

# *Worth* Is Worth Investigating: A Corpus-based Analysis of *Worth* Constructions\*

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## 0. Introduction

The adjective *worth* in present-day English exhibits peculiar syntactic properties, compared with many other adjectives. For example, it can take a nominal object as its complement without recourse to any preposition; it can take as its complement the gerundive complement; and the matrix subject of *worth* constructions corresponds to an empty object of the gerundive complement clause. The last one is similar to that of *tough* constructions. Despite of these peculiar syntactic properties, little attention has been paid to this construction in the literature.

The aim of this paper is twofold: First, we claim that the adjective *worth* has an AP shell structure, which is similar to that of Chomsky's (1995, 1998) VP shell structure. Second, it will be shown that given the AP structure and PF deletion of an object of gerundive complements, the properties of *worth* constructions are straightforwardly explained. The arguments presented in this paper are based mainly on data collected from the COBUILD *Direct* corpus.

This paper is organized as follows. Section 1 provides some theoretical assumptions and makes some comments on the data investigated in this

paper. In section 2, we examine syntactic properties of *worth* and propose an AP shell structure. Section 3 considers how the *worth* construction is derived within a version of the minimalist framework. In sections 4 and 5, we are concerned with gerundive complements to *worth*. Specifically, we claim that the null object of gerunds is not null operator, PRO or *pro*, but it is an overt lexical element to be deleted at PF. Section 6 is a conclusion of this paper.

## 1. Theoretical Assumptions and Data

This section provides some theoretical assumptions adopted in this paper. To begin with, we basically adopt the feature-checking theory advocated by Chomsky (1993, 1995), but sometimes refer to a newer version (cf. Chomsky (1998)). Chomsky (1995) proposes that while categories move in overt syntax, only features move in covert syntax.<sup>1</sup> In English, for example, the EPP feature of T is checked by overt movement of a category with the [+D] feature. By contrast, the Case feature of DPs is checked in covert syntax after the feature, not a whole category, raises to an appropriate functional head.

Secondly, we assume that among clausal complements, gerunds are nominal and must be Case-checked while *that* clauses and *to* infinitives do not have to be Case-checked. This assumption is partly verified by the following contrasts:<sup>2</sup>

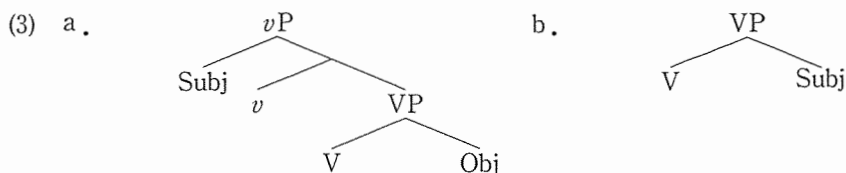
- (1) a. It was John's singing the school song that I opposed.  
       b. \*It was that John sang the school song that we believed.  
       c. \*It was to sing the school song that they wanted.
- (2) a. Did John's singing the school song annoy you ?  
       b. \*Was that John sang the school song appropriate ?

c. \*Would to sing the school song be an affront to anyone ?

(Petrovitz (1997: 241))

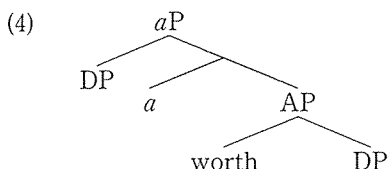
As illustrated in (1), gerunds can be used in cleft sentences while *to*-infinitives and *that* clauses cannot. A similar contrast is observed in subject-auxiliary inversion, as in (2).

Thirdly, this paper assumes that Case-checking must take place within functional projections (to be more precise, the [+F (unctional)] categories if Fukui's (1995: 338) terms are adopted).<sup>3</sup> Given this assumption, transitive verbs have the Split VP structure in (3a), while unaccusative verbs have the non-Split VP structure in (3b). This is just because unaccusatives have no Case checking ability.



Chomsky (1995: 352) also assumes that the small *v* is relevant to the accusative Case checking. The accusative Case feature is checked after Obj overtly raises to the specifier of *v*P, or after the feature is adjoined to the small *v* in covert syntax. The VP structure of unaccusatives lacks the *v*-shell because they cannot take accusative objects (cf. Burzio's generalization).

In parallel, it might be expected that the structure of adjectives contains a light adjective to check Case feature, if the adjectives can take nominal complements. *Worth* is a typical instance of such adjectives, and introduces the AP-shell structure as in (4).



Finally, I distinguish subcategorized DPs, i.e. arguments, from non-subcategorized DPs, e.g. bare NP adverbs. The former is licensed by having the Case feature checked, while the latter is licensed by another condition.<sup>4</sup> This is not only because the Case Filter must be satisfied but also because some lexical property of predicates must be satisfied.

The following discussions are built mainly on the data collected from COBUILD *Direct*, which is one of the largest computer-readable corpora. This corpus includes 56 million English words from both written and spoken materials. We deal with only written ones, in order to eliminate non-syntactic factors, such as intonation and pauses. The database of written English is composed of magazines, newspapers and books published in the United Kingdom, the United States and Australia.<sup>5</sup>

## 2. Worth as a Transitive Adjective

### 2.1. Adjectival Properties of *Worth*

*Worth* is one of the most difficult words to see what category it should be classified into. If we follow Ross's (1972) criteria of a squish between adjective and preposition, *worth* would be adjectival. First of all, nominalization is used to characterize adjectives. Given Ross's criterion, *like* and *near*, which can be nominalized as in (5), are classified as adjectives, though they do not require prepositions, as in (6).

