Reducing Zero Exponence in Distributed Morphology[*]

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Abstract

This paper examines the existence and classification of zero exponence in Distributed Morphology (DM), and which types of zero exponence are essential for this theory. In this paper, propose the following: 1) Zero exponence in DM can be divided into three types: Preferential, Elsewhere, and Dependent; 2) DM cannot exclude Preferential zero exponence because of its competition and underspecification system for determining exponence; 3) DM does not need to assume Elsewhere zero exponence in *No Insertion* analysis; and 4) Dependent zero exponence can be analyzed by Obliteration. Furthermore, I explore the existence of zero exponence in an empirical ground through the analysis of the sentence-medial particle in Japanese.

Keywords: *zero exponence, Vocabulary Item, particle drop, sentence-medial particle, Obliteration*

1. Introduction

Realizational morphological theories[1] including DM overcame some difficulties that resulting from the assumption that a form is always paired with a meaning based on the notion

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[1] See Stump (2001) for advantages of the realizational theory of morphology. "Exponence" is a term that refers to a phonological realization of a morphosyntactic feature in the theories.

of a classical "morpheme". However, there remains some issues with DM because this theory is morpheme-based, and obligatorily assuming zero exponence is one such problems. Other realizational and paradigm-based theories of morphology (Anderson (1992), Stump (2001)) have avoided assuming zero exponence. I refer to them as *Do Nothing* analysis (for zero exponence), where inflected words have the same output as their base form.

In this paper, I suggest a reduction of some types of zero exponence in DM by introducing *Do Nothing* analysis and Obliteration, a morphological operation that has not been sufficiently investigated in the DM literature.

This paper is organized as follows. Section 2 proposes a new and basic classification of zero exponence in DM. Section 3 argues that it is impossible to discard Preferential zero exponence in DM and confirms that not assuming Preferential zero exponence derives incorrect morph combinations. I use English tense and Japanese causative morphs in transitive alternation as examples. Section 4 proposes *No Insertion* analysis for Elsewhere zero exponence, which is identical to *Do Nothing* analyses in other morphological theories. This analysis reduces many instances of zero exponence in DM analyses and is an alternative to Embick's (2010) Pruning analysis, which contains an empirical problem. Section 5 suggests that DM has a problem with Dependent zero exponence and argues that Obliteration analysis is available instead of assuming a Vocabulary Item for zero exponence. I adapt this analysis of superlative morphology in English and postposition drop in Japanese. Section 6 explores the existence of zero exponence from an empirical perspective through a discussion of the sentence-medial particle in Japanese. The sentence-medial particle has the ability to detect the existence of zero elements and verifies use of Obliteration analysis for the postposition drop. Section 7 concludes this paper.

2. Zero Exponence in DM

2.1. Trommer's (2012) classification

Trommer (2012) summarizes how recent morphological theories treat zero exponence and related phenomena in various languages. His classification of zero exponence in DM is as follows.

(1) Varieties of Ø-exponence in DM (Trommer (2012): 330)

	Ø-exponence of	Locus	Status
a. Underspecification of Vocabulary item	single features	at insertion	indirect
b. Non-insertion of a Vocabulary item	entire head	at insertion	indirect
c. Absence of features in the input to morphology	entire head	before insertion	indirect
d. Fusion of Heads	entire head	before insertion	indirect
e. Impoverishment before insertion	single features or entire head	before insertion	direct
f. Ø-Vocabulary Item	entire head	at insertion	direct
g. Deletion of Vocabulary item (Readjustment)	entire head	at insertion	direct

The three classification criteria are: 1) zero exponence might affect an entire head or only part of a head; 2) Ø-exponence might be triggered at VI, before it, or after it; and 3) zero exponence might be direct or conspiratory. Here, "direct" zero exponence is a consequence of an explicit device in the grammar and conspiratory (indirect) zero exponence follows from the interaction of different factors (Trommer (2012): 330). For example, (1e) is direct because Impoverishment deletes a feature itself that is a locus of exponence, while (1d) is indirect because Fusion combines only two adjacent features and it does not always lead to a zero exponence.

Although this classification is detailed and exhaustive, it is not sufficient for the purpose of this paper in its examination of how many and which type of zero exponence can be eliminated in DM. I classify zero exponence into three types to achieve this research aim.

2.2. Three Types of Zero Exponence in DM

The competition and underspecification of Vocabulary Items are the core ideas of DM. This standpoint is essential in classifying zero exponence in DM. I thus propose the following classification.

(2) Zero exponence in DM

a. Elsewhere: zero exponence that is an elsewhere form.

b. Preferential: zero exponence that is preferentially inserted and there is another elsewhere exponent (that has phonetic content).

c. Dependent: zero exponence that appears only under a specific syntactic hierarchy and there is another elsewhere exponent (that has phonetic content).

DM cannot expel Preferential zero exponence due to its mechanism of Vocabulary Insertion. Elsewhere zero exponence has not been examined in detail in the DM literature.   It is not necessary that DM also assumes zero exponence in a Vocabulary Item like other paradigm-based morphological theories. Dependent zero exponence can be analyzed in various ways. I explore the possibility of an analysis by a morphological operation.

3. Preferential Zero Exponence

DM cannot remove Preferential zero exponence due to its mechanisms of Vocabulary Insertion based on the competition and underspecification of Vocabulary Items. DM needs a Vocabulary Item that includes zero exponence when it is a contextual allomorphy of an elsewhere form that is not zero. Let us examine some instances of English past tense exponents.

