Victor Junnan Pan*, Mamoru Saito and Yuqiao Du

Introduction: workspace, MERGE and labelling

It has been more than three decades since the Minimalist Program (MP) set off a new stage of Generative Syntax. As the campaign advances into deeper waters, reflections on the fundamental concepts are in order at this point.

Chomsky's recent series of works (2019, 2020a, 2020b, 2021a, 2021b) demonstrate such efforts and lay the ground for further investigations. These works contain several important proposals. First, Workspace (WS), a trivially defined concept in previous works, is brought to the center of the spotlight. It forms the basis to capture the properties of derivations in precise terms. This can be seen in the second proposal: MERGE is redefined as an operation that updates a Workspace as in (1).

(1)   MERGE (P, Q, WS1) = WS2

In (1), MERGE takes 3 arguments, a Workspace WS1 and two accessible items P and Q in WS1. It applies binary merger to P and Q, forming a new Workspace that includes {P, Q} and members of WS1 with the exclusion of P and Q. With this apparatus, Chomsky goes on to pursue MERGE in its simplest form. He places great importance to general economic principles in the system, based on the belief that human brain has very limited working memory. Resource Restrictions (RR), the linguistic term for the economic principles, have a fundamental role in this WS-based system.

Specific proposals have been made for RR. First, Chomsky argues that MERGE is strictly Markovian and has no access to the prior stages of derivation that yielded WS1. Second, MERGE abides by Minimal Yield (MY): The number of accessible elements can increase at most by 1 with each application of MERGE. Important here is Minimal Search (MS), which requires search to be minimal. External MERGE of α and β adds {α, β} to the WS, and this is the only new accessible item. On the other hand, Internal MERGE apparently adds two new accessible items to the WS. For example, if {α, {α, β}} is formed from {α, β}, an additional copy of α as well as the newly formed object is added to the WS. However, the higher copy of α blocks

*Corresponding author: Victor Junnan Pan, The Chinese University of Hong Kong, Hong Kong, Hong Kong S.A.R., E-mail: victorjunnanpan@cuhk.edu.hk
Mamoru Saito, Notre Dame Seishin University, Okayama, Japan, E-mail: saito@nanzan-u.ac.jp
Yuqiao Du, The Chinese University of Hong Kong, Hong Kong, Hong Kong S.A.R.,
E-mail: yqdumalin@link.cuhk.edu.hk

the lower copy in its c-command domain from being accessible. The search of the lower copy of α is not a minimal search for α because of the presence of the higher copy. Thus Internal MERGE conforms to MY as well. MY excludes "non-standard" forms of Merge such as sideward Merge and parallel Merge. Phase Impenetrability Condition (PIC) states that derivations proceed phase by phase, and items in the complement of the previous phase are not accessible for MERGE. MS and PIC both reflect the idea of minimizing computational burdens, so they fall under RR.

Chomsky (2021b) introduces an important new mechanism, FormCopy. It takes two identical elements in a structure and assigns copy relation to them. As it applies to two identical elements regardless of whether they are produced by Internal MERGE or introduced into the structure independently by External MERGE, it unifies the analyses for raising and control.

Labeling Algorithm (LA; Chomsky 2013, 2015) is another key concept in the recent development of MP. Labels of constituents are necessary for interpretation. For example, the interpretive components need to know that {V, PP} is labeled as a verb phrase and not as a prepositional phrase. LA explains the distribution of noun phrases and excludes illicit cases of movement (External MERGE) by distinguishing constituents that are properly labeled and those that are not.

Traditional concepts such as adjunction, conjunction, and head-movement also call for new inspections from the advanced position we now possess. It is a long-standing observation that they produce non-standard structures, and this has invited 'unorthodox' solutions, for instance, Pair-Merge, and FormSequence and Amalgamate from Chomsky's recent papers. It remains to be seen if these operations can be justified. Further research is required to find out what implications they, or their competing alternatives, have on our understanding of syntax.

Bearing these concerns in mind, we held the Workshop on Workspace, MERGE and Labeling on August 7th, 2022. It was a part of GLOW in Asia XIII, hosted by the Department of Linguistics and Modern Languages at the Chinese University of Hong Kong. The workshop called for discussions that focus on the architecture of MP, especially on the fundamental concepts like Workspace, MERGE and Labeling. The topics to be addressed included (but were not limited to) their definitions and potential subtypes, their interactions with other operations/conditions, and their empirical consequences. We received a great number of abstracts from all over the world, which indicates the wide interest in these theoretical issues. This special issue of *The Linguistic Review* is a collection of selected papers from the Workshop and the main session. We believe that these papers provide good answers to the question we raised at the beginning of the Workshop:

What can MP tell us about languages and what can languages tell us about MP?

Brief summaries of the six papers in this issue are given below.