- (5) a. The likeness of Sarah to a bumblebee is evident.
- b. The nearness of our Fiat to his added to the confusion.
- (6) a. Sarah is like \*to/ ??unto a bumblebee.

- b. The shed is near (to) the barn. (Ross (1972: 317))

He also picks up ‘pied-piping’, and states that the more adjectival a word is, the more easily it can [be] pied pipe (Ross (1972: 318)). As shown in (7), the ‘pure’ adjective *proud* is pied pipe, while pied-piping to the ‘pure’ preposition *in* is less acceptable.<sup>6</sup>

- (7) a. How proud of you is Mr. Greenjeans ?  
 b. How near to the toothpaste are the termites ?  
 c. ??How nearly in the house was the yacht ? (Ross (1972: 318))

*Worth* exhibits the same properties as *near* with respect to both criteria, as illustrated in (8) and (9). In (8), *worth* is a zero-derived nominal, and in (9), *how* pied-pipes *worth(while)*.<sup>7</sup>

- (8) a. the new arrivals will be determined to show their worth, to  
 prove themselves. <id=N0000000462>  
 b. So that I have not a penny, not a penny worth, to help me to  
 either spice or sugar or strong waters. . . <id=B9000001417>  
 (9) a. Now I have a child of my own I realise how worthwhile helping  
 these two children is <id=N6000920414>  
 b. . . . to look back over it and assess and evaluate how worth-  
 while and fulfilling it has been <id=B0000001190>

In addition, *worth* has a comparative form, as in (10). This fact argues for the claim that *worth* is “more” adjectival, since a “more” prepositional element does not have declensions.

- (10) a. another gave me half a pint of peas which was more worth  
 than many bushels at another time <id=B9000001417>  
 b. All my unhappiness drifts away and my life is once more worth  
 something. <id=N6000941019>

Therefore, it could be concluded that *worth* is classified as an adjective. The following subsection examines the Case checking ability of the adjective *worth*.

## 2.2. The Case Checking Ability

Examples in which *worth* takes nominal complements are found in COBUILD *Direct*. In many of them, *worth* represents the value of a specified amount or sum. Here are some examples.

- (11) a. Your example to the regiment has been worth everything to the boys. <id=B0000000551>  
 b. Murphy's property is worth dollar; 111,341. <id=B9000000515>  
 c. Not all leather suitcases are worth money.<id=N2000960316>  
 d. the business will be worth hundreds of thousands at least <id=N0000000668>

As we can see from (11), the *worth* constructions involve two DPs: a subject and 'object.' The subject is assigned Case by T. How about the object? It will be natural to assume that the objects in (11) are arguments of *worth*, given that *worth* means to have a stated value. To put it differently, the objects of (11) are subcategorized in the lexical entry of *worth*. As stated in section 1, subcategorized DPs must be assigned Case for licensing. Then it might be that the objects in (11), which are arguments of *worth*, are assigned Case by *worth*. This proposal is reinforced by the historical and cross-linguistic facts.

In earlier English, for example, *worth* could take nominal complements with inherent Case. This is exemplified in (12).

- (12) a. Oxan horn bið x. pæninga weorð  
 ox's horn is ten coins.Gen worth  
 'Ox's horn is worth ten coins.' (LawIne Iviii/OED)  
 b. he nyste hwa heo hæfde oððe hwæs heo wurð wæs  
 he not-wist who it had or what.Gen it worth was  
 'he wist not who had it, or what it was worth'

(ChronE 220. 20 (1086)/*Anglo-Saxon Dictionary*)

The Old English examples in (12) have the genitive DPs as complements. The German counterpart of English *worth* also has DP complements.

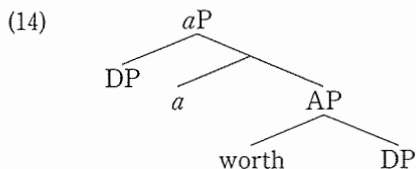
- (13) a. Das alte Fahrrad ist noch 50 Mark wert.  
           This old car is still 50 mark. Dat worth  
           ‘This old car is worth 50 mark.’  
       b. Wieviel ist das Grundstück wert?  
           how-much is this ground worth  
           ‘How much is this ground worth?’

*Worth* in present-day English and its counterparts of Old English and German are similar in that they all can take nominal complements, but they are different in that only *worth* in present-day English assigns structural Case to its complement. This is just because inherent Case has been obsolete in the history of English.

To sum up, *worth* of present-day English is a two-place transitive adjective. It still retains the ability to check the Case feature of its complements. The next section examines how *worth* constructions are derived under the assumptions of the minimalist program presented in section 1, and shows the viability of an AP shell structure.

### 3. AP Shell Structure and the Derivation of *Worth*

As discussed in the previous section, the adjective *worth* takes two arguments and Case-check its nominal complement. This section more concretely shows how the derivation proceeds. To begin with, let us repeat the AP-shell structure presented in section 1.



In structure (14), the small *a* is the functional head to check the Case feature of the complement to *worth*. This is similar to the small *v* in the VP shell structure proposed in Chomsky (1995, 1998). We then consider how this structure is built up, by taking (15=(11b)) as an example for expository purpose.

