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TRANSITIVE ALTERNATION WITH *OVER-V*s

1 INTRODUCTION

Several previous studies have examined why the object of a few verbs prefixed with *over-* (*over-V*s) can be backgrounded at extremely high frequencies (Lieber 2004, Iwata 2008, Bauer et al. 2013).[1] *Over-V*s such as *overeat, overbuy,* and *overachieve* are all used intransitively, as (1) shows.

(1)　　a. You need to watch your weight - have you been **overeating**?

　　　　　　　　　　　　　　　　　　　　　　　　　(LDOCE)

　　　　b. Pros are strategic in what storage containers they have clients purchase, whereas someone desperate to declutter in a single weekend will tend to **overbuy**.　　　(Bauer et al. 2013: 352)

　　　　c. Solving problems others created or succeeding for someone else's benefit develops stress or a compulsion to **overachieve**.

　　　　　　　　　　　　　　　　　　　　　(Bauer et al. 2013: 352)

The prefixation of *over-* allows for the deletion of an argument, so that a normally transitive verb can be used intransitively (Bauer et al. 2013:352). For instance, as exemplified in (1a), the verb *overeat* is predominantly used intransitively, because the implicit object, *non-specific food*, is easily inferred and understood from the context.

　　Overbuy and *overachieve* in (1b, c) are also frequently used as intransitives for the same reason. When the implicit object of a transitive verb is deleted, the verb is used intransitively, as unergative intransitives (Therefore, all intransitive verbs given above are identified as unergative intransitives). However, *over-V*s can also occur in different types of intransitive constructions where the Agent is backgrounded;

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[1] Widely-recognized previous studies on *over-*affixation are Marchand (1969), Kageyama & Yumoto (1997), Lieber (2004), Iwata (2008), and Bauer et al. (2013). In this paper, we particularly discuss Lieber (2004), Iwata (2008) and Bauer et al. (2013) which observe the intransitive structures caused by *over-*affixation. Incidentally, in the present paper, I frequently use the term *over-V*, which was probably coined by Kageyama & Yumoto (1997). *Over-V* indicates verbs prefixed with *over-*, but it is necessary to note that the stems of derivative verbs are not always verbs. For example, a derivative verb *outsmart* is represented as [*out-smart*ADJ]V, because the base word is not a verb (verbal stem), but an adjective *smart*.

unaccusative construction and middle construction. This study focuses on what type of Agents can be deleted, and then what type of object (the Patient) can become the subject referents, for *over-V*s to be used intransitively in an unaccusative or middle construction. More specifically, we discuss what type of 'Patient' is construed as conceptually autonomous.

2 PREVIOUS STUDIES

This section reviews several previous studies on how the prefix *over-* affects argument structures when they are attached to verbal stems. Studies on how the objects of *over-V*s are backgrounded as unergative intransitives are not scarce in number, and this work owes an enormous debt to previous analyses, in particular to Lieber (2004), Iwata (2008), and Bauer et al. (2013), respectively. We examine Lieber (2004) in 2.2, Iwata (2008) in 2,3, and Bauer et al. (2013) in 2.4. However, before we move onto reviewing these previous studies, it may be helpful to briefly explain the difference between unergative and unaccusative intransitive verbs in general.

2.1 Unergative and Unaccusative Intransitives

Typically, pseudo-intransitive verbs fall into two main categories: unergatives and unaccusatives.[2] The difference between unergatives and unaccusatives lies between which participant (the Patient or the Agent)[3] is backgrounded. To illustrate the former, consider the following example in (2a, b), where the verbs *eat* and *drink* are used intransitively.

>   (2)   a. Felix chatted cheerfully as he **ate**.   (LODCE)
>   b. How much did she **drink** at the party?   (Wordbanks)

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[2] I call the verbs which are mainly used transitively and occasionally used intransitively as pseudo-intransitives here to differentiate the verbs which are only used as one argument intransitives, such as *exist*, *happen, arrive, occur, appear* and *disappear*. According to Kageyama (2001: 17), verbs which refer to 'existence', 'occurrence', and 'disappearance' are only used as intransitives.

