Multicategorial multiple right dislocation in Chinese: A cross-framework study

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Abstract

This paper studies multicategorial multiple right dislocation (MMRD) in Dongying Mandarin Chinese. This pattern of right dislocation differs from the more familiar patterns in European languages in that it is not restricted by syntactic category or constituency and typically involves a very incomplete main clause. I review previous approaches to right dislocation in three theoretical frameworks—Minimalism, Lexical-Functional Grammar, and Dynamic Syntax—and conclude that MMRD is a challenge for all of them. Then, building on useful ideas from previous studies, I develop a new minimalist analysis using multiworkspace derivation, which explains the flexible word order and disorganized interpretive effect of MMRD. I also give the workspace-level information integration in my analysis a formal protocol borrowing tools from process calculi, especially the session calculus.

1 Introduction

The colloquial register of many languages has a construction as illustrated in (1).

(1) a. He's really smart, John (is). (Kayne 1994)

b. *Il a mangé la soupe, Jean.* (French, Lambrecht 1981)
he has eaten the soup Jean

c. *Lo porto domani, il dolce.* (Italian, Benincà 1988)
it bring.1SG tomorrow the dessert
'I'll bring it tomorrow, the dessert.'

This construction is called *right dislocation* (RD), at least pretheoretically, since part of the sentence, usually an argument, is apparently dislocated to the right edge. There is usually a coreferential pronoun in the main body of the sentence too. A subtype of RD that has received relatively little attention is RD that involves multiple RD-ed units—call it *multiple RD* (MRD). When examples are given, such as those in (2), they are usually mentioned in passing, probably because MRD in familiar European languages is a straightforward extension of *single RD* (SRD) as in (1).

(2) a. He gave them to his sister, Peter, the keys. (Averintseva-Klisch 2009)

b. *Maria gli lo ha portato, il dolce, a Gianni.*
Maria to.him it has brought the dessert to Gianni
'Maria brought it to him, the dessert, to Gianni.' (Italian, Sun 2022)

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As shown in (1)–(2), in familiar European languages the RD-ed units in both SRD and MRD are mostly argument or adjunct phrases. By contrast, a wider range of elements can be RD-ed in Chinese, including nonconstituents, as in (3).[1]

(3) a. *Shang feiji le, wo kuai.* (Standard Mandarin, Sun 2022)
get.on plane SFP I soon
'Get on the plane, I soon.' ≈ 'I'll get on the plane soon.'

b. *Gaa ce lo, bei.* (Cantonese, Cheung 1997)
CLF car SFP PASS
'A car, by!' ≈ 'It was a car that hit him.'

The RD-ed units in (3a/b) are a subject-adverb string (i.e., a nonconstituent) and a passive auxiliary, respectively. In addition, these sentences do not involve coreferential pronouns. Thus, RD as a syntactic phenomenon is more flexible in Chinese. Also note that the Chinese RD-ed units are consistently to the right of the so-called sentence-final particles (SFPs), which are generally taken to mark the right boundary of the sentence (see, e.g., Cheung 2009).

Against the above background, in this paper I investigate a special case of RD in Chinese, which I call *multicategorial multiple right dislocation* (MMRD). It involves multiple RD-ed units of miscellaneous categories. MMRD is not that common in Standard Mandarin but naturally occurs in some regional dialects. The data in this paper are taken from Dongying Mandarin (of which I am a native speaker), a minor subvariety of Northern Mandarin spoken in the Yellow River Delta area. See (4).

(4) a. *Gae-buliao liae, shɒ ye, zhe yi mer.* (Dongying Mandarin)
do-cannot SFP anything also this one period
'Can no longer do, anything, this period of time.'
≈ 'One can't do anything anymore these days (due to COVID-19).'

b. *Bu niaehur ae, zhe sie diaefen, yi daer ye.*
not sticky SFP this CLF starch one bit even
'Not sticky, this starch, even a bit.'
≈ 'The starch isn't sticky at all (i.e., is of poor quality).'

c. *Lie-du-ren li, ngen laoye kae, dai jiɒ-liu.*
hunt-drug-person SFP your grandpa watch be.at home-in
'The Drug Hunter, your grandpa is watching, at home.'
≈ 'Your grandpa is watching The Drug Hunter at home. (surprised tone)'

d. *Chao caihuar chi ae, wo ji ni, jin shangwu.*
stir.fry cauliflower eat SFP I give you this noon
'Stir-fry cauliflower, I for you, this noon.'
≈ 'I will stir-fry cauliflower for you for lunch today.'

[1] Grammatical labels not included in the Leipzig abbreviation list: DISP = disposal, SFP = sentence-final particle, STA = stative.

e. *Zaezae-zhou ae, dei, mae yunqi lai, haoshi-zhou.*
save.up-STA SFP must DISP luck DISP carefully-STA
'Save up, must, (good) luck, carefully.'
≈ 'We must carefully save up our good luck.'

As we can see, the RD-ed units in MMRD are highly versatile. In particular, (4a/b) involve RD-ed negative polarity items (NPIs) marked by the particle *ye* 'also, even'; (4c/d) involve RD-ed nonconstituent strings made up of a subject plus another element (i.e., *kae* 'watch' and *ji ni* 'for you'); and (4e) RD-s a modal auxiliary *dei* 'must' as well as the first half of a so-called disposal construction [*mae* NP *lai* V] (= Standard Mandarin [*ba* NP V]), which promotes an affected object to the preverbal position. Prosodically, there is a clear pause before each RD-ed unit in sentences like the above, and there is no pause within any individual RD-ed unit. This is evidence that the RD-ed units in such sentences have been RD-ed in their entirety, despite not being syntactic constituents.[2]

Sentences like these naturally occur in casual, relaxed speech. Intuitively, this happens because Dongying Mandarin speakers habitually deliver the most crucial information of a sentence first and append less crucial information afterward. People would avoid speaking in this manner when they need to sound more organized (e.g., when talking to people of higher social status or discussing heavier topics). In less casual situations, RD is still common, but not MMRD. Two additional observations concerning MMRD in Dongying Mandarin are: *i*) it is not tied to any particular illocutionary force, and *ii*) the multiple RD-ed units can usually be freely reordered. I illustrate these in (5)–(6) below.