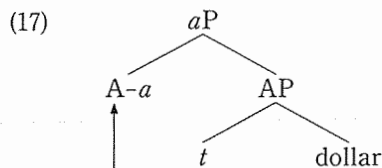
- (15) Murphy's property is worth dollar; 111,341

The adjective *worth* first merges with a nominal DP, and projects AP. This operation is driven for the  $\theta$ -role requirement, and is called pure Merge in Chomsky (1998), distinguished from Merge that is part of Move.

- (16) Pure merge in theta position is required of (and restricted to) arguments. (Chomsky (1998: 16))

The definition in (16) forbids a non-argument to be merged in theta position. On the other hand, no feature checking takes place at this point, unless theta roles are formal features. This is because pure Merge with a predicate, such as verb or adjective, takes place to satisfy the  $\theta$ -role requirement.

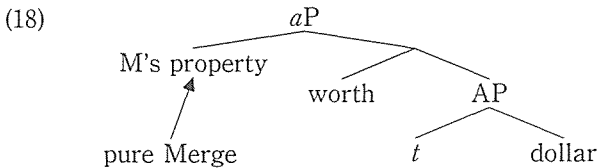
At the next step, AP and the small *a* merge for the reason of the selectional property of *a*, and the small adjective projects *aP*. The small adjective has the [+A (djective)] feature to attract the lower A, just as the light verb does. This movement of A overtly takes place. This is illustrated in (17).





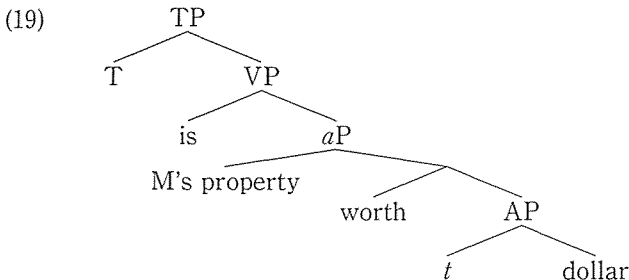
As proposed above, the complex A-*a* can check the structural Case of the complement to A, in particular, the complement to *worth*. In (present-day) English, the Case feature is generally assumed to be checked in covert syntax. Given that the parameter setting regarding some feature checking is uniform within a language, the Case feature with *worth* also should take place covertly.<sup>8</sup>

As the derivation proceeds, the other argument merges with *aP* by means of pure Merge. This operation is driven to satisfy the  $\theta$ -role requirement, and no feature checking takes place. Now we have the structure in (18).



In (18), *Murphy's property* and *worth* are in a Spec-Head relation, a checking configuration, but neither the categorial nor Case feature is checked at this step. If it took place, feature mismatch would cancel the derivation. Within *aP*, the  $\theta$ -grid of *worth* is satisfied.

At subsequent steps, *is* merges with *aP* and projects VP; T merges with VP headed by *is*, and TP is projected. This structure is given in (19).

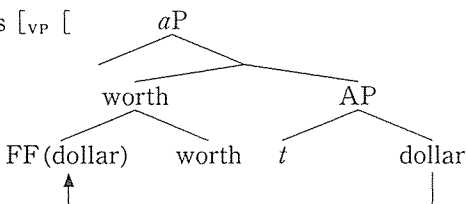


The copula verb *is* must overtly raise to T, and T has the EPP feature to

attract the closest DP. In structure (19), the closest DP is *Murphy's property*, which raises into the specifier position of TP. At Spell-Out, we have the structure in (20).

- (20) [<sub>TP</sub> Murphy's property is [<sub>VP</sub> [<sub>AP</sub> worth [<sub>AP</sub> dollar]]]]

After Spell-Out, the Case feature of the lower DP *dollar* raises to the A-*a* complex, as shown in (21). In this structure, FF (*dollar*) stands for the Case feature of *dollar*. As a result, the derivation will converge.

- (21) [<sub>TP</sub> Murphy's property is [<sub>VP</sub> [

This section has claimed that the adjective *worth* has the AP shell structure, and we have further shown that the structural Case of the object is checked by the A-*a* complex in covert syntax. Furthermore, the checking mechanism presented here is crucial to the following discussion.

#### 4. Gerundive Complements of *Worth*

Another peculiar property of *worth* is that it can take a gerundive complement. Compared with *that* clauses or *for-to* infinitives, gerunds are difficult to be extraposed from the subject position.<sup>9</sup> Examples like (22c), in which the gerund is extraposed and pleonastic *it* is employed, are generally less acceptable, while examples like (22a-b) are acceptable.

- (22) a. It was a shame that you failed in the exam.  
 b. It was a shame for Max to have to pay rent.  
 c. ?\*It was a shame Max's getting arrested.

(cf. Araki and Yasui (1992: 613))

By contrast, *worth* and some other adjectives can freely take gerundive complements, as illustrated in (23)-(25).

- (23) a. if it's worth achieving that status <id=N6000920408>  
 b. It is well worth giving your lender an up-to-date valuation of  
 your property. <id=B0000001143>  
 c. But it's worth knowing before you go ahead all the same.  
 <id=N00000000078>  
 d. it's also worth remembering we scored a goal  
 <id=N9119980420>
- (24) a. It's tough accepting that I turned to dust. <id=N6000940804>  
 b. It is very tough working in a band and doing a full-time job as  
 well. <id=N9119980503>
- (25) a. It's not easy keeping it secret. <id=N6000940311>  
 b. It's not easy making a guitar purchase on your own.  
 <id=N00000000812>

The difference between *worth* and *tough/easy* is that the latter cannot take a nominal complement. This difference leads to the difference in the structure of each adjective: *worth* has the AP-shell structure and the others do not.