In *On Wh and Subject Positions, the EPP, and Contextuality of Syntax*, Željko Bošković begins the discussion with the examination of the puzzling properties of local subject wh-movement and argues that its landing site is a Spec position with mixed A/A′ properties located higher than AgrsP and lower than the locus of non-subject wh-phrases. He goes on to show that this position enables us to analyze diverse phenomena in many typologically unrelated languages. Bošković argued in his earlier paper (2016) for contextual approach in syntax, proposing that the highest phrase in a phasal domain (e.g., split CP projections) functions as a phase. The investigation in this paper leads to split IP structure with A/A′, Agrs and T heads. He proposes that what happens to be the highest among them in specific examples is the locus of the EPP, and argues that this provides further support for the contextual approach.

The paper *On Minimal Yield and Form Copy: Evidence from East Asian Languages* by Mamoru Saito develops Quicoli's (2008) phase-based analysis of the locality of anaphor binding. This leads to a new definition of phase that refers to ϕ-feature agreement because the presence/absence of agreement affects the binding domain for anaphors as is well known. The paper goes on to show that the new definition serves to resolve the contradiction between the phase theory and FormCopy analysis of control. Finally, it takes up a surprising difference between English and Japanese with respect to the proper binding effect. It is shown there that Kitahara's (2017) analysis of the proper binding effect in terms of Minimal Yield (MY) predicts this difference correctly when combined with the new definition of phase. This constitutes further evidence for MY as well as for the new definition of phase.

Victor Junnan Pan and Yuqiao Du's collaborated paper, *A Multi-dimensional Derivation Model under the Free-MERGE System: Labor Division between Syntax and the C-I Interface*, addresses the problem of adjunction and coordination with innovations in the architecture of MP. The paper proposes a general derivation model based on the concept of derivational dimensions, which constitute a parameter that MERGE must decide on. Set-MERGE keeps the merge-mates within the same dimension, while Pair-MERGE assigns the merge-mates to different dimensions. Each dimension has its own Labeling Algorithm, ignoring syntactic objects in other dimensions. At the Conceptual-Intentional interface, products of Pair-MERGE are interpreted in coordination or modification relations. The various labeling possibilities in a multi-dimensional structure lead to different interpretation. C-I considers the competition of different labels and exhaustively explores each possibility to determine the appropriate interpretation.

The paper contributed by Nobu Goto and Toru Ishii, *Seeking an Optimal Design of Search and Merge: Its Consequences and Challenges,* proposes that the selection of items for Merge (External and Internal) is constrained by Binarity and the Phase

Impenetrability Condition, but not by Minimal Search (MS). It is argued that this MS-free MERGE allows us to explain, for example, the freezing effect, *that*-trace effect, the anti-locality effect and the ban on vacuous movement in terms of Binarity. It is shown also that MS-free MERGE makes Minimal Yield (MY) redundant as sideward Merge and parallel Merge are excluded by Binarity under this model. The proposal in this paper to eliminate the role of MS in MERGE is, in a sense, a slight modification of Chomsky's model. Yet, it leads to an alternative that is clearly worth pursuing as it has a number of important consequences as shown in the paper.

With insights into large-scale pied-piping, Hiromune Oda develops novel ideas about weak heads and Minimal Search in the paper *Large-scale Pied-piping in the Labeling Theory and Conditions on Weak Heads*. The paper first presents two generalizations on languages that allow large-scale pied-piping: They have indeterminate pronouns and are head-final. The claim is typologically grounded. Then, it proposes explanations for the generalizations with an analysis of large-scale pied-piping based on the Labeling theory. The analysis implies that large-scale pied-piping is possible only if (i) a wh-phrase can have an unvalued operator feature, i.e., can be an indeterminate pronoun and (ii) the phrase to be pied-piped has a weak head in the sense of Chomsky (2015). It is argued that a head can be weak only if it is morphologically dependent and only head-final complementizers satisfy this condition. It is also suggested on the basis of this analysis to reduce Agree to Minimal Search and to eliminate Agree as a syntactic operation.

The paper titled *The Third Way: Optional Object Reordering as Ambiguous Labeling Resolution* by Adrian Stegovec presents an analysis for word-order variation in Slovenian ditransitive sentences in terms of Labeling. The main proposal is that the variation arises because there are two ways to resolve the Labeling problem with the VP structure that contains two objects as in {NP, {V, NP}}. The first way is to raise the higher object to Spec, ApplP. The second is to smuggle {V, NP} to the position. The paper shows that the analysis successfully explains the differences that are observed between the two word-orders with respect to interpretation and possible passive forms. It also shows that the analysis has empirical advantages over the two standard ones in the literature, one with distinct base structures and the other with optional movement of the lower object. This suggests that the analysis may be extendable to word-order variations in ditransitive sentences in other languages, including the English double-object/dative alternation.

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