(3)   Allomorphs of T[past] in English (Embick (2010): 6)
        a. -∅: hit/hit-∅, sing/sang-∅, break/broke-∅, etc.
        b. -t: bend/ben-t, leave/lef-t, buy/bough-t, etc.
        c. -d: elsewhere

To analyze this allomorphs, Embick (2010) suggests the following Vocabulary Items.

(4)   Vocabulary Items for Tense (Embick (2010): 12)
        a. T[past] ↔ -t/__{√LEAVE, √BEND, …}
        b. T[past] ↔ -∅/__{√HIT, √SING, …}
        c. T[past] ↔ -d

Because (4a) and (4b) are more specific than (4c), they are preferentially inserted in Morphology, and (4c), the least specific Vocabulary Item, determines the elsewhere exponence

for the feature [past] in English[2].

If a DM-style analysis does not assume a zero exponence in non-elsewhere Vocabulary Items when there is another elsewhere form that has phonological content, it generates wrong outputs with the elsewhere morph. In the English example above, the wrong forms "sanged" or "broked" as past forms of √SING or √BREAK, are generated without the Vocabulary Item in (4b), which guarantees that the past suffix is not attached to these ablaut Roots.

This pattern, Preferential zero exponence, appears in analyses of various languages. In other words, DM cannot drop many zero exponents. Every Vocabulary Items with zero exponence differs according to feature, context, and language. It can be said that DM still partly possesses the problem of a traditional "morpheme," which was pointed out by Anderson (1992), although DM has overcome some problems of old-fashioned morpheme-based theories of morphology by the introduction of realizationalism. The problem of zero exponence shows that DM is a modern morpheme-based theory of morphology.

Let us examine another example of Preferential zero exponence in Japanese. Zero exponence appearing in transitive suffixes of Japanese fulfills the condition of Preferential zero exponence shown above, according to Miyagawa (1998).

(5) *(S)ase* as an elsewhere exponence of the transitive suffix

	Intransitive	Transitive
a. cool:	sam-e	sam-as
b. bloom:	sak-∅	sak-(s)ase
c. cut:	kir-e	kir-∅

Intransitive-transitive pairs of verbs in Japanese have various combinations of suffixes depending on their verb Roots (Jacobsen (1992)). Miyagawa (1998) analyzes *-(s)ase* as an elsewhere form of a functional category CAUS(E), as in (5b). While this analysis enables a

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[2] Siddiqi (2009) proposes an alternative analysis without zero exponence in contrast to "secondary exponence" analyses such as Embick (2010). Instead, the analysis has to assume many language-specific rules of Fusion and Morphological Merger (Lowering). Therefore, it is not certain that the analysis is clearly superior to the secondary exponence analyses. See Nishiyama (2010) for other problems with Siddiqi (2009).

uniform account for the transitiviser and syntactic causatives[3], a Vocabulary Item of zero exponence must be assumed, as in (6b). It is a part of the complete list of Vocabulary Items because there are other combinations of intransitive and transitive verbs. However, it is certain that the Vocabulary Item with zero exponence is more specific than the Vocabulary Item of elsewhere form, *-(s)ase*.

(6)　Vocabulary Items for CAUS in Japanese

　　　a. CAUS ↔ as/{√SAM, √TOK, √MOR, . . . }＿

　　　b. CAUS ↔ Ø/{√KIR, √TOR, √KUDAK, . . . }＿

　　　c. CAUS ↔ (s)ase

If not assuming the Vocabulary Item for zero exponence, (6b), incorrect transitive forms *kir-ase* 'cut$_{tr}$', *tor-ase* 'take$_{tr}$', and *kudak-ase* 'break$_{tr}$' are generated although these forms are appropriate as syntactic causatives.

4. Elsewhere Zero Exponence

4.1. *No Insertion* Analysis

In this section, I show that Elsewhere zero exponence is not required to be assumed in DM analyses, like some paradigm-based morphological theories. Although some DM literature has referred to this possibility, it has not been thoroughly examined.

The English case of the present tense in (7) is a good and simple example of Elsewhere zero exponence.

(7)　English Present Tense

	Singular	Plural
1 psn	play-Ø	play-Ø
2 psn	play-Ø	play-Ø

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[3] This analysis is also supported by other pieces of evidence, for example, the fact that *-(s)ase* appears as a transitiviser for Sino-Japanese or Foreign verbal nouns (i.e., *bakuhatu-suru* 'explode$_{intr}$' vs. *bakuhatu-saseru* 'explode$_{tr}$') that have no morphological marker of transitivity the same as native Japanese Roots.

3 psn   play-s   play-Ø

Bobaljik (2017) assumes the following Vocabulary Items for the distribution of exponence.

(8)   Vocabulary Items for English Present Tense (Bobaljik (2017))
   a. [3sg, pres] ↔ -s
   b. [pres] ↔ -Ø

First, (8a) is preferentially inserted because it is more specific than (8b) concerning the number of features.   The exponent -*s* is inserted in the third person because this is the only environment that satisfies (8a). (8b) is a Vocabulary Item of elsewhere exponence that covers remaining contexts where tense, person, and number features are not realized with phonological content. Here, a zero exponence is an elsewhere form.

   I propose using the *No Insertion* analysis for Elsewhere zero exponence that does not assume an elsewhere Vocabulary Item for zero exponence. The Vocabulary Items for English present tense (8) are revised as in (9) along with the analysis.