(5) a. *Bu niaehur man, zhe sie diaefen, yi daer ye?* (interrogative)
not sticky SFP this CLF starch one bit also
'Not sticky, this starch, even a bit?' ≈ 'The starch isn't sticky at all?'

b. *Chao caihuar chi bae, ngen ji ngae, jin shangwu!*
stir.fry cauliflower eat SFP you give me this noon
'Stir-fry cauliflower, you for me, this noon!'
≈ 'Stir-fry cauliflower for me for lunch today, please!' (imperative)

c. *Zaezae-zhou ninhae, renge dai, mae yunqi lai, yizuer!*
save.up-STA SFP others will DISP luck DISP altogether
'Save up, she/he will, (good) luck, altogether!'
≈ 'She/he is going to save up all her/his good luck!' (exclamative)

(6) a. *Zaezae-zhou ae, dei, haoshi-zhou, mae yunqi lai.*
save.up-STA SFP must carefully-STA DISP luck DISP
'Save up, must, carefully, (good) luck.'

[2] I thank an anonymous reviewer for reminding me to clarify this.

b. *Zaezae-zhou ae, mae yunqi lai, dei, haoshi-zhou.*
save.up-STA SFP DISP luck DISP must carefully-STA
'Save up, (good) luck, must, carefully.'

As in (5), MMRD may occur in nondeclarative sentences as well. And as in (6), the multiple RD-ed units in an MMRD sentence may be freely reordered (here I only show two out of the six possibilities for reasons of space).

There is no previous study on MMRD to the best of my knowledge, and RD itself also poses a challenge to syntactic theory considering dislocation in natural language is primarily to the left edge of the sentence. Given this state of affairs, in the rest of this paper I will first review how RD is treated across syntactic theories (§2). More specifically, I will examine previous approaches to RD in three theoretical frameworks—Minimalism, Lexical-Functional Grammar (LFG), and Dynamic Syntax (DS)—and conclude that MMRD is a challenge for all of them. Next, I will propose a derivational approach to MMRD combining ideas from Minimalism and DS (§3), deriving each RD-ed unit in a separate workspace with just enough structure and letting each RD-workspace be loosely connected to the main workspace by Pair Merge. Finally, I will further propose a formal protocol for cross-workspace communication borrowing tools from the subarea of computer science known as process calculi (§4). Section 5 concludes.

2 Previous approaches to right dislocation

In this section, I review previous approaches to (simple) RD in three syntactic frameworks: Minimalism (§2.1), Lexical-Functional Grammar (§2.2), and Dynamic Syntax (§2.3). I will conclude that MMRD is a challenge for all of them.

2.1 Minimalism

In Minimalism, RD is usually analyzed in one of two ways: *i*) in a single clause, by stranding the RD-ed unit after leftward movement of the rest of the clause (the monoclausal approach); *ii*) by coordinating two (mostly) identical clauses plus ellipsis in the second clause, following leftward movement of the RD-ed unit (the biclausal approach). Both approaches have been applied to Chinese. Thus, Sun (2022) applies them to inversion-like RD (7a) and argument-RD (7b), respectively.

(7) a. *Shang feiji le, wo kuai.* (Standard Mandarin, = 3a)
get.on plane SFP I soon
'Get on the plane, I soon.' ≈ 'I'll get on the plane soon.'

b. *Mali mai le ba, baozhi.*
Mary buy SFP SFP newspaper
'Probably Mary bought (it), the newspaper.'

We have seen both RD patterns in Section 1. Inversion-like RD is the multicategorial pattern common in Chinese (see, e.g., 3), while argument-RD is the coreferentiality-based pattern common in European languages (see, e.g., 1), though the latter pattern often involves null pronouns in Chinese, as in (7b), since Chinese is a so-called radical pro-drop language (Neeleman & Szendrői 2007). See (8) for Sun's analysis of the two RD patterns.

(8) a. $[_{\text{FocP}}\ [_{le\text{P}}\ \text{t}_i\ \textit{shang feiji le}]_j\ [_{\text{Foc}'}\ \text{Foc}\ [_{\text{IP}}\ \textit{wo}_i\ [_{\text{I}'}\ \text{I}\ [_{\text{AspP}}\ \textit{kuai}\ [_{\text{Asp}'}\ \text{Asp}\ \text{t}_j]]]]]]$

b. $[_{:\text{P}}\ [_{\text{CP}_1}\ \textit{mali mai}\ \text{pro}_i\ \textit{le ba}]\ [_{:'}\ :\ [_{\text{CP}_2}\ \textit{baozhi}_i\ \sout{[_{\text{IP}_2}\ \textit{mali mai}\ \text{t}_i\ \textit{le}]}]]]]$

In (8a), the verb phrase plus the low SFP[3] *le* (marking a currently relevant state), together labeled *le*P, is base-generated as the complement of Asp. From there, the subject *wo* 'I' first moves to Spec-IP, and the remnant *le*P subsequently moves to Spec-FocP. Since the latter movement is for focusing purposes, Sun calls this RD pattern *focus fronting*. By contrast, in (8b) two almost identical CPs are coordinated by a special coordinator denoted by a colon (i.e., Koster's 2000 specifying coordination). Next, the argument *baozhi* 'newspaper' is raised to the CP-level for discourse reasons, and the remnant IP_2 is elided.[4] Crucially, focus fronting does not require the RD-ed unit to be a constituent, for it is not really moved but merely stranded. Meanwhile, coordination-plus-ellipsis not only requires the RD-ed unit to be a constituent but furthermore requires it to be a phrasal constituent of a suitable type—the type that can be targeted by discourse-driven A′-movement. Therefore, focus fronting as an RD-deriving mechanism is more flexible than coordination-plus-ellipsis. Its only limitation is that each clause only allows one round of focus fronting, which makes it hard to extend the mechanism to MMRD.

Sun borrows the colon coordinator–based derivation in (8b) from Ott & de Vries (2016), whose main proposal is schematized in (9).

(9) $[_{\text{CP}_1}\ldots\text{correlate}_i\ldots]\ (:)\ [_{\text{CP}_2}\ d\text{XP}_i\ \sout{[\ldots\text{t}_i\ldots]}]$

In (9), two (mostly) identical clauses are put together either via the colon coordinator or simply by juxtaposition. The "dislocated" unit *d*XP is generated in CP_2 and moves to its left edge for discourse reasons; the remainder of CP_2 is then elided. CP_1 contains a coindexed "correlate" of *d*XP, usually a pronoun.