[3] *'The Patient'* is a semantic role given to the animate or inanimate 'undergoer' of a situation denoted by a predicate (Aarts 2011). For instance, in *'We replaced **everything**'*, *everything* is the Patient which undergoes the event of being replaced. *'The Agent'* is also a semantic role to the animate 'instigator' of a situation denoted by a predicate' (Aarts 2011). For example, as in ***The police** arrested him*, *'the police'* is identified as *the Agent*, which performs the action represented by the matrix verb *arrest*. The Agent often occurs as the subject. However, it is frequently backgrounded in passive voice, as in *He was arrested (by the police)*. The concepts of 'semantic roles' such as the Agent and the Patient were introduced in Case Grammar, which was claimed by Fillmore (1968).

In both examples above, the objects are backgrounded. *'What Felix ate'* is omitted in (2a), and '*what she drank'* is not mentioned in (2b) either. The objects of these verbs are backgrounded because they are easily inferred from the meaning of the verb.

   For example, when we see or hear *eat* being used as an intransitive verb, we construe that the Agent eats *some kind of solid food*, that is, *non-specific food*, which can be unnecessary information in describing the situation, or not worth mentioning in context. The verb *drink* in (2b) is also frequently used intransitively. When it is realized as an intransitive verb, we construe what the Agent drinks is *some sort of alcohol beverage* (Fillmore 1986: 97). Therefore, (2b) is interpreted as *'How much alcohol did she drink at the party?*

   Again, *what kind of beverage she drank* is not specified in the context, because we can infer the missing object. Besides, we do not take what she drank as *water* or *soda* when we hear the verb used intransitively, because the implicit object of the intransitive verb *drink* normally implies *alcohol beverage*, which is conventionally determined and inferred from the meaning of the verb. To summarize, with unergative intransitives, the inferable object (the Patient) of a verb is backgrounded.[4] In contrast, as for unaccusative intransitives, the Agent is backgrounded and the Patient serves as the subject referent. To illustrate, consider the following examples in (3a, b).

   (3)   a. His family **drove a car** into the city and are bringing him back home.

<div align="right">(Wordbanks)</div>

         b. … they watched as **a small car drove** fast over a barricade and into
            Lake Michigan. Moreno called 911, which he said he knew how to do
            from watching American movies.…

<div align="right">(US 2018/ Now Corpus)</div>

The Agent indicates 'the animate instigator of a situation denoted by a predicate' (Aarts 2011). In (3a), the Agent, *his family,* as the subject is specified in this context, because *who drove the car to bring him back home* is necessary information for describing the situation. Their involvement is salient and fully incorporated in the event structure; accordingly, *his family* cannot be backgrounded.

   However, as in (3b), the Agent (the driver) is backgrounded. The car does not move autonomously without the driver, and therefore someone must be in there to control the vehicle. However, in a context like this, *who was driving the small car* is unimportant and can be deleted. The focal point in (3b) is that the car drove over the barricade and plunged into a lake. Neither *they*, the witnesses of the accident, nor the speaker might know who the driver is. The Agent, the driver who caused the accident, is not as salient as the accident; hence it is backgrounded. *'The small car'*, the Patient, functions as the subject, in turn.

   In short, with unaccusative intransitives, the Patient is used as the subject referent

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[4] The intransitive verb *eat* and *drink* are often categorized as prototypical unergatives, and they are frequently realized intransitively. A number of scholars have discussed these verbs when they explain unergative intransitives: see *e.g.* Fillmore (1986), Levin (1993) and Taylor (2012).

with the non-salient instigator backgrounded in context. Another important thing to note is that when a verb like *drive* is used as an intransitive verb, the subject referent must look autonomous. More precisely, in that event, the vehicle must be described as if it drove autonomously.

(4)   a. He **opened the door** to my room, switched on the air-conditioner, …

(US 2020/ Now Corpus)

b. **The door opened** and a young woman came in. (CA 2021/ Now Corpus)

The same observation can be applied to the transitive alternation with the verb *open*, as exemplified in (4).[5] When the normally transitive verb *open* is used intransitively, the subject *the door* is described as if it opened autonomously, as in (4b). In contrast, when the speaker directly saw *him* opening the door, it cannot be depicted as an autonomous entity, as in (4a). It is suggested that, the speaker did not see the young woman opening the door, so that the door was more salient to him than the young woman (the Agent). That is why the door is depicted as if it opened autonomously, and why the door serves as the subject referent of the intransitive *open*. To summarize, with unaccusative intransitives, the event is described from a different angle, that is to say, from the Patient's side, rather from the Agent's, because the Patient is more salient than the Agent.[6]