(9)   Vocabulary Item for English present tense under *No Insertion* analysis
   [3sg, pres] ↔ -s

There is one Vocabulary Item that realizes an exponent -*s* into the third person, singular, and present contexts. Then, the adaptation of Vocabulary Insertion stops and nothing happens after that.   It derives the same output as (7). (10) shows the results of Vocabulary Insertion under the *No Insertion* analysis.

(10)   English present tense under the *No Insertion* analysis

	Singular	Plural
1 psn	play	play
2 psn	play	play
3 psn	play-s	play

Halle and Marantz (1993) have already indicated the specialty of the elsewhere type of zero exponence, as stated in (11)[4].

(11) It may be that Universal Grammar provides a zero spell-out as the default phonological realization of a morpheme in the unmarked case. This possibility in no way undermines the existence of zero morphemes.

(Halle and Marantz (1993): 133-134)

The *No Insertion* analysis of Elsewhere zero exponence is one of the realizations of the idea. The unmarked case can be defined as when a Vocabulary Item for a zero exponence is least specific in the competition of Vocabulary Items[5]. DM does not need to designate which Vocabulary Item is elsewhere because the least specific Vocabulary Item automatically behaves as an elsewhere rule in the competition and underspecification system of DM.

The *No Insertion* analysis can eliminate large amounts of Vocabulary Items for zero exponence in every language. On the other hand, the *No Insertion* analysis does not force us to reject every Vocabulary Items for Elsewhere zero exponence. Zero exponence should be inserted when its existence is confirmed by empirical evidence, as discussed in the latter section.

Trommer (2012) points out that DM analyses seem to assume the *Axiom of Obligatory Exponence* that conflicts with the *No Insertion* analysis for Elsewhere zero exponence.

(12) Although it is often implicitly assumed in DM that something like (13) holds:

(13) *Axiom of Obligatory Exponence*: in the output of morphology, every head must be filled by at least one VI

There is very little evidence that this is a necessary assumption with interesting empirical consequences.

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[4] Bobaljik (2017) assumes the Vocabulary Item for zero exponence in (8) for convenience because this is an article of an encyclopedia article that introduces and overviews DM. Bobaljik (2002: 53) uses "=" only for zero exponence instead of "↔", which is a formal symbol for Vocabulary Item. It may reflect the special treatment of Elsewhere zero exponence, but he does not explicitly refer to this problem.

[5] In other words, there is no guarantee that *No Insertion* analysis covers all zero exponents in the unmarked case, although almost all of them cloud be the target of this analysis.

As Trommer (2012) indicates, however, the system and mechanism of DM have no necessity to defend this axiom.

The *No Insertion* analysis corresponds to *Do Nothing* approaches to zero exponence in paradigm-based morphological theories. For example, A-Morphous Morphology (Anderson (1992)) assumes a Word-Formation Rule that outputs the same form as the input (stem), and Identity Function Default has the same roll in Paradigm Functional Morphology[6] (Stump (2001)). The *No Insertion* analysis can avoid the criticism of morpheme-based morphological theories and the classical notion of morpheme espoused by Anderson (1992) regarding Elsewhere zero exponence.

4.2. The Existence of Zero Exponence

As thus far discussed, DM has to hold some type of zero exponence (Preferential zero exponence) while other morphological theories, especially paradigm-based ones, can technically discard the notion of zero exponence itself. It is a theoretical point of controversy and there is room for further research into the existence of zero exponence from the empirical perspective.

Embick (2010) presents a clear and strong argument for the existence of zero exponence, and Trommer (2012) raises doubts about the argument. Embick (2010) proposes the operation referred to as Pruning, which cuts out zero exponence after Vocabulary Insertion based on the lack of intervention effect of zero exponence.

(14) Lack of intervention effect in Latin (Embick (2010): 74)

a. amāvī

am	-ā	-v	-∅	-ī
love	Th	Asp	T	Agr

'I loved'

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[6] See also Trommer (2012: 332-334) for a comparison between treatments of zero exponence in DM with other morphological theories.

b. amāverām

am	-ā	-v	-erā	-m
love	Th	Asp	T	Agr

'I had loved'

An agreement exponent *-ī* is an allomorph that is conditioned by an ASP element, as in (14a). That is, ASP is visible from AGR and the existence of the T exponent *-Ø* is ignored. In contrast, as shown in (14b), a default exponent *-m* is realized when T has phonological content. That means zero exponence does not block interaction between ASP and AGR. A strict adjacent-based analysis that Embick (2010) proposes needs to delete even zero exponence to guarantee interaction between ASP and AGR in (14a). This fact, however, seems to indicate the non-existence of zero exponence rather than the special operation.

Trommer (2012) presents three types of phenomena that can be problematic for the argument on Pruning proposed by Embick (2010). I briefly introduce one of them on English conversion that shows that phonological asymmetry depends on the direction of derivation.

(15)   Stress-shift in verb-to-noun conversion: torme'nt$_v$ → to'rment$_n$ (level I)

(16)   Stress-shift in overt level-I affixation: o'rigin → ori'ginal (level I)

(17)   No stress-shift in noun-to-verb conversion: pa'ttern$_n$ → pa'ttern$_v$ (level II)

(18)   No stress-shift in overt level-II affixation: o'rigin → o'rigin-less (level II)

(Trommer (2012): 345)

What is important here is that stress-shift depends on the level of affix irrespective of the presence or absence of phonological content. These facts can be analyzed assuming zero affixation that has the same phonological status as the other overt affixes.