Ott & de Vries distinguish two types of RD: *backgrounding* (via colon coordination) and *afterthought* (via juxtaposition). I will abbreviate these as BRD and ARD, respectively. Their key difference lies in the discourse status of *d*XP: the *d*XP in BRD encodes old information (i.e., is topic-like), while that in ARD encodes new information (i.e., is focus-like). Ott & de Vries further distinguish two subtypes of ARD: the specificational subtype and the predicative subtype. See (10).

[3] See Paul (2014) for the different hierarchical positions of Chinese SFPs.

[4] The exact discourse reason is topicalization (Ott & de Vries 2016) or defocusing (Lee 2017). Yip (2024) replaces ellipsis by multidominance, assuming that CP_1 and CP_2 directly share structure. However, the theoretical status of multidominance in Minimalism is in dispute (Chomsky 2013).

(10) a. *Ich habe heute einen Star getroffen: den John Travolta!*
I have today a.ACC star met the.ACC John Travolta
'I met a star today: John Travolta!' (specificational ARD)

b. *Ich habe heute den J.T. getroffen: ein berühmter Star!*
I have today the.ACC J.T. met a.NOM famous star
'I met John Travolta today, a famous star!' (predicative ARD)
(German, Ott & de Vries 2016)

In (10a), the *d*XP *den John Travolta* is a direct further specification of its correlate *einen Star*, hence their case agreement (both accusative). This can be directly derived from the colonless version of (9), as in (11a). By contrast, in (10b) the *d*XP *ein berühmter Star* is a separate predicate about its correlate *den John Travolta*, which Ott & de Vries analyze using a copular construction within CP_2, as in (11b); hence the case mismatch. For completeness, I also illustrate Ott & de Vries's analysis of BRD in (11c), using the English example from (1a).

(11) a. [$_{CP_1}$ *ich habe heute einen Star getroffen*] (specificational ARD)
[$_{CP_2}$ [*den John Travolta*].ACC$_i$ ~~[*habe ich* t$_i$ *getroffen*]~~]

b. [$_{CP_1}$ *ich habe heute den John Travolta getroffen*] (predicative ARD)
[$_{CP_2}$ [*ein berühmter Star*].NOM$_i$ ~~[*ist er* t$_i$]~~]

c. [$_{:P}$ [$_{CP_1}$ he$_i$'s really smart] [$_{:'}$: [$_{CP_2}$ John$_i$ ~~[t$_i$ is really smart]~~]]] (BRD)

As mentioned in Section 1, previous studies on RD are mostly dedicated to SRD, while MRD only gets mentioned in passing. Thus, Sun (2022) proposes a multi-:P account of MRD in familiar European languages, as in (12). Sun illustrates this with the Italian example from (2b), repeated in (13a). Its derivation is given in (13b).

(12) [CP_1 : [CP_2 : CP_3]]

(13) a. *Maria gli lo ha portato, il dolce, a Gianni.* (= 2c)
Maria to.him it has brought the dessert to Gianni
'Maria brought it to him, the dessert, to Gianni.'

b. [$_{:P_1}$ [$_{CP_1}$ *Maria gli$_i$ lo$_j$ ha portato*] :$_1$ [$_{:P_2}$ [$_{CP_2}$ *il dolce$_j$* ~~[*Maria gli ha portato* t$_j$]~~] :$_2$ [$_{CP_3}$ *a Gianni$_i$* ~~[*Maria lo ha portato* t$_i$]~~]]]

However, this account cannot be easily extended to MMRD. First, it is essentially designed for BRD of the familiar European type, where the main body of the sentence is relatively complete and the RD-ed units are argument or adjunct phrases that can be targeted by discourse-driven A′-movement. MMRD sentences in Chinese usually do not meet these standards. To illustrate, consider (14).

(14) [$_{CP_1}$ *Mu* *jiae-hang* *ni* *mae*], [$_{CP_2}$ *bu* (Dongying Mandarin)
not.have see-get.to you SFP not

shi], [$_{CP_3}$ *shang* *yi* *huir* *she*], [$_{CP_4}$ *yinwei*]*?!*
is last one round time because

'Did not get to see you, isn't it, last time, because?!'
≈ 'Isn't it because (I) didn't get to see you last time?! (So here I am again.)'

In this sentence, CP_1 is highly incomplete, lacking substantive content that cannot be recovered by coreferentiality. And among its three RD-ed units—a nonconstituent string, a time adverbial, and a subordinating conjunction—only the time adverbial can be targeted by discourse-driven A′-movement.

Second, the missing parts in the RD-ed units of an MMRD sentence are often semantically nonequivalent, which makes a repetition-based ellipsis mechanism technically infeasible. This is clearly reflected in CP_2 and CP_4 from (14). See (15).

(15) a. *bu* *shi* [~~*mu jiae-hang ni mae*~~] (CP_2)
not is not.have see-get.to you SFP
'Isn't it ~~that (I) didn't get to see you~~?'

b. *yinwei* [~~*shang-yi-huir-she mu jiae-hang ni*~~] (CP_4)
because last.time not.have see-get.to you
'because ~~last time (I) didn't get to see you~~'

Here CP_2 must contain the yes/no SFP *mae*, without which the meaning completely changes: 'isn't it that I didn't get to see you?' (with *mae*) → 'it's not that I didn't get to see you' (without *mae*). Meanwhile, CP_4 cannot contain the yes/no SFP but must contain the time adverbial, without which the reason introduced by 'because' is no longer that intended by the speaker.

Third, the repetition-plus-ellipsis approach to MRD in (12) employs underlyingly full-fledged CP-conjuncts by design, but having to manipulate $n + 1$ CPs when there are n RD-ed units is resource-demanding. While the ellipsis takes place at PF, both the syntax and LF must deal with nonelided multiclausal structures, which greatly adds to processing burden. Last but not least, as mentioned in Section 1, the multiple RD-ed units in an MMRD sentence can be freely reordered. Thus, there is no empirical motivation for the hard-coded asymmetric structural relation in (12).

2.2 Lexical-Functional Grammar

While most existing studies on RD are done in Minimalism, there are also occasional studies in other frameworks. I examine an LFG-based study, Kalbertodt (2019), in this section and will further review some studies in Dynamic Syntax in Section 2.3. The empirical focus of Kalbertodt (2019) is on German, so it only considers the familiar coreferential pattern in European languages. Nevertheless, it shows us how RD can be handled by a monostratal syntactic theory like LFG.

Kalbertodt also distinguishes true RD and afterthought, reserving the term "RD" for the former. However, while her basic criterion is the same as that in the minimalist literature—with true RD being topic-like and afterthought focus-like—what she identifies as afterthought often closely resembles RD, as in (16).