2.2 Lieber (2004)

By clarifying the difference between unergative and unaccusative intransitives, we discuss the transitive alternation caused by *over*-affixation. As mentioned at the beginning of this paper, we review three previous studies on how *over-* changes the argument structure of verbal stems. Lieber (2004) divides the meaning of prefix *over-* into three major categories: 'location', 'completion' and 'excess', all of which are considered to derive from those of preposition *over*.[7] Although *over-V*s with other

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[5] Levin (1995) points out that with unergatives, the overt objects are omitted in context, and calls this type of transitivity alternation 'unexpressed object alternation'. Other unergative intransitive verbs she cites (*ibid*: 33) are *bake, chop, cook, hunt, fish, sow, plow*, many of which are related to food just like *eat* and *drink*.

[6] In passive voice, the Agent is backgrounded. However, there is a syntactic difference between the passive voice and unaccusative intransitives. The agent can occasionally be salient in the passive voice, because it can occur with preposition *by,* as in *the door was opened by him*. In unaccusative intransitives, though, *by* & the agent are not allowed to occur.

[7] There are several other studies indicating that the meanings of prefix *over-* come from preposition *over* (Marchand 1969, Tyler and Evans 2003). For example, both *fly over* (*the bird **flew over** the tree/* Lieber 2004: 127) and *overfly* (*Drones have been used to **overfly** some fire areas at night,…/* CA.2021. Now Corpus) denote locational sense. The *over* as in '*Your article is **over** the page limit*' can display 'excess' reading.

two meanings ('location' and 'completion') are well worth discussing, in this paper we particularly focus on the most frequent and productive meaning, that is' *over-* with 'excess' reading.

The key aspect of her theory is that with 'excess' sense the prefix *over-* does not affect the argument structure of the verbal stem.[8] More specifically, when *over-* is attached either to a transitive verb or to an intransitive verb, this *over-* does not modify the argument structure.

(5)   a. They **developed** the area.
      b. They **overdeveloped** the area.   (*ibid:*127)

The verb *overdevelop* is used transitively, as its verbal stem *develop* is used primarily transitively, as exemplified in (5a, b). *Over*-prefixation does not affect the argument structure of the verb *develop*.

(6)   a. The children **slept.**
      b. The children **overslept.**   (*ibid:*127)

Furthermore, *oversleep* is realized as an intransitive verb when *over-* is attached to the normally-intransitive-verb *sleep*, as in (6), indicating that no transitive alternation observed with *over*-affixation. For the most cases, the prefix *over-* does not affect the argument structure of verbal stems.[9]

Lieber (2004) claims that, when excess *over-* attaches to intransitives it yields intransitives, and with transitive verbs as the verbal stems it derives transitive verbs (*ibid*: 132). In this previous study, she pointed out that *overeat* is the only exception, whose argument structure does seem to be changed by prefixation of *over-*.

(7)   a. A woman who **overeats** during pregnancy can cause health problems for
         her child.   (LDOCE)
      b. ··· all obese people **overeat** has not been substantiated…
                                                        (1972/OED)

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[8] *Verbal stem* is also called *'verbal base'*. The term *stem* or *base* refers to the word which is used as the basis of a derivational word before affixation (derivation). Verbal stem is the base of a derivational word which is also categorized as a verb in word classification. For example, when the word *out-* is prefixed to the verbal stem *achieve*, the process derives the derivational verb *outachieve*. In other words, *achieve* serves as the verbal stem.

[9] The prefix *over-* opts to be attached to transitive verbs. Therefore, the majority of verbs prefixed with *over-* are used transitively such as *overcompensate, overdose, overfeed, over-generate,* and *overuse*, which are predominantly realized as transitive verbs.

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The verb *eat* is used both transitively and intransitively. As mentioned in the previous section, it is likely to be deleted when the object is not any specific food. However, the transitive *eat* still occurs at a constant frequency, because we often need to specify what sort of food we eat in daily communication. With *over*-affixation, however, *eat* (*overeat*) is predominantly used as an intransitive verb.

Overeating almost always causes detrimental effects to your health. To illustrate, consider the example in (7a). What food is allowed to be eaten too much by a pregnant woman? It goes without saying that there is no food recommendable for her to eat too much under any circumstance.