The existence of some of zero exponence can be proved as shown above, although there is no guarantee that the existence of every instance of zero exponence can be demonstrated based on empirical arguments. When the existence of Elsewhere zero exponence is confirmed, the *No Insertion* analysis is not faced with difficulty because the analysis is not obligatory and there is a choice to posit an elsewhere Vocabulary Item that inserts zero exponence. The present

discussion sheds light on the possibility that even elsewhere or default zero exponence in unmarked cases can be divided into two types, that is, substantial and non-existent.

Furthermore, the *No Insertion* analysis can account for the invisibility of the tense zero exponence in Latin verbal inflection without Pruning. Let us examine the relevant inflection in (19).

(19) Perfect indicative (present perfect) forms of *amō* 'love' in Latin

amā-v-∅-ī

amā-v-∅-istī

amā-vi-∅-t

amā-vi-∅-mus

amā-v-∅-istis

amā-v-∅-ērunt

(Embick (2010): 71, modified)

The exponence of tense is always zero in the perfect indicative context, as Embick (2010: 74) also states. Assuming the perfect indicative is a combination of a [perf(ect)] feature on an ASP head and a [pres(ent)] feature on a T head by Embick (2010), The *No Insertion* analysis does not need to assume any Vocabulary Item for the zero exponence. Because there is no Vocabulary Item on [pres], exponence is not realized in every number and person contexts.

A crucial difference between Embick (2010) and the present analysis is whether a zero exponence is inserted or not. There is no zero exponence between ASP and AGR and they can interact with each other without any further assumption under the *No Insertion* analysis.

5. Dependent Zero Exponence

5.1. Functional Heads and Zero Exponence

In this section, I argue problems of Dependent zero exponence, the third type, appear under a specific syntactic configuration, that is, when being c-commanded by a specific head. The *No Insertion* analysis cannot be adapted to this type because there is an elsewhere exponence with phonological content.

An analysis of English comparative and superlative morphosyntax in Bobaljik (2012) raises the problem concerning Dependent zero exponence. Bobaljik (2012) assumes a functional category CMPR for comparative and SPRL, superlative respectively.

(20) Syntax and morphology of English superlative
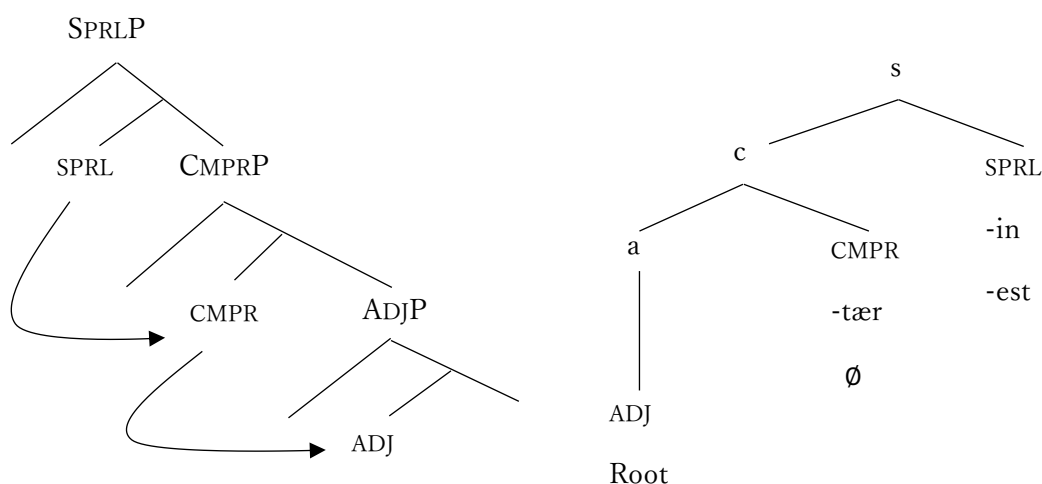
(Bobaljik (2012): 82, Persian and English exponents added)

Whether a comparative exponence appears or not is a language specific problem because there are languages like Persian, where superlative morphology contains comparative morphology in contrast with English, where the comparative suffix *-er* does not appear in a superlative context. Bobaljik (2012) proposes the Vocabulary Item (21) to avoid overgenerating a combination of comparative and superlative exponents, *-er-est* in the superlative context in English.

(21) CMPR → ∅/__] SPRL]

(Bobaljik (2012): 34, (42))

This treatment is due to the assumption that a superlative head is independent from a comparative head. While the assumption is one of the core ideas of Bobaljik (2012) and enables a fine-grained typological study of comparative and superlative morphology, the problem of

zero exponence arises[7].

This is a typical example of Dependent zero exponence and a problem that may often occur in many DM analyses that are based on generative syntactic studies with rich functional categories, such as Cartography (Rizzi (1997)). A number of (functional) heads brings the potential loci of Vocabulary Insertion. Although it is not the case that DM studies should be consistent with Cartographic analyses, DM studies tend to assume many heads in syntax because of its anti-lexicalist nature. Namely, each formal feature becomes one head in the syntax of DM that bans any pre-syntactic formation, such as feature-bundling.

5.2. Post-syntactic Deletion Operation

I propose a deletion analysis by Obliteration (Arregi and Nevins (2012)) for Dependent zero exponence instead of an additional Vocabulary Item. The analysis of Bobaljik (2012) treats the zero exponence in the English superlative as Preferential zero exponence[8] because an elsewhere exponent of CMPR is *more*[9].