In the remainder of this section, we show that this syntactic property can be straightforwardly accounted for under the present analysis. In particular, we assume that gerunds are DPs and must be Case-checked in some way.

#### 4.1. Verbal Gerunds and Retroactive Nominals

Before going into the main discussion, it is relevant to note the difference between verbal gerunds and retroactive nominals. As pointed out by Clark (1990: 76–79), retroactive nominals cannot appear as complements to *worth*. This is exemplified in (26).

- (26) a. \*It is worth some working on this problem.  
 b. \*It is worth a little looking at Picasso's later paintings.  
 c. \*It isn't worth any worrying about John's arguments.

(Clark (1990: 78))

In fact, however, I found only one example of this type in COBUILD *Direct*.

- (27) it is well worth the asking price. <id=N0000000419>

Thus, the complement of *worth* is regarded as a verbal gerund, rather than a retroactive nominal.<sup>10</sup>

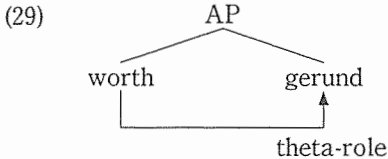
#### 4.2. Verbal Gerunds as an Argument of *Worth*

It has been controversial what category verbal gerunds belong to. Some researchers analyze them as DP (cf. Abney (1987)); others as IP (cf. Stowell (1983)). This paper, however, does not make any detailed discussion of the internal structure, and just assumes that verbal gerunds belong to the DP category without any argument. Suppose also that any DP argument must have its Case feature checked (for the reason of the Case Filter). If verbal gerunds are DP arguments, as we assume, they must have the Case feature checked, just as other nominal arguments. If a gerundive complement was not checked, its derivation would crash.

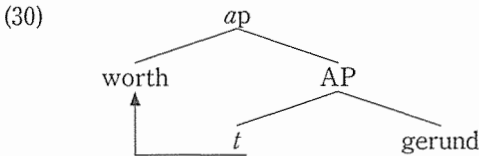
Let us begin by considering some relevant examples from COBUILD *Direct* for expository purpose.

- (28) a. But it's worth trying to tune in if you're outside London too.  
 <id=N6000940902>  
 b. they will wonder whether it is worth standing up for right  
 against wrong <id=N6000940317>  
 c. it is worth quoting his exposition at some length  
 <id=B9000000544>  
 d. it is worth having a plant or two in the flower border  
 <id=B0000001178>

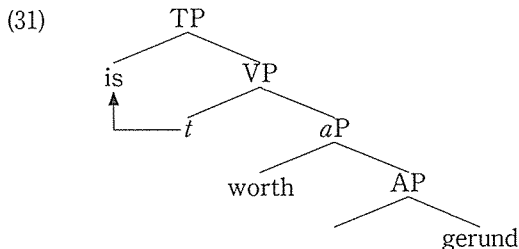
In (28), one argument of *worth* is a gerund, which is assigned Case by *worth*, and pleonastic *it*, which is a non-argument, is in the subject position. At the first step of the derivation, *worth* merges with a DP gerund to satisfy the  $\theta$ -role requirement.



The small adjective *a* next merges with AP and projects *aP*; *worth* raises to *a*.



No argument other than the gerund appears in each example of (28). Given that Pure Merge is driven to satisfy the  $\theta$ -role requirement (cf. 16), pleonastic *it* cannot merge with *aP* because *it* is not an argument. It is assumed in this case that only one argument is required in the structure of (30), unlike that of (18) above.<sup>11</sup> As the derivation proceeds, then, the copula verb merges with *aP* and T further merges with VP, and then the copula verb moves up to T. This is illustrated in (31).



At the next step, the EPP feature of T must be checked. In order to satisfy the EPP requirement, pleonastic *it* is instead inserted into the specifier of TP. *It*, unlike pure expletive *there*, has the categorial and Case features, and then not only the EPP feature but also the Case feature is checked simultaneously. Given this, no formal feature (e. g. the Case feature) of its associate raises to T in covert syntax, unlike *there* constructions. The Case feature of the associate, i.e. the gerundive complement, is covertly checked by the A-*a* complex. There is another way to check the EPP feature, but its derivation constitutes a different numeration from that of the derivation just discussed above. Thus, it cannot be a competing derivation. This option will be examined in section 5.

#### 4.3. Gerunds: Extraposed or Base-Generated

Before completing section 4, we provide two pieces of evidence supporting that the gerund is an argument of *worth* and is not extraposed from the subject position. As pointed out by a reviewer, the gerund of (22c) cannot be extraposed from the subject position because it has the genitive subject. When no lexical subject is manifested, extraposition can be freely applied, as in (23)-(25) above. Some relevant examples are repeated below.

(22) c. ?\*It was a shame Max's getting arrested.

(23) a. if it's worth achieving that status

(24) a. It's tough accepting that I turned to dust.

- (25) a. It's not easy keeping it secret.