(16) a. *Ich hab ihn gesehen, den Peter.* (RD) (German)

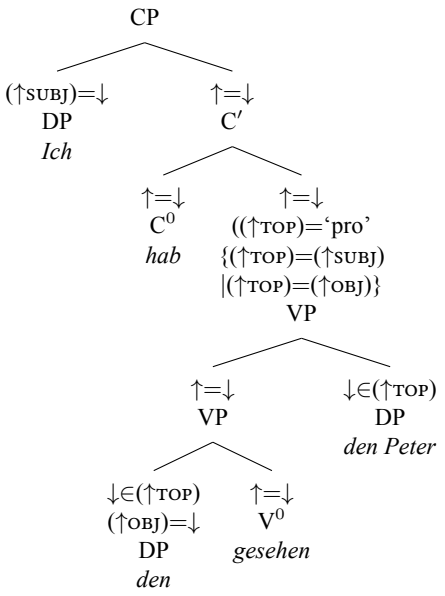
b. *Ich hab ihn gesehen. Den Peter.* (afterthought)
I have him seen the.ACC Peter

These two sentences minimally differ in punctuation and prosody. According to Kalbertodt (2019: 78), true RD-ed units are deaccented and have compressed pitch, while afterthoughts receive nuclear accent and have a full pitch inventory.

Overall, Kalbertodt's position is that true RD-ed units are syntactically integrated into the main clause, while afterthoughts are only pragmatically bound to it. Adopting the LFG framework, Kalbertodt then analyzes true RD-ed units as VP-adjuncts, and afterthoughts, as "syntactic orphans" (following Averintseva-Klisch 2009). See (17)–(18) below for the details of her analysis.

(17) *Ich hab ihn gesehen, den Peter.* 'I have seen him, Peter.' (RD)

a. c-structure

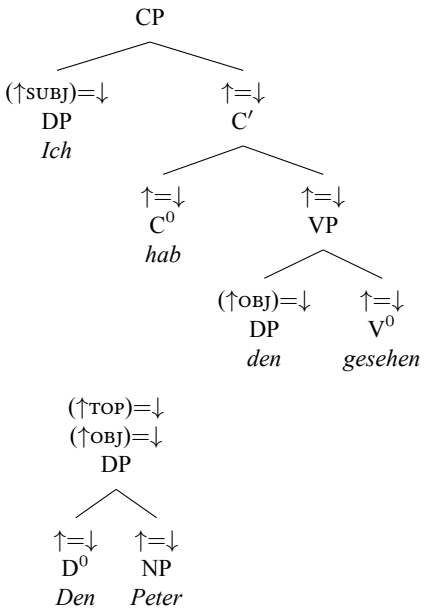


b. f-structure

$$\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'pro'} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{NOM} \end{bmatrix} \\ \text{PRED} & \text{'sehen}\langle(\uparrow\text{SUBJ})\,(\uparrow\text{OBJ})\rangle\text{'} \\ \text{TENSE} & \text{PERFECT} \\ \text{TOP} & \left\{ \begin{bmatrix} \text{PRED} & \text{'pro}_i\text{'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{ACC} \\ \text{GEND} & \text{MASC} \end{bmatrix}, [\text{"den Peter}_i\text{"}] \right\} \\ \text{OBJ} & [\quad] \end{bmatrix}$$

(18) *Ich hab ihn gesehen. Den Peter.* 'I have seen him. Peter.' (afterthought)

a. c-structure



b. f-structure

$$\begin{bmatrix}
\text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'pro'} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{NOM} \end{bmatrix} \\
\text{PRED} & \text{'sehen}\langle(\uparrow\text{SUBJ})\,(\uparrow\text{OBJ})\rangle\text{'} \\
\text{TENSE} & \text{PERFECT} \\
\text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'pro'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{ACC} \\ \text{GEND} & \text{MASC} \end{bmatrix}
\end{bmatrix}$$

$$\begin{bmatrix}
\text{TOP} & \begin{bmatrix} \text{SPEC} & \text{DEN} \\ \text{PRED} & \text{'Peter'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{ACC} \\ \text{GEND} & \text{MASC} \end{bmatrix} \\
\text{OBJ} & [\quad]
\end{bmatrix}$$

(adapted from Kalbertodt 2019: 149, 155–156)

The phrase *den Peter* in (19), identified as a true RD-ed unit, is analyzed as a VP-adjunct of the main clause in the c-structure and as a topic in the f-structure (on a par with its correlate *den* 'him'). By contrast, the same phrase *den Peter* in (20) is identified as an afterthought and analyzed as part of a separate, elided sentence (c-structure), as both its object and topic (f-structure). In short, Kalbertodt (2019) proposes a monoclausal structure for BRD and a biclausal structure for ARD. The latter is similar in spirit to Ott & de Vries's (2016) structure for ARD (see §2.1).

While Kalbertodt's analysis is not directly useful for our task (Chinese MMRD) due to its limited scope (i.e., only for the coreferential pattern in familiar European languages), we can nonetheless draw inspiration from it. In particular, both the use of adjunction to connect the RD-ed unit to the main clause in (19) and the "lite" biclausal syntax in (20) may be useful. In Section 3, I will propose an analysis that integrates these ideas, but before doing that I will first examine how RD is treated in a third theoretical framework, Dynamic Syntax, which provides another useful idea.

2.3 Dynamic Syntax

Dynamic Syntax is a grammar formalism that "directly reflects the time-linearity and context-dependent growth of information governing natural language parsing" (Cann et al. 2005: 3). Thus, it is resource-sensitive by design, and that is well reflected in its treatment of RD. In a nutshell, in DS the RD-ed unit may directly adjoin to the main clause as is, without being embedded in any elided clausal structure. Hence, the DS

approach to RD is truly lite. In this section, I review two DS-based accounts of RD, one for BRD (Cann et al. 2005, Wu 2005) and the other for ARD (Chatzikyriakidis 2016). Note that both accounts are designed for RD of the familiar European pattern (i.e., the coreferential pattern). Thus, they cannot be directly applied to Chinese MMRD. However, we may still draw inspiration from them.