Arregi and Nevins (2012) demonstrate the necessity of Obliteration, a post-syntactic morphological operation that deletes a node before Vocabulary Insertion in addition to Impoverishment, which deletes a feature. Although Impoverishment has often been used and discussed in the DM literature, Obliteration has not been focused on. One of a few studies, Arregi and Nevins (2012) adopt an Obliteration analysis to participant dissimilation phenomena in Basque languages. A first plural dative clitic must be deleted in the context of second person ergative in Zamudio, a dialect of the Basque languages. A dative clitic *ku* (the second bold part) that agrees with a dative argument must not occur in (22).

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[7] For example, another DM analysis by Embick (2007) can ignore the zero exponence problem because the analysis uses a functional category, DEG, for both the comparative and superlative.

[8] Bobaljik (2012) suggests an alternative analysis, in which CMPR and SPRL heads become portmanteaus in languages like English (Bobaljik (2012): 56-60). However, in order to make CMPR and SPRL heads placeholders for one Vocabulary Item, Fusion must be applied to them in addition to the proposed structure.

[9] Bobaljik (2012) does not show a complete set of Vocabulary Items of comparative morphology of English. Instead, see Vocabulary Items for Modern Greek (Bobaljik (2012): 69)

(22) Zamudio: Obliteration of 1Pl dative in the context of 2nd ergative

Sue-k   **gu-ri**   lagun-du   *s-endu-e-n*

you(Pl)-Erg **us-Dat** accompany-Prf   Cl.E.2-Pst.3.Sg-Cl.E.Pl-Cpst

/ **d-o-**ku**-su-e-n* (>doskusuen)

/ L-Pst.3.Sg-**Cl.D.1.Pl**- Cl.E.2- Cl.E.Pl-Cpst

'You(Pl) accompanied us.'

(Arregi and Nevins (2012): 218)

An Obliteration rule of Zamudio is as follows:

(23) Zamudio: 1 Pl Obliteration

a. Structural description: an auxiliary M-word with two clitics Cl_1 and Cl_2 such that Cl_1 is [+motion, +participant, +author] and Cl_2 is [+participant].

b. Structural change: delete CL_1.

(Arregi and Nevins (2012): 217)

Arregi and Nevins (2012) argues convincingly that both Obliteration and Impoverishment are necessary to analyze participant dissimilation phenomena and related allomorphy in the Basque languages[10].

It is notable that an Obliteration analysis needs not to assume a Vocabulary Item of zero exponence because this operation completely deletes a node, a locus of Vocabulary Insertion[11]. Therefore, the Obliteration analysis reduces zero exponence in DM in addition to the *No Insertion* analysis for Elsewhere zero exponence.

An Obliteration rule in (24) derives an appropriate exponence of English superlative instead of the Vocabulary Item (21).

(24) Obliteration of CMPR in English in the context of superlative

[[ADJ] CMPR] → [ADJ/__] SPRL]

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[10] See chapter 4 of Arregi and Nevins (2012) in detail.
[11] Trommer (2012) points it out as a feature of Impoverishment. Although it is correct when a node has a single feature, Impoverishment widely used to analyze not only deletion phenomena but also other kinds of allomorphy in DM studies.

The Obliteration analysis can be a better alternative for Dependent zero exponence because this kind of zero exponence is disappearance triggered under a specific context rather than contextual allomorphy.

The introduction of Obliteration systematizes post-syntactic morphological operations of addition and deletion in DM. This is the second theoretical advantage of the Obliteration analysis in addition to the reduction of zero exponence. Obliteration corresponds to Dissociated Nodes, an additional operation of a node, as shown in (25).

(25) Cross-classification of morphological operations of addition and deletion

	Feature	Node
Addition	Dissociated Features	Dissociated Nodes
Deletion	Impoverishment	Obliteration

At the end of this section, I introduce an Obliteration analysis for postposition drop in Japanese as preparation for an empirical exploration of the existence of zero exponence in the next section.

5.3. Postposition Drop in Japanese

Modern Japanese permits postposition drop of *ni* of Goal argument that is similar to nominative and accusative case marker drop that has been explored in studies of Japanese syntax (see Aoyagi (2006) and references cited there).

(26) Sono-hon-wa   hikidasi-no-naka-ni/-Ø   ire-ta-yo.

That-book-Top   drawer-Gen-inside-to/-Ø   put-in-Pst-Prt

'I put the book in a drawer.'

It is ambiguous whether the Japanese particle *ni* is a case marker or a postposition. According to Sadakane and Koizumi (1995), a *ni* that is attached to a nonaffected goal argument of a transitive verb like *hikidasi-no-naka* in (26) is a postposition[12].

An argument that the postposition *ni* needs to be adjacent to a verb when the postposition

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[12] See Ishida (1997) for other examples.

drops is the same as the case marker drop shown in (27). A goal argument without the particle *ni* cannot be separated from a verb by scrambling, which is the same as a theme argument without an accusative case marker *o*.

(27) a. John-ga   nani-o/∅   tabe-ta   ka   osie-ro

John-Nom   what-Acc/∅   eat-Pst   Q   tell-Imp

'Tell me what John ate.'

b. nani-o/*∅   John-ga   tabe-ta   ka   osie-ro

what-Acc /∅   John-Nom   eat-Pst   Q   tell-Imp

'Tell me what John ate.'