As for *worth* constructions, by contrast, I found examples in which a genitive or accusative subject appears.

- (32) a. it would be worth his entering <id=B0000001293>  
 b. But it's worth him remembering that if the RFU was as old  
 fashioned as he. . . <id=N6000950504>

These examples support our proposal that gerunds are base-generated in the complement to *worth*.

Another piece of evidence for our proposal is the ungrammaticality of sentences like (33). The examples in (33) are ruled out since *worth* still bears the Case feature to be checked. By contrast, sentences like (34) involve extraposition and they are acceptable and preferred if the gerunds are in the subject position, as in (35).

- (33) a. \*achieving that status is worth  
 b. \*giving your lender an up-to-date valuation of your property is  
 well worth
- (34) a. it is worth our while pursuing the path we have begun  
 <id=B0000001257>  
 b. It's not worth your while staying. <id=N9119980614>
- (35) a. pursuing the path we have begun is worth our while  
 b. staying is not worth your while.

In (35), the Case feature of *worth* is checked off by the object *one's while*, and the gerunds are extraposed from the subject position to the clause-final position in (34).

Moreover, *to*-infinitives are not compatible with *worth* constructions, as shown in (36). This contrasts with the adjectives *tough* and *easy* in (37) and (38).

- (36) a. \*It is worth to achieve that status.  
 b. \*It is well worth to give your letter an up-to-date valuation of

your property.

- (37) a. It is tough to accept that I turned to dust.  
 b. It is very tough to work in a band and to do a full-time job as well.
- (38) a. It is not easy to keep it secret.  
 b. It is not easy to make a guitar purchase on your own.

The incompatibility of *to*-infinitives with *worth* is straightforwardly accounted for, given that *to*-infinitives do not require Case checking. The sentences in (36) are ruled out because the Case feature of *worth* remains unchecked.

## 5. The Gap within the Gerundive Complement

In some *worth* constructions, the matrix subject corresponds to the null object of gerundive complements. The same syntactic property is shared by *tough* constructions. This section shows that the null operator movement analysis, as proposed regarding *tough* constructions, cannot be applied to *worth* constructions, since *wh*-phrases do not appear in *worth* constructions. It will be shown that the matrix subject moves from the specifier of *aP* into the specifier of TP to check the EPP feature. To begin with, let us consider some relevant examples.

- (39) a. The treaty was worth achieving. <id=N6000920611>  
 b. Clayfighter on the Super Nintendo is worth checking out  
 <id=N6000940514>  
 c. our present sufferings are not worth comparing with the glory  
 that will be revealed. . . <id=B9000001088>  
 d. old things are worth preserving <id=N0000000908>  
 e. The point is worth repeating. <id=N2000951104>
- (40) a. why brass instruments can actually be worth taking the ear  
 plugs out for <id=N0000000351>



- b. three North African villages would be worth thinking about as well <id=N0000000375>
- c. Mr Blair was worth keeping an eye on. <id=N6000951003>
- d. A better love life is not worth dying for. <id=B9119980525>
- e. what he has to say is worth listening to <id=B9000001405>
- f. the relationship is worth working at <id=N0000000078>

In (39), the matrix subjects correspond to the null objects of the gerundive complements. In (40), the matrix subjects correspond to the null objects of the prepositions within the gerundive complements. There are some alternative possibilities to derive sentences like those in (39) and (40). Let us consider a first possibility that the matrix subjects raise from the object position of gerundive complements. Sentences like (39) would have the following schematic internal structure in (41), with V-ING standing for a gerund.

- (41)  $[_{TP} T [_{VP} \text{be} [_{AP} \text{worth} [_{AP} [_{DP} \text{V-ING} [_{VP} \text{DP}]]]]]]]$

In order to check the EPP feature of T, some element with the matching feature must raise to the checking domain of T. Which element can move there depends on the conditions of Attract and closeness, which are given in (42)-(43).

- (42) Attract F

K attracts F if F is the closest feature that can enter into a checking relation with a sublabel K. (Chomsky (1995: 297))

- (43) closeness

$\beta$  is closer to K than  $\alpha$  unless  $\beta$  is in the same minimal domain as (a)  $\tau$  or (b)  $\alpha$ . (ibid.: 356)

In (43),  $\tau$  is the target of raising. Given these definitions, the element closest to T is the DP headed by V-ING, not the lower DP, since both DPs are not in the same minimal domain. Since the target T and the gerundive DP are not in the same domain, the lower DP cannot raise to the specifier of T

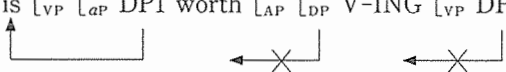
across the gerundive DP. Therefore, the sentence cannot be derived from the structure in (41).

We next consider a second possibility: the matrix subjects are directly inserted into the specifier of TP. This possibility is theoretically ruled out as well. The reason is this: even if the matrix subjects merged with TP by pure Merge, they could not receive any  $\theta$ -role, since the specifier of TP is a non-theta position. Thus, this derivation is also ruled out since the subject bears no  $\theta$ -role, resulting in nonconvergence.

Finally, let us consider a third possibility, which is theoretically motivated: the matrix subjects are base-generated in the specifier of *a*P and move into the specifier of TP to check the EPP feature. This derivation is schematically illustrated in (44).