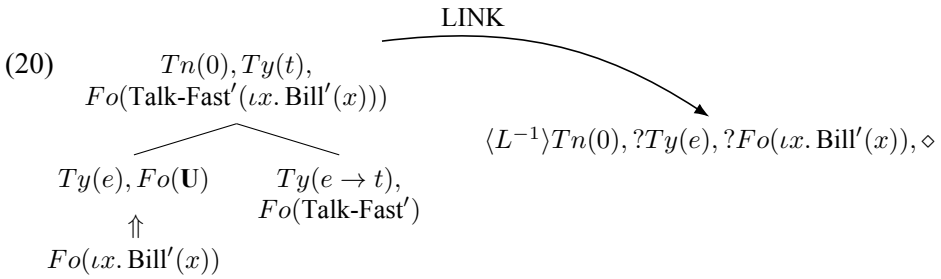
Let us begin with Cann et al.'s (2005) account of BRD, which is more exactly only meant for the pronoun doubling construction, as in (19a). Wu (2005) directly applies this account to Chinese data that fall in the same pattern, as in (19b).

(19) a. He talks too fast, the new secretary. (Cann et al. 2005)

b. *Jianghua hao kuai ya, Lisi.* (Standard Mandarin, Wu 2005)
talk so fast SFP Lisi
'(He) talks so fast, Lisi.'

Cann et al. recognize the RD-ed unit in this pattern as a background topic with a recapitulation effect, which "re-identifies the same element identified in the main clause by the pronoun" (p. 189). They model the pattern using a pair of DS-trees connected by a LINK arrow, as in (20) (adapted from ibid., p. 191).

(20)



Tree nodes in DS are decorated by "declarative units" (DUs) in the $Label(Value)$ format. The first tree in (20) parses the main clause *he talks too fast* from (19a). Its root has treenode address (Tn) 0, type (Ty) t, and a formula (Fo) that reads 'Bill talks (too) fast', where Bill is a contextual referent of *he* substituted ($\Uparrow$) for a "metavariable" **U**. After parsing the main clause, the parser ($\diamond$) moves on to the RD-ed unit *the new secretary* by creating a LINK from the first tree to a second tree requiring type e.[5] At this stage, this second tree only has a root node. Requirements for information (marked by ?) are a standard part of the DS machinery. The LINK not only connects the two trees but also carries over the formula value of a subterm of the main tree (here, *he*) as a formula requirement on the LINKed tree. Due to this requirement, the second tree will only be well-formed if the RD-ed unit also refers to Bill. This LINK mechanism is like cross-tree adjunction, and it is indeed called "adjunction" in Wu (2005). Crucially, the adjunct-tree is just a standalone chunk of type e (i.e., a DP), with no elided CP-structure at all.

[5]The prefixed treenode address $\langle L^{-1}\rangle Tn(0)$ in the second tree indicates that it is reversely LINKed to the node $Tn(0)$—the root node of the first tree.

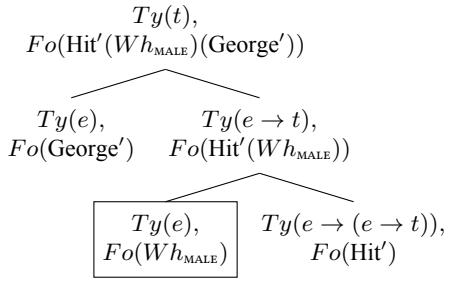
While Cann et al. (2005) and Wu (2005) only consider BRD, Chatzikyriakidis (2016) considers both BRD and ARD. He further distinguishes two subtypes of ARD: identificational and specificational. See (21) (adapted from pp. 300, 317). The double comma indicates period intonation. I skip Chatzikyriakidis's modeling of BRD since it is the same as that in Cann et al. (2005) and Wu (2005).

(21) a. *Ton htipise o Giorgos,, ton Giani.* (Greek)
him.ACC hit the George the.ACC John.ACC
'George hit him,, John.' (identificational ARD)

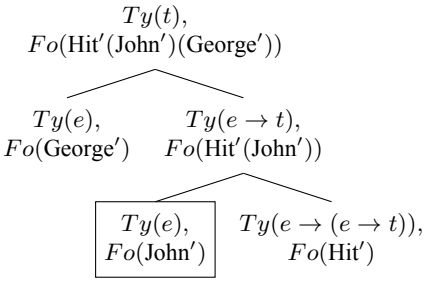
b. *Gnorisa enan thrilo,, ton Miki Theodoraki.*
met.1SG a.ACC legend.ACC the.ACC Mikis.ACC Theodorakis.ACC
'I met a legend,, Mikis Theodorakis.' (specificational ARD)

In both sentences in (21), the RD-ed unit is a proper name; the two sentences mainly differ in the correlate part, which is a pronoun in (21a) but an indefinite noun phrase in (21b). Chatzikyriakidis's key idea is to model afterthoughts (of both subtypes) as preemptively provided "clarification answers to implicit questions" (p. 299). Specifically, he assumes that when an afterthought is parsed, the context includes an implicit question that is minimally different from the main clause in the correlate part, which is replaced by a *wh*-metavariable. The afterthought's value is then substituted for that metavariable, effectively answering the question. The type of this *wh*-metavariable is determined by the nature of the correlate. Thus, the *wh*-metavariable in (21a) is a bare one (i.e., $what$), while that in (21b) is a restricted one (i.e., $which$). Due to space constraints, I only present Chatzikyriakidis's parse trees for (21a) below (adapted from p. 301).

(22) a. Implicit question
'Who$_{\text{MALE}}$ did George hit?'



b. Substitution
'George hit John.'



Under this analysis, the more pedantic reading of (21a) is:

(23) 'George hit him. You want to ask who George hit? George hit John.'

Thus, the clarification or repair function of ARD is clearly brought out. Here, too, the RD-ed unit is treated as is, without being embedded in any larger structure.

The above DS approach to ARD may also be extended to MRD. Chatzikyriakidis (2016: 310) gives the following example.

(24) *Ton ida,, ton Giorgo,, xtes.* (Greek)
him.ACC saw.1SG the.ACC George.ACC yesterday
'I saw him,, George,, yesterday.' (MRD)

There are two RD-ed units here: an argument and a time adverbial. Chatzikyriakidis assumes that the latter serves to update a time metavariable under a situation/event node in the main clause. The parsing procedure is the same as above, just involving two implicit questions. The interpretive effect is as follows:

(25) 'I saw him. You want to ask who I saw? I saw George. You also want to ask when I saw George? I saw George yesterday.'