(Aoyagi (2006): 487, modified for simplicity)

c. John-ga   hon-o   doko-ni/∅   ire-ta   ka   osie-ro

John-Nom   book-Acc   where-to/∅   put-in-Pst   Q   tell-Imp

'Tell me where John put the book.'

d. doko-ni/*∅   John-ga   hon-o   ire-ta   ka   osie-ro

where-to/∅   John-Nom   book-Acc   put-in-Pst   Q   tell-Imp

'Tell me where John put the book.'

    While licensing by an abstract Case (Kuroda (1988)) or incorporation (Aoyagi (2006)) can be used to analyze case marker drop, it is necessary to delete P in a postposition drop because the P exists in syntax, which is attested by the well-known numeral quantifier test (Miyagawa (1989), Sadakane and Koizumi (1995)).

(28) a. John-ga   hikidasi-o   3-tu   ake-ta

John-Nom   drawer-Acc   3-Cl   open-Pst

'John opened three drawers.'

b.*John-ga   hon-o   hikidasi-ni   3-tu   ire-ta

John-Nom   book-Acc   drawer-to   3-Cl   put-in-Pst

'John put the books in three drawers.'

The P blocks an association between a goal argument and numeral, even though they are linearly adjacent, as in (28b), while the case marker drop does not, as in (28a).

I thus propose the following Obliteration rule for the deletion of P, which is adopted only when a nonaffected goal argument is syntactically close to a verb. Because Obliteration is applied post-syntactically, the syntactic function of P is preserved.

(29) Obliteration of postposition in Japanese[13]

[NP$_{\text{nonaffected goal}}$ P] $\rightarrow$ [NP]/__] V]

If the operation is not adapted, a feature [+dative] is inserted to P in Morphology depends on syntactic information and the exponent *ni* realizes according to a Vocabulary Item in (30)[14].

(30) [+dative] $\leftrightarrow$ ni

This Vocabulary Item guarantees the identity of exponence of case marker *ni* and postposition *ni* under the assumption that a feature [+dative] is inserted to both NP (or D) and P.

6. Particle and Zero Elements

This section discusses how to explore the existence of zero exponence empirically based on the sentence-medial particle in Japanese, which is blocked from some zero elements like deletion.

6.1. The Sentence-medial Particle *ne* in Japanese

Japanese has some sentence-medial particles (henceforth, SMP), as shown in (31)[15]. It seems to not affect sentence meaning, while some studies indicate its pragmatic or interactional

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[13] This morphological structure in the context of the rule is constructed via P incorporation to the verb like D incorporation, as proposed by Aoyagi (2006).
[14] This is a DM version of Marantz's (1991) dependent case analysis. See also McFadden (2004) and Aoyagi (2006) for further theoretical and empirical discussion.
[15] I use particle *ne* and the gloss Ne. Other sentence-medial particles *sa* and *yo* are incompatible with the purpose of this paper because both particles have strong stylistic biases that often interfere with grammatical judgments. All examples with the SMP *ne* in this paper have a sentence-final particles because also the SMP ne has a mild stylistic bias.

functions like sentence-final particles[16].

(31) asita-wa   ame-ga(-ne)   fur-u-yo

      Tomorrow-Top   rain-Nom-Ne   fall-Prs-Prt

      'It will rain tomorrow.'

SMPs are called "interjection particles" in the traditional Japanese linguistics because it is unclear what semantic or pragmatic functions they have, and they attach to any element as described below. It may be one of the reasons why SMPs have received little attention in generative syntax studies, although there are some studies on this kind of particle in the field of discourse or conversation analysis.

This subsection describes the basic properties of the SMP *ne* and examines whether the attachment of the SMP is phonologically conditioned.

First, the SMP *ne* attaches to any category: NP, PP, adverbs, other particles, and clauses. The type of particle, adverb, or clause does not matter, as shown in (32). The gloss for the SMP is omitted for simplicity.

(32) Kinoo(-ne) Tokyo-ni(-ne) yuki-ga(-ne)   fur-te(-ne),   totemo(-ne)   samukat-ta-yo.

      Yesterday   Tokyo-to   snow-Nom   fall-and   very   cold-Pst-Prt

      'Because it snowed in Tokyo yesterday, it was very cold.'

This "category-free" feature has been pointed out for focus particles in Japanese (Aoyagi (1998)). However, the SMP *ne* cannot intervene between a verb predicate and tense unlike in the case of the focus particles. While a focus particle *mo* can separate a verb stem from a tense exponent with do-support in (33a), the SMP *ne* cannot, as shown in (33b).

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[16] See Morita (2005) for more on their functions and the relation between sentence-medial and sentence-final particles

(33) a. sensei-wa   seito-o   sikari-mo   si-ta

     Teacher-Top   student-Acc   scold-Foc   do-Pst

     'The teacher also scolded the student.'

  b.*sensei-wa   seito-o   sikari-ne   si-ta-yo

     Teacher-Top   student-Acc   scold-Ne   do-Pst-Prt

     'The teacher scolded the student.'

  cf. sensei-wa   seito-o   sikari-mo-ne   si-ta-yo

     Teacher-Top   student-Acc   scold-Foc-Ne   do-Pst-Prt

     'The teacher also scolded the student.'

 These features indicate that the occurrence of the SMPs is conditioned phonologically. I propose that they attach to an outermost minor phrase (Poser 1984).

(34) Phonological condition of sentence-medial articles in Japanese

     SMPs attach to a specific prosodic category: maximal minor phrase.

The fact in (35) that the SMPs cannot be inserted in a clitic cluster that consists of other particles supports the condition.