- (44) a. [<sub>AP</sub> DP1 worth [<sub>AP</sub> [<sub>DP</sub> V-ING [<sub>VP</sub> DP2]]]]  
 b. [<sub>TP</sub> is [<sub>VP</sub> [<sub>AP</sub> DP1 worth [<sub>AP</sub> [<sub>DP</sub> V-ING [<sub>VP</sub> DP2]]]]]

In (44), there are three DPs which can check the EPP feature of T. Given the definitions in (42)-(43), the closest element to T is DP1 in the specifier of *a*P, since each DP is not in the same minimal domain of another DP.

- c. [<sub>TP</sub> is [<sub>VP</sub> [<sub>AP</sub> DP1 worth [<sub>AP</sub> [<sub>DP</sub> V-ING [<sub>VP</sub> DP2]]]]]  
  
 d. [<sub>TP</sub> DP1 is [<sub>VP</sub> [<sub>AP</sub> worth [<sub>AP</sub> [<sub>DP</sub> V-ING [<sub>VP</sub> DP2]]]]]

The EPP feature is checked within TP, and the Case and  $\phi$ -features are also checked. Unlike sentences such as (28), in which pleonastic *it* is used, finite verbs agree with a subject in examples like (39)-(40). As for  $\theta$ -role assignment, DP1 is assigned some  $\theta$ -role in the specifier of *a*P by the head *a*. Thus, DP1 satisfies  $\theta$ -role requirement as well.

Let us turn to the internal structure of the gerundive complement. As discussed above, the matrix subject is not base-generated in the object position of gerunds. Since the same phenomenon is observed in *tough* constructions, it is important here to note the null operator movement

analysis of *tough* constructions. Under this analysis, null operator moves from the object position to the specifier of CP, as illustrated in (45).

- (45) John is easy [<sub>CP</sub> OP<sub>i</sub> C [<sub>TP</sub> to please *t<sub>i</sub>*]]

Along the same line, the syntactic property of *worth* constructions could be explained: null operator moves from the object position to the specifier of a functional head. It appears that the null operator movement analysis might be motivated by the fact that *worth* constructions exhibit a number of phenomena characteristic of A'-dependency, one of which, preposition stranding, has been already reviewed (cf. (40)). As is well known, *wh*-movement is subject to the Coordinate Structure Constraint (CSC), as in (46a), unless it applies in the Across-the-Board (ATB) way, as in (46b).

- (46) a. \*Who<sub>i</sub> is Bill [<sub>AP</sub> [proud of his father] and [tired of *t<sub>i</sub>*]] ?  
 b. Which film<sub>i</sub> did [<sub>IP</sub> [the critics hate *t<sub>i</sub>*] and [the audience love *t<sub>i</sub>*]] ?  
 (Kaneko (1996: 11))

*Worth* constructions also exhibit the same effects of (46), as shown in (47). The example in (47b) has the internal structure in (48).

- (47) a. Far more buildings are now deemed to be worth restoring or rebuilding. <id=N2000951118>  
 b. Is a rotten world not worth fighting for or saving ?  
 <id=B9000000492>  
 c. And they certainly aren't worth dying and killing for.  
 <id=N9119980419>  
 (48) Is [a rotten world]<sub>i</sub> not worth [[<sub>DP</sub> fighting for *t<sub>i</sub>*] or [<sub>DP</sub> saving *t<sub>i</sub>*]] ?

In fact, Fukuyasu (1984) takes this position and proposes that null operator moves to COMP position dominated S'. This is illustrated in (49).

- (49) This book is worth [<sub>NP</sub> [<sub>S'</sub> [<sub>COMP</sub> OP<sub>i</sub>] [<sub>S</sub> PRO buying *e<sub>i</sub>*]]]

Unfortunately, however, there seems to be no COMP position in the internal structure of gerunds. If a gerund contained COMP, then it would be

predicted that *wh*-movement applies inside it. This is not correct, as shown in (50).

- (50) a. \*I don't remember who (our) visiting.  
 b. \*I wonder where (his) going.  
 c. \*We talked about what doing. (Stowell (1983: 561))<sup>12</sup>

Besides, there is no gerundive complementizer parallel to *for* or *that* at all. Emonds (1985: 88), contrary to Fukuyasu, argues that gerunds have no COMP position by pointing out the fact that they are not compatible with *wh*-phrases. Given the fact in (50), there seems no empirical reason to posit null operator movement within the gerunds. Thus, the null objects in *worth* constructions cannot be a null operator.

Let us next consider another possibility that the null object is PRO, which is also rejected. Under the Case-theoretic approach to the distribution of PRO, PRO must be null-Case checked by the [+Tense] T to be licensed. However, no [+Tense] T exists within the gerunds, as we assumed above. The suffix *-ing* is assumed to be generated under D, not T. The object position is not the position where null Case is checked, too.<sup>13</sup>

A possibility to be examined is that the null object is *pro*, but this possibility is also thrown away since *pro* is not allowed in English. We have examined three possibilities concerning the status of the null object within the gerunds of *worth* constructions, and reached a conclusion that the null object is not null operator, PRO or *pro*. We thus claim that the 'null' object is inserted as an overt lexical element and it is deleted at PF.<sup>14</sup> A similar claim is made by Emonds (1985) with respect to non-NP gerunds. He proposes that the sentence in (51) has the structure of (52).

- (51) How many dishes<sub>i</sub> should I dry *t<sub>i</sub>* while putting away *e<sub>i</sub>* ?