As hinted above, a major advantage of DS is its built-in resource-sensitivity. That said, two design limitations make the DS approaches above inapplicable to Chinese MMRD: First, they only work for RD-ed units with relatively complete syntactic and semantic status, as each DS parse tree must have a well-defined semantic type (mainly t or e). Thus, it is unclear how the miscellaneous nonconstituent RD-ed strings in MMRD can be handled.[6] Second, due to the fundamental status of left-to-right parsing in DS, the accounts above rely on relatively complete main clauses, because without sufficient lexical content it is impossible to construct a suitably shaped parse tree to begin with. Left-to-right parsing is hard to unfold in the case of MMRD, where too much substantive information has been RD-ed.

2.4 Interim summary

In this section, I have reviewed how RD is treated in three theoretical frameworks, which has led me to conclude that MMRD is a challenge for all of them. Table 1 summarizes the key ideas and problems of the cross-framework treatments of RD.

Table 1: Useful ideas from previous studies and their problems

Idea	Framework	Advantage	Problem
Focus fronting	Minimalism	can derive nonconstituent RD	limited to SRD
Coordination + ellipsis	Minimalism	can derive MRD	constituent-only, resource-demanding
Lite multitree syntax	DS (LFG)	can derive MRD, resource-sensitive	constituent-only, needing a complete main clause

To recapitulate, focus fronting is the only mechanism that can handle nonconstituent RD, but it is limited to SRD. Coordination-plus-ellipsis and lite multitree

[6] That is, unless we allow arbitrarily complex function types like those in Categorial Grammar for DS parse trees. Thanks to Hans-Martin Gärtner for pointing this out to me.

syntax are not limited to SRD but cannot handle nonconstituent RD. Between the latter two mechanisms, lite multitree syntax, especially its incarnation in DS, is resource-sensitive, though it depends on a relatively complete main clause. In the next section, I will present a new analysis of MMRD that integrates useful ideas from previous studies and bypasses their problems.

3 Deriving multicategorial multiple right dislocation

To combine the advantages of previous ideas, I propose to inherit the basic settings of the minimalist studies—so that focus fronting can normally proceed—but simultaneously adopt a multiworkspace derivational mechanism, which can help us implement the lite multitree syntax idea in Minimalism. The reason why the coordination-plus-ellipsis approach is resource-demanding is because it manipulates full-fledged CP-structures. There is no such requirement in multiworkspace derivation. Workspace-level theorizing is increasingly prominent in current Minimalism. Indeed, it has become part of the latest definition of Merge (Chomsky et al. 2023). But multiple workspaces have long been used in practice too, and the assumption that syntactic derivation proceeds in multiple parallel workspaces or layers is essentially uncontroversial (see, e.g., Zwart 2011, Fowlie 2013). To illustrate, consider (26).

(26) The man kicked the ball. (Zwart 2011)

To derive this sentence, the subject *the man* must be merged onto the clausal tree as a unit (in Spec-TP). But for that to happen, *the man* must be prederived in a separate layer or workspace. Since this derivational scenario is very common, we must conclude that multilayered or multiworkspace derivation is the de facto norm in generative syntax, though it is not often explicitly stated.

As the above simple example shows, the content of a parallel derivational layer/workspace may well be a nonclausal object. This gives us a way to implement lite multitree syntax in Minimalism. That is, we can replace the CPs in the coordination-plus-ellipsis approach to RD by smaller and more flexibly sized structures now, which is a significant improvement in terms of resource-sensitivity. That said, in the case of RD I do not let the contents of the multiple workspaces combine into a normal tree, but just let them be loosely grouped by workspace-level coordination. This is similar to Ott & de Vries's (2016) juxtaposition in discourse, though I do not adopt juxtaposition because its operands are sentences (i.e., the basic units of the discourse), and that would lead us back to the resource-demanding multi-CP situation. Moreover, since the workspace is still a narrow-syntactic notion in Minimalism, the outputs of the multiple workspaces still need to be combined in syntax and shipped to the interface together. To illustrate, consider the Dongying Mandarin MMRD sentence from (1c) repeated below.

(27) *Zaezae-zhou ae, dei, mae yunqi lai, haoshi-zhou.*
save.up-STA SFP must DISP luck DISP carefully-STA
'Save up, must, (good) luck, carefully.'

We can now derive this sentence in the following way, using three workspaces.[7]

(28) a. WS_1 (main clause + RD_1) (à la Sun 2022):
[$_{\text{ForceP}}$ [$_{\text{FocP}}$ [$_{v\text{P}}$ *zaezae-zhou* pro$_o$]$_k$ [$_{\text{Foc}'}$ Foc t$_j$]]$_i$ [$_{\text{Force}}$ *ae*]
[$_{\text{GroundP}}$ [$_{\text{IP}}$ pro$_s$ [$_{\text{I}'}$ [$_{\text{I}}$ *dei*] t$_k$]$_j$ [$_{\text{Ground}'}$ Ground t$_i$]]]]

b. WS_2 (RD_2):
[$_{v\text{P}}$ pro$_s$ [$_{v'}$ [$_v$ *mae*] [$_{\text{ApplP}}$ *yunqi*$_o$ [$_{\text{Appl}'}$ [$_{\text{Appl}}$ *lai*] [$_{\text{VP}}$ ~~*zaezae-zhou*~~ t$_o$]]]]]

c. WS_3 (RD_3):
[$_{v\text{P}}$ [$_{\text{AdvP}}$ *haoshi-zhou*] [$_{v\text{P}}$ pro$_s$ [$_{v'}$ *v* [$_{\text{VP}}$ ~~*zaezae-zhou*~~ pro$_o$]]]]

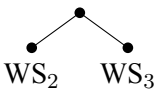
The main workspace WS_1 has a full-fledged clausal structure, where the first RD-ed unit *dei* 'must' is derived by focus fronting.[8] Meanwhile, the two RD-workspaces WS_2 and WS_3 only have just enough structure, and the two further RD-ed units are derived by in-situ VP-ellipsis, without invoking any CP-level operation.

The three workspaces in (28) do not combine into a single tree but are coordinated as workspaces. This is possible because workspaces are technically sets. I further posit that the main workspace has some structural prominence over the two RD-workspaces (by c-commanding them both) and that the two RD-workspaces themselves are structurally symmetric (neither c-commanding the other). See (29).

(29) $\{\langle WS_1, WS_2\rangle, \langle WS_1, WS_3\rangle\} \equiv \langle WS_1, \{WS_2, WS_3\}\rangle$

Adopting a method in Song (2024),[9] I let WS_1 separately pair-merge with WS_2 and WS_3, each on a different plane. This yields the multidimensional syntactic object on the left in (29), which is order-theoretically equivalent to the partially ordered set on the right, where WS_1 is ranked above the set $\{WS_2, WS_3\}$. That is, both sides of $\equiv$ in (29) describe the same partial order as represented by the Hasse diagram in (30).