(35) Okinawa(*-ne)-dake(*-ne)-kara(*-ne)-wa(-ne)   tomodati-ga   ki-ta

     Okinawa-only-from-Top   friends-Nom   come-Pst

     'My friends only came from Okinawa.'

 It is impossible to generalize that the SMPs always need some particles because the SMP follows from adverbs without any particle and a zero topic NP permits the direct attachment of the SMP in (36).

(36) kono-naihu-ne   yoku   kire-ru-yo

     This-knife-Ne   well   cut -Prs-Prt

     'This knife cuts well.'

6.2. Some Zero Elements Block the Attachment of the SMP

There are four cases where the SMP cannot occur, although they satisfy the phonological condition of (34). The only commonality is that the SMPs are attached to some omitted elements in every environment.

6.2.1. Complementizer Drop

Standard Japanese allows dropping the complementizer *ni* from a purpose clause (Ishida (1997))[17]. When the complementizer drops, the SMP *ne* cannot be attached to the clause as shown in (37).

(37) Complementizer drop blocks the SMP

   a. John-ga   hirugohan-o   tabe(-ni)   it-ta

      John-Nom   lunch-Acc   eat(-Comp)-Ne   go-Pst

      'John went to lunch.'

   b. John-ga   hirugohan-o   tabe*(-ni)-ne   it-ta-yo

      John-Nom   lunch-Acc   eat(-Comp)-Ne   go-Pst-Prt

      'John went to lunch.'

It is unlikely that the phonological condition in (34) accounts for the ungrammaticality, because the SMP *ne* does not occur inside the maximal minor phrase when the complementizer drops and the verb stem can be independent without the SMP.

6.2.2. Coordination Marker Drop

Standard Japanese also permits the dropping of the coordination marker *te*. This drop rejects the attachment of the SMP *ne* in the same way as in the previous environment, as the contrast in (38) indicates.

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[17] As Kishimoto (2006) states, Standard Japanese does not permit the dropping of the complementizer *tte*, which is acceptable in a western Japanese dialect.

(38) Coordination marker drop blocks the SMP

    a. John-ga   piza-o   tabe(-te),   biiru-o   nom-da

    John-Nom   pizza-Acc   eat(-and)   beer-Acc   drink-Pst

    'John ate a piece of pizza and drank a glass of beer. '

    b. John-ga   piza-o   tabe*(-te)-ne,   biiru-o   nom-da-yo

    John-Nom   pizza-Acc   eat(-and)-Ne   beer-Acc   drink-Pst-Prt

    'John ate a piece of pizza and drank a glass of beer. '

This phenomenon cannot only be analyzed only phonologically due to the same reason as the complementizer drop discussed above. A verb stem without the coordination marker *te* can construct a maximal minor phrase by itself, and it should allow the attachment of the SMP *ne*. This prediction, however, is not born out.

The stylistic feature of the coordination drop does not account for the ungrammaticality in (38). Although it is sure that the coordination drop prefers the formal style and the SMP *ne* does not, the SMP *ne* attaches to other elements in the coordination drop context.

(39) John-ga-ne   piza-o   tabe(-te),   biiru-o   nom-da-yo

    John-Nom-Ne   pizza-Acc   eat(-and)   beer-Acc   drink-Pst-Prt

    'John ate a piece of pizza and drank a glass of beer. '

6.2.3. Verb Raising in Coordination

The third environment that disallows the attachment of the SMP *ne* is coordination with verb predicate raising, which is discussed in Koizumi (2000) (cf. Fukui and Sakai (2003), Vermeulen (2008), Hayashi and Fujii (2015)).

(40) Verb raising in coordination blocks the SMP

    a. ringo-o   3-tu,   nasi-o   2-tu   kat-ta

    apple-Acc   3-Cl   pear-Acc   2-Cl   buy-Pst

    'I bought three apples and two pears.'

b. ringo-o   3-tu*-ne,   nasi-o   2-tu   kat-ta-yo

apple-Acc   3-Cl-Ne   pear-Acc   2-Cl   buy-Pst-Prt

'I bought three apples and two pears.'

The phonological condition (34) does not reject the attachment of the SMP *ne* in the context (40) because the combination of NP and a numeral phrase allows the SMP *ne* attachment in another environment, as shown in (41).

(41)   ringo-o   3-tu-ne,   morat-ta-yo

apple-Acc   3-Cl-Ne   get-Pst-Prt

'I got three apples.'

The zero element in this environment is a copy of a verb that is raised and not pronounced in verb raising analysis. Other analyses also need some zero elements that block the attachment of the SMP *ne* to account for the contrast between (40b) and (41).

6.2.4. Right Node Raising

Another deletion in coordination also blocks the attachment of the SMP *ne*. I consider this deletion phenomenon to be Right Node Rising (henceforth, RNR) in Japanese based on descriptions by Tagawa (2019), however, the type of deletion is irrelevant here[18].

The SMP *ne* seems to attach to a deleted part in the typical case of RNR, as shown in (42a). There is, however, the possibility that the SMP *ne* attaches to a source argument directly, which is illustrated in (42b).

(42)   a. John-wa   ringo-o   ~~kat-te~~-ne,   Mary-wa   nasi-o-ne   kat-ta-yo

John-Top   apple-Acc   buy-and-Ne   Mary-Top   peer-Acc-Ne   buy-Pst-Prt

'John bought an apple and Mary bought a peer.'