- (52) How many dishes<sub>i</sub> should I dry *t<sub>i</sub>* while [<sub>S</sub> [<sub>NP<sub>i</sub></sub> Ø] [<sub>AUX</sub> Ø] [<sub>VP</sub> put away *e<sub>i</sub>*]]] (cf. Emonds (1985: 88-92))

Under his analysis, the gerund after the preposition have no COMP position,

and so null operator is not in COMP but it is rather an empty NP, which is deleted at S-structure. Given the structure in (52), we suppose that *worth* constructions have the following structure at Spell-Out:

- (53)  $[_{TP} DP_i \text{ is worth } [_{DP} V\text{-ING } [_{VP} t_v [_{DP} Obj_i]]]]$

In (53), DP in the specifier of TP is coindexed with Obj. Within the minimalist program, this is interpreted as follows: in forming Numeration, the index of the DP is specified as *two*, thereby the same lexical item is selected twice. As the derivation proceeds, the lower DP, Obj, is deleted under identification at PF and we have the PF output in (54b).

- (54) a.  $[_{TP} DP_i \text{ is worth } [_{DP} V\text{-ING } [_{VP} t_v [_{DP} \emptyset_{Obj}]]]]$   
 b.  $[_{TP} DP_i \text{ is worth } [_{DP} V\text{-ING } [_{VP} t_v [_{DP} \emptyset_i]]]]$

To sum up, we have reached the conclusion that the null object in the gerunds is not null operator, PRO or pro, and that it is base-generated as an overt element and is deleted at PF. As for the matrix subject, it merges with *aP* and then moves into the specifier of TP in order to check the EPP feature of T.

## 6. Conclusion

We have argued that the adjective *worth* is a two-place predicate and can check the Case feature. To explain this property of *worth*, we have proposed the AP shell structure to it, following Chomsky's (1995, 1998) VP shell structure. In particular, it was proposed that the *worth-a* complex in the AP shell structure checks the Case feature of its complement DP.

This paper showed that the null operator movement analysis is not adequate though there are phenomena exhibiting A'-dependency: preposition stranding and CSC/ATB effects of *worth* constructions. The reason for the inadequacy is that *wh*-phrases are incompatible and no overt complementizer appears in the gerunds. This paper also rejected the two

possibilities that the null object is PRO or *pro*. It was instead proposed that the object is inserted in the object position and deleted at PF, contrary to the null operator movement analysis of *tough* constructions. The difference in status of the null object between *tough* and *worth* constructions can be attributed to the categorial difference in the complement of each construction.

In addition, to avoid the problem concerning the  $\theta$ -Criterion, it was assumed that while pleonastic *it* is directly inserted into the specifier of TP, the other lexical subject is base-generated in the specifier of the small *a*P and moves into the subject position. Both operations are driven for checking the EPP feature of T.

### Notes

\* I am grateful to three *IVY* reviewers for their valuable comments and criticisms to an earlier version of this paper. Needless to say, all remaining errors are my own.

<sup>1</sup> Covert feature raising is abandoned in Chomsky (1998). This paper does not pursue this newer approach. See note 8.

<sup>2</sup> These contrasts are originally pointed out by Ross (1973).

<sup>3</sup> He divides categories in the lexicon into four types by using the two distinctive features,  $[\pm F]$  and  $[\pm L \text{ (exical)}]$ . Due to his distinction, the light verb and the light adjective, which I introduce, belong to the type specified as  $[+F]$  and  $[+L]$ .

<sup>4</sup> For licensing of bare-NP adverbs, see Larson (1985, 1987) and the references cited therein.

<sup>5</sup> For more detailed information and concrete book titles, see documentations downloadable at: <ftp://titania.cobuild.collins.co.uk/pub/50M>.

<sup>6</sup> Since *in* is not degree predicate, the quantifiable adverb *nearly* is employed to check its possibility of pied-piping.

<sup>7</sup> In citing examples from COBUILD *Direct*, the ID numbers used there are

added to each example. From the first five letters (one alphabet character and four numbers) of the ID numbers, a category each example belongs to can be identified. For example, N0000 stands for magazines published in the United Kingdom; N2000 for *The Times* and *The Sunday Times*; N6000 for *Today*; N5000 for *The Courier Mail* and *The Sunday Mail*; N9119 for *The Sun* and *The News of the World*; B0000 for books published in the United Kingdom; B9000 for books published in the United States. See also note 5.

<sup>8</sup> In Chomsky (1998), the distinction between overt and covert syntax is eliminated, though LF syntax is called narrow syntax for convenience. A new operation *Agree* seeks some matching feature within its domain, i.e. complement. Feature checking takes place under matching, instead of covert feature raising. If we adopt this type of feature checking, the essence of the analysis here remains unchanged.

<sup>9</sup> I do not consider gerunds to be extraposed from the subject position. For detailed discussion, see below.

<sup>10</sup> For other differences between retroactive nominals and verbal gerunds, see Safir (1987).

<sup>11</sup> This might be a stipulation, but there seem to be no other assumptions. Otherwise, the matrix subject *it* might be assumed to be a kind of reflexive pronoun. There are some similar examples found in the corpus. One of them is given in (i).