(30) WS_1 $\quad (WS_1 \geq WS_2, WS_1 \geq WS_3)$



[7] I analyze *mae* in (28b) as a *v* head in the spirit of Li (2017) and, for convenience, treat *lai* 'lit. come' as an applicative head (Appl), leaving a more detailed analysis of it for future study.

[8] Here I place RD_1 in WS_1 mainly to illustrate focus fronting, but it may also occupy a separate workspace. Such flexibility is generally available for MMRD, unless independent factors dictate that one of the RD-ed units be part of the main clause in the underlying structure. See Footnote 10 below.

[9] Song's (2024) multidimensional Pair Merge operation is developed based on the conception of Pair Merge in Chomsky (2004) and the coordination-as-adjunction idea in Chomsky (2019).

This gives us a way to account for the flexible word order of MMRD. Recall from Section 1 that the multiple RD-ed units in MMRD can usually assume any order. Such word order flexibility can be explained as follows: First, the main clause always comes first due to the structural prominence of WS_1. Second, usually any of the RD-ed units may be derived via focus fronting in WS_1.[10] Third, the remaining RD-ed units can assume any order due to their symmetric structural relation.

As hinted above, multiworkspace derivation may proceed in two different ways: *i*) tightly, with the separately derived syntactic objects assembled into a single tree; *ii*) loosely, with the workspaces themselves being "coordinated" (via Pair Merge). The first way is what happens in the derivation of non-RD sentences, such as the simple sentence in (26). The second way is what happens in MMRD. Admittedly, this is not a normal derivational scenario, because the syntactic information in it is shipped to the interfaces in a disorganized way (which is very palpable in interpretation). It only occurs when the speaker is too lazy or relaxed to assemble the various pieces of information into a single syntactic object. Therefore, when the speaker does make an effort to organize their language, MMRD does not occur.

Semantically, I assume that the loosely coordinated workspaces are interpreted by a generic coproduct or disjoined union operation $\oplus$, as in (31). Note that the normal boolean conjunction $\wedge$ does not work here because the multiple workspaces do not all have type-t content.

(31) $[\![(27)]\!] = [\![WS_1]\!] \oplus [\![WS_2]\!] \oplus [\![WS_3]\!]$

This yields the following interpretive effect:

(32) 'Save it up, we must; save up the good luck; save it up carefully.'

4 A formal protocol for cross-workspace communication

In the preceding section, I presented a minimalist approach to MMRD that combines the advantages of the cross-framework approaches to right dislocation reviewed in Section 2. A main feature of my approach is its use of multiworkspace derivation. As mentioned above, workspace-level theorizing is increasingly prominent in current Minimalism. Meanwhile, it should be noted that workspace-level derivation may

[10] However, there are also cases where one of the RD-ed units must be derived in WS_1 due to independent factors. Consider the Dongying Mandarin sentence from (4c) repeated below:

(i) *Lie-du-ren li, ŋen laoye kae, dai jiɒ-liu.*
hunt-drug-person SFP your grandpa watch be.at home-in
'The Drug Hunter, your grandpa is watching, at home.'

In this example, the main clause only has an argument plus an SFP, so a verb must be provided in the first RD-ed unit for WS_1 to be well-formed.

require different formal methods from those typically used in ordinary derivation. In particular, as alluded to above, multiworkspace derivation may proceed either at the level of tree-building—call it the *tree level*—or at a more abstract level beyond the assembling of syntactic trees, where individual trees, together with the workspaces containing them, become atomic operands; for want of a better term, we may call the latter the *forest level*. At the tree level, the contents of the multiple workspaces are ultimately assembled into a single tree (i.e., a single syntactic object) in a single workspace. By contrast, at the forest level, which is the level MMRD resides in, the contents of the multiple workspaces remain separate and are not integrated into a single object; it is the workspaces themselves that are (loosely) joined together. As a caveat, forest-level multiworkspace derivation is not the same as the derivation of multiple sentences (e.g., to form a paragraph); in the latter scenario, the workspaces for the multiple sentences are not joined in syntax, and the sentences are merely juxtaposed in discourse.

The two levels above require different modes of derivation and have different interpretive effects. Derivation-wise, tree-level derivation is mainly based on normal Set Merge (and occasional, tree-internal Pair Merge); it is just that the output of one workspace may be used as input to another workspace. In other words, we have a workspace-containment relation. By contrast, forest-level derivation, under the conception in Section 3, involves workspace-level Pair Merge, which renders a workspace-coordination relation. Moreover, this difference in derivation mode corresponds to a difference in the mode of semantic composition, which is normal composition (mainly based on functional application) at the tree level but coproduct formation at the forest level. Interpretation-wise, tree-level derivation gives rise to grammatically tightly organized (i.e., normal) sentences, whereas forest-level derivation gives rise to the kind of disorganized utterance observed in MMRD, though MMRD is presumably not the only such scenario in human language.

Considering the derivational, compositional, and interpretive differences between tree-level and forest-level multiworkspace derivation, we must formally distinguish them in workspace-level theorizing. However, such a distinction is hard to precisely formulate using existing tools of Minimalism (e.g., Merge, Move, Agree), which is unsurprising since those tools are all designed for the derivation of well-formed normal sentences. Forest-level derivation requires us to go beyond that design, both in technicalities and in mindset. In particular, we must both keep the multiple workspaces relatively independent—without letting the output of one workspace directly feed the derivation of another—and allow them to be eventually unified and shipped to the C-I interface as a whole. In a sense, we need a formal method or routine to model the high-level communication or information integration across multiple workspaces conceived as separate subsystems. As it turns out, there is a well-established tool for this purpose in the computer science subarea known as *process calculi*. Such calculi are formal languages used by computer scientists to describe concurrent processes and distributed systems. Simply put, process calculi are to concurrency what λ-calculi are to functions (Milner 1990). In fact, the Dynamic Syntax machinery we have seen in Section 2.3—especially its

information-requesting expressions like $?Ty(e)$—is already partly similar to how information exchange is modeled in process calculi. In this section, I will go a step further and present a tentative formal protocol for forest-level cross-workspace information integration. While the specific implementation here is only an initial exploration, it nonetheless demonstrates the kinds of high-level issues that need to be taken into account in a serious attempt to formalize workspace-level theorizing. This, I believe, is the *raison d'être* of this section.[11]

