it. I intend it to make flesh two related ideas: (i) that the fundamental (indeed, the only *specifically* grammatical) operation of the grammar is the operation which forms constituents, and (ii) that the emergence of the constituent as a central element of FL is what underlies the rise of grammatical competence in humans. The earliest minimalist conception of Merge had this property. The Merge Hypothesis (sans the "Extended" part) is the idea that Merge is the cognitively special something that underlies human grammatical competence. This idea refracted through the FPG states that once one adds Merge (the operation that builds constituency) to the biological cognitive mix, out drops something with more or less the properties of the human FL as described more or less accurately by GB. So, why do humans have a GB kind of FL? Because FL contains an operation like Merge that it uses to mediate all G-dependencies, that's why. In what follows we will have a lot more to say about both Merge and the FPG and how they combine to derive many (most?) of the principles of FL/UG that Generativists have discovered over the last sixty years. This will, in fact, constitute the substantive empirical/theoretical core of what follows.

Fourth, the book adopts a particular method. It argues that a central feature of MP is to distinguish those features of FL that are linguistically parochial from those that are, plausibly, cognitively and/or computationally generic. Indeed, one goal of MP is to distinguish those features of FL that are *linguistically* bespoke (specifically *grammatical* operations and principles) from those that FL deploys but are *not* linguistically special. The EMH makes the claim that Merge *alone* (understood as the operation that generates constituents and that mediates all grammatical dependencies as per the FPG) is linguistically (or, more exactly, syntactically) special within FL.[14] All other operations and principles are, in principle, reflections of more general features of cognition/computation.[15]

In order to flesh out the EMH and its consequences, what follows will proceed piecemeal through the GB properties to be explained and identify the particular assumptions EMH requires to derive them. So, for example, some properties will follow from those of the combinatorics of the Merge operation

[14] To be more precise, Chapter 7 argues that labeling is the unique syntactically special operation. The combination part of the Merge operation is not uniquely linguistic.

[15] Note the weasel word 'reflection.' I would love to be able to actually reduce/unify the non-Merge assumptions to other clearly identified cognitive/computational operations and principles. Alas, I will largely not be able to do this. What I will do, I hope, is provide reasons for thinking that this is a rational hope, for at least some of these. See Chapter 8 for more discussion.

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