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[18]   See Sato and Maeda (2019) for a recent study

b. John-wa   ringo-o-ne   ~~kat-te~~,   Mary-wa   nasi-o-ne   kat-ta-yo

John-Top   apple-Acc-Ne   buy-and   Mary-Top   peer-Acc-Ne   buy-Pst-Prt

'John bought an apple and Mary bought a peer.'

The following case where a source particle is deleted by RNR as shown in (43b) can exclude the above possibility because this particle is impossible to drop, unlike a part of case markers without RNR as (43a) shows.

(43)   a. John-ga   sensei*(-kara)   hon-o   morat-ta

John-Nom   teacher-from   book-Acc   get-Pst

'John got a book from a teacher.'

b. John-wa   sensei-~~kara~~   ~~hon-o~~   ~~morat-te~~,   Mary-wa   hahaoya-kara

John-Top   teacher-from   book-Acc   get-and   Mary-Top   mother-from

hon-o   morat-ta

book-Acc   get-Pst

'John got a book from a teacher and Mary got a book from her mother.'

It is clear that a deleted part including the source particle by RNR rejects the attachment of the SMP *ne*.

(44)   RNR blocks the SMP

a. John-wa   sensee-kara   hon-o   morat-te-ne,   Mary-wa   hahaoya-kara

John-Top   teacher-from   book-Acc   get-and-Ne   Mary-Top   mother-from

hon-o   morat-ta

book-Acc   get-Pst

'John got a book from a teacher and Mary got a book from her mother.'

b.*John-wa   sensee-~~kara~~   ~~hon-o~~   ~~morat-te~~-ne,   Mary-wa   hahaoya-kara

John-Top   teacher-from   book-Acc   get-and-Ne   Mary-Top   mother-from

hon-o   morat-ta-yo

book-Acc   get-Pst-Prt

'John got a book from a teacher and Mary got a book from her mother.'

The phonological condition (34) is not enough to analyze these facts. If the SMP *ne* is sensitive only to the phonological information, the particle cannot know whether there is the deleted source particle or not.

I thus propose a morphosyntactic condition (45) in addition to the phonological one for a more accurate explanation for the SMP.

(45) *Zero Attachment Condition*
      Particles must not be attached to zero elements.

Therefore, the attachment of the SMP is able to detect the existence of the deleted element if the following conditions are met: 1) the SMP is attached to an accurate prosodic phrase, generalized in (34), and 2) there is no possibility that the SMP skips the deleted element and directly attaches to an element with phonetic content, as discussed in the argument on RNR above.

6.3. Case Marker and Postposition Drop

On the contrary to the four cases argued above where different kinds of zero elements appear, the case marker drop allows the attachment of the SMP *ne*. (46) shows that the SMP *ne* attaches to a theme argument even when a case marker is absent.

(46) John-ga   ringo(-o)-ne   tabe-ta-yo
      John-Nom   apple(-Acc)-Ne   eat-Pst-Prt
      'John ate an apple.'

The contrast between the case marker drop and the four cases indicates that there is no zero element when the case marker is omitted if the descriptions and generalizations proposed above are on the right track. It provides support for non-deletion analyses of case marker drop, like Kuroda (1988) or Aoyagi (2006).

Let us go back to the discussion on the existence of zero exponence and the postposition drop. In addition, the postposition drop allows the attachment of the SMP *ne*, which is the same as the case marker drop.

(47) Sono-hon-wa   hikidasi-no-naka(-ni)-ne   ire-ta-yo
      That-book-Top   drawer-Gen-inside-to-Ne   put-in-Pst-Prt
      'I put the book in a drawer.'

The Obliteration analysis that is proposed in section 5 is compatible with this behavior of the postposition drop under the morphosyntactic condition (45) of the attachment of the SMP. There is no zero element between the goal argument and the SMP *ne* in (47) because Obliteration completely deletes a P in Morphology and leaves no trace. The present analysis needs a further modification that the morphosyntactic condition (45) is checked in the post-syntactic morphological component and it is a natural assumption because exponence is realized, that is, whether zero or not is determined in Morphology via Vocabulary Insertion in DM.

The case marker drop and the postposition drop cases demonstrate that the attachment of the SMP *ne* is not limited by any phenomena, where something disappears but discerns whether zero elements exist or not in a particular context if the two conditions that are summarized in the previous subsection are satisfied.

In this section, I demonstrated that the SMP cannot be attached to a deleted element directly based on descriptions of four phenomena including different types of zero elements. The SMP attachment test is useful for a check of whether a zero element exists and shows that the case marker or postposition drop phenomena cannot be accounted for by deletion analysis.

7. Conclusion

This paper examines the types of zero exponence that occur in DM analyses and their properties. Zero exponence in DM can be divided into three types: Preferential, Elsewhere, and Dependent. The Preferential zero exponence cannot be excluded from DM while the Elsewhere zero exponence is not essential to the theory. Dependent zero exponence can also be reduced

by adopting Obliteration analysis.

These discussions indicate that DM is a morpheme-based morphological theory although the theory avoids some traditional problems. Furthermore, DM needs some special treatment for a specific zero exponence, that is, Dependent one that has a strong link with the problems of functional categories. It originates in the syntax-oriented nature of DM, which is also a strong point of this theory.

The existence of zero exponence has tended to been discussed as a theoretical issue in morphological studies in contrast with much attention focused on the existence of zero elements in studies of syntax. The empirical exploration of zero exponence is an essential and fascinating issue for not only DM but also other morphological theories, although it might be challenging to find a piece of evidence for every instance of (the lack of) zero exponence.

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