Well-known process calculi include CCS (Calculus of Communicating Systems), CSP (Communicating Sequential Processes), the π-calculus, and the session calculus (see, e.g., Sangiorgi & Walker 2001, Wadler 2014, Yoshida & Gheri 2020). Below I use a simplified version of the *synchronous multiparty session calculus* in Yoshida & Gheri (2020)[12] to illustrate how cross-workspace information exchange can be protocolized. The original session calculus can describe a wide range of inter-system communication scenarios, but for current purposes we only need to consider two:

(33) a. Sending message m via channel c: $!\mathrm{c}\langle m\rangle$

b. Receiving any message via channel c and store it in variable x: $?\mathrm{c}(x)$

In session-based modeling of concurrency, a communication session between participants or (sub)systems consists of a structured sequence of message-passing interactions like the above, and each participant p in a session is associated with their own process P, written $\mathrm{p} \triangleleft P$. The sequencing of interactions is denoted by the dot operator, and termination, by **0**. See (34), for example.

(34) $\mathrm{p} \triangleleft !\mathrm{c}\langle m\rangle.?\mathrm{d}(x).\mathbf{0}$

In this process, p sends message m via channel c, receives a message via channel d and stores it in x, and terminates.

In our scenario of cross-workspace communication, the derivation of an MMRD sentence can be viewed as a session, with each workspace viewed as a participant. In the structure in (29), we can assume that each step of Pair Merge establishes a communication channel. Thus, the main workspace is connected to each RD-workspace via a unique channel, but the RD-workspaces themselves are not connected. Still taking the sentence in (27) as an example, we can represent the cross-workspace information integration as a session as in (35). In addition to the three workspaces, I also posit a participant C-I to represent the ultimate destination of the flow of integrated semantic information (i.e., the conceptual-intentional system).

[11] I thank an anonymous reviewer for reminding me to clarify this important issue.

[12] Specifically, I have simplified its notation, so (33) in fact looks more like the π-calculus. However, I still adopt the notion of session since it suits the scenario of cross-workspace communication very well. I thank Francisco Ferreira for introducing me to this area of study.

(35) a. $\text{WS}_2 \triangleleft P_{\text{WS}_2} = !\text{a}\langle[\![\text{WS}_2]\!]\rangle.\mathbf{0}$
(WS_2 sends its own content as a message via channel a and terminates.)

b. $\text{WS}_3 \triangleleft P_{\text{WS}_3} = !\text{b}\langle[\![\text{WS}_3]\!]\rangle.\mathbf{0}$
(WS_3 sends its own content as a message via channel b and terminates.)

c. $\text{WS}_1 \triangleleft P_{\text{WS}_1} = ?\text{a}(x).?\text{b}(y).!\text{s}\langle[\![\text{WS}_1]\!] \oplus x \oplus y\rangle.\mathbf{0}$
(WS_1 receives two messages via channels a and b and stores them in x and y, loosely conjoins the received messages with its own content, sends the coproduct via channel s, and terminates.)

d. $\text{C-I} \triangleleft P_{\text{C-I}} = ?\text{s}(z).\mathbf{0}$
(C-I receives a message via channel s, stores it in z, and terminates.)

The processes in (35) run in parallel (i.e., are concurrent), which is represented in the session calculus as in (36a). The ultimate information received by C-I is (36b).

(36) a. $\mathcal{M}_{(27)} = P_{\text{WS}_1} \mid P_{\text{WS}_2} \mid P_{\text{WS}_3} \mid P_{\text{C-I}}$
($\mathcal{M}_{(27)}$ is the name of this multiparty session)

b. $z = [\![\text{WS}_1]\!] \oplus [\![\text{WS}_2]\!] \oplus [\![\text{WS}_3]\!] = (32)$

Finally, the session-based modeling of concurrency has a well-established type system—the system of *session types* (Honda et al. 2008, Yoshida & Gheri 2020). Thus, the cross-workspace communication session above can be given the *global type* in (37), which describes the entire session from a bird's-eye perspective.

(37) $\text{WS}_2 \to \text{WS}_1 : \text{a}(\texttt{sem})$.
$\text{WS}_3 \to \text{WS}_1 : \text{b}(\texttt{sem})$.
$\text{WS}_1 \to \text{C-I} : \text{s}(\texttt{sem}).\texttt{end}$

This declares that the session has four steps, including three message-passing steps (`sem` is the type for semantic values) and a termination step (`end` is the type for **0**).

5 Conclusion

In this paper, I presented a cross-framework study of multicategorial multiple right dislocation (MMRD) in Dongying Mandarin Chinese. While single right dislocation (SRD) is common in the world's languages, MMRD is a more peculiar phenomenon. It has three distinctive traits: First, it involves multiple RD-ed units of miscellaneous syntactic categories, including both heads and phrases. Second, its RD-ed units need not all be constituents. Third, it typically involves a very incomplete main clause. These traits sharply distinguish MMRD from RD in familiar European languages.

Since there is no previous study on MMRD, I reviewed previous approaches to simple RD in three theoretical frameworks: Minimalism, Lexical-Functional Grammar (LFG), and Dynamic Syntax (DS). MMRD is a challenge for all of them.

The two main minimalist mechanisms that have been used to derive RD are focus fronting and coordination-plus-ellipsis. However, the former is limited to SRD, while the latter is limited to constituent RD and furthermore resource-demanding. Meanwhile, previous approaches to RD in LFG and DS are all tailor-made for familiar European languages and cannot be easily extended to Chinese MMRD.

Despite these challenges, previous studies provide useful ideas for an adequate analysis of MMRD. I developed a new analysis based on two previous ideas: focus fronting from Minimalism and lite multitree syntax from DS (and LFG to a lesser extent). I integrated these ideas in a minimalist model that utilizes multiworkspace derivation, where each RD-ed unit (optionally excluding the first one) is derived with just enough structure in a separate derivational workspace. The multiple workspaces are loosely conjoined in syntax via Pair Merge, which explains the flexible word order and the disorganized interpretive effect of MMRD. Finally, I further gave the cross-workspace information integration in MMRD a formal protocol using the session calculus, a typed process calculus from computer science that has been used to model concurrent processes and distributed systems. Considering the increasing prominence of workspace-level theorizing in current Minimalism, the application of process calculi to linguistics may be an interesting direction of future research.

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