(i) It was worth it to see his face. <id=N6000920129>

In (i), the *to*-infinitive, which is generally incompatible with *worth* constructions, is extraposed from the subject position under the present analysis. The dummy *it* in the complement to *worth* is coindexed with the matrix *it*, i.e. the *to*-infinitive.

<sup>12</sup> Stowell does not analyze gerunds as DP, but as IP.

<sup>13</sup> If we take the approach based on government, which is already abandoned in the minimalist program, PRO within the gerunds cannot be licensed.

<sup>14</sup> Lasnik and Fiengo (1974) propose Tough Deletion to *tough* constructions. This operation deletes the object of infinitival complements at S-structure.

## References

- Abney, S. P. (1987) *The English Noun Phrase in Its Sentential Aspect*, Ph. D. dissertation, MIT.
- Araki, K. and M. Yasui (1992) *Sanseido's New Dictionary of English Grammar*, Sanseido, Tokyo.
- Chomsky, N. (1993) "A Minimalist Program for Linguistic Theory," *The View from Building 20*, ed. by K. Hale and S. J. Keyser, 1-52, MIT Press, Cambridge, Mass.
- Chomsky, N. (1995) "Categories and Transformations," *The Minimalist Program*, MIT Press, Cambridge, Mass.
- Chomsky, N. (1998) "Minimalist Inquiries: The Framework," ms. MIT.
- Clark, R. (1990) *Thematic Theory in Syntax and Interpretation*, Routledge, London and New York.
- Emonds, J. (1985) *A Unified Theory of Syntactic Categories*, Foris, Dordrecht.
- Fukui, N. (1995) "The Principles-and-Parameters Approach: A Comparative Syntax of English and Japanese," *Approaches to Language Typology*, ed. by M. Shibatani and T. Bynon, 327-372, Clarendon Press, Oxford.
- Fukuyasu, K. (1984) "On the Syntactic Properties of *Worth*-Constructions," *Eigogaku* 27, 41-58, [in Japanese].
- Kaneko, Y. (1996) "On *Tough* Constructions: A GB Approach," *Though Constructions in English and Japanese*, ed. by A. Ikeya, 9-41, Kurosio Publishers, Tokyo.
- Larson, R. (1985) "Bare-NP Adverbs," *Linguistic Inquiry* 16, 595-621.
- Larson, R. (1987) "'Missing Prepositions' and the Analysis of English Free Relative Clauses," *Linguistic Inquiry* 18, 239-266
- Lasnik, H. and R. Fiengo (1974) "Complement Object Deletion," *Linguistic Inquiry* 5, 535-571.
- Petrovitz, W. (1997) "On the Opacity of Clausal Constituents," *Word* 48, 237-248.
- Ross, J. R. (1972) "The Category Squish: Endstation Hauptwort," *CLS* 8, 316-328.
- Ross, J. R. (1973) "Nouniness," *Three Dimensions of Linguistic Theory*, ed. by O.



Fujimura, 136-257, TEC Company, Tokyo.

Safir, K. (1987) "Evaluative Predicates and the Representation of Implicit Arguments," ms. Rutgers University.

Stowell, T. (1983) "The Tense of Infinitives," *Linguistic Inquiry* 13, 561-570.

## Synopsis

*Worth* Is Worth Investigating:A Corpus-based Analysis of *Worth* Constructions

Tomohiro Yanagi

This paper discusses some syntactic properties of *worth* constructions, as given in (1).

- (1) a. Not all leather suitcases are worth money.
- b. It is worth quoting his exposition at some length
- c. The treaty was worth achieving.

The *worth* constructions in (1) are peculiar in some respects. First, the adjective *worth* can take DP as its complement, as in (1a), while many other adjectives in English cannot. Second, *worth* can take gerundive complements, as in (1b), though sentences where gerunds are extraposed are less acceptable, compared with *that* or *for-to* clausal complements. Third, the matrix subject corresponds to the null object of the gerundive complement, as in (1c). *Tough* constructions exhibit the same syntactic property as (1c), as argued in the literature.

In this paper, I will claim that the adjective *worth* has an AP shell structure, as in (2), in which the small *a* can check the Case feature of the complement, in order to explain the syntactic properties of *worth* constructions illustrated in (1).

- (2) [<sub>AP</sub> DP1 *a* [<sub>AP</sub> worth DP2]]

This structure might be verified by the fact that when *worth* does not take a nominal or gerundive complement, the sentence is ungrammatical, as in (3).

- (3) \**achiving* that status is worth

If *worth* must always check the Case feature, the ungrammaticality of sentence (3) can be straightforwardly explained: the Case feature of *worth* remains unused.

I will argue against the null operator movement analysis of *worth* constructions such as (1c), though there are phenomena characteristic of A'-dependency in (4)-(5), which are shared by *tough* constructions.

- (4) A better love life is not worth dying for.
- (5) Is a rotten world not worth fighting for or saving ?

In (4), the preposition is stranded; sentence (5) exhibits effects of the Coordinate Structure Constraint and Across-the-Board. This paper further claims that the null object in gerunds is not null operator, PRO or pro, but it is an overt lexical element to be deleted at PF.

To avoid a problem with theta-marking, in addition, it is also assumed that in a sentence like (1c), the matrix subject is base-generated in the specifier of *aP*, in which a  $\theta$ -role is assigned to it, and raises into the subject position to check the EPP feature of T. The argument presented in this paper is based mainly on the data collected from COBUILD *Direct*.