Overeat with excess sense,[10] which is typically paraphrased as *'eat too much'* has been used as an intransitive verb, at least from 1590, according to OED. The verb is often used to describe health problems of individuals, as in (7b). Lieber provides the following analysis to explain why *overeat* is predominantly used as an intransitive verb.

Lieber (2004) claims that if '*she overate pickles'* were to be acceptable, it would have to have the meaning '*she ate too many pickles'*, indicating that *over-* does not delete an argument when it attaches to the verb base *eat*, but rather chooses as its base the intransitive form of the verb, possibly preventing that it takes scope over an overt object.

In my understanding, what Lieber tries to explain here is that *eat* is one of the prototypical unergative intransitive verbs, and therefore, the missing object is substantially inferable (*overt*). Furthermore, when *eat* is used with *over*-affixation, the implicit object is even more inferable to the extent that we are all the more likely to use it as an intransitive verb.

However, no matter what her interpretation is, the explanation above is neither clear nor persuasive, as she does not provide any examples of what type of food can be acceptable as the object of the transitive *overeat*.

2.3. Iwata (2008)

Lieber (2004) claims that *over*-prefixation does not involve transitivity alternations to the verbal stem. However, she cannot explain why the argument structure of *eat* is considerably changed with *over*-affixation. Iwata (2008) addresses the question which has remained unsolved by Lieber (2004); why *overeat* is predominantly used as an intransitive verb, whereas its verbal stem *eat* is optionally used as an intransitive verb?

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[10] There used to be *overeat*, which was predominantly used as a transitive verb (OED). However, the transitive *overeat* is obsolete and no longer used in contemporary English. The verb had meant '*to provide more for eating than (another)*'. Apparently, the intransitive *overeat* (*to eat too much*), which we use today, appeared later than the transitive *overeat*.

(8)   a. Yoshika **overate {*apples/*lunch}.**
       b. Yoshika **overate {fruit/sweets/fatty foods}.**

While the objects of *overeat* such as *apples* and *lunch* in (8a) are not acceptable, *fruits, sweets,* and *fatty foods* in (8b) are occasionally acceptable as the objects. What differentiates noun phrases in (8b) from those in (8a) is that the direct objects denote some particular type of food, whose consumption in a large amount is harmful to one's health, irrespective of whether the person becomes full (Iwata 2008: 167).

   More specifically, only when you overeat some specific food to the extent that it can cause physical or mental harm to your healthy living, it occurs as the object in context. His observation fully makes sense, and one of my empirical studies has confirmed it with corpora data.

(9)   a. I think the Paleo Diet is but one option of many diets choices for
          lifestyle adherence. I don't think it should keep making claims of
          curing genetic disorders. It's hard to **overeat meat** and **veggies**, and
          allows for a lot of nutrients.
                    (US/ Global Web-based English Corpus/ Iwamiya 2020 (1): 11)
       b. We simply **overeat foods** that have high concentrations of salt. This
          can also contribute to high blood pressure.
                    (US/ Global Web-based English Corpus/ Iwamiya 2020 (1): 13)

The specific foods can occur as the object of *overeat*, and overeating them can have a detrimental effect on human health as in (9a, b). 'Paleo diet' in (9a) is an abbreviation for Paleolithic diet (also called 'caveman diet'), popular among Americans in recent years.

   In the diet that imitates the people's eating habits in the stone age, they avoid eating any processed food including sugar, salt, milk, cheese, coffee and alcohol, and eat only vegetables, fruits, nuts, roots and meat. Some people believe the diet is healthy, but the speaker in (9a) seriously doubts whether it is good for your health. The diet can lead to overeating meat and vegetables, which, in turn, can hurt your healthy living. That is why *overeat* is realized as a transitive verb, with the object specified in the context. The negative consequence to the health, 'high blood pressure', is observed in context, as exemplified in (9b), where it is evident that, the health problem results from overeating salty foods. Again, the data retrieved in my research can corroborate the validity of Iwata's observation.

   Incidentally, in Corpus of Global Web-based English, there are 29/353 examples where *overeat* is used intransitively (The data was retrieved from four English speaking countries:, the United States, the Great Britain, Canada and Australia by July 10. 2019).[11] According to my previous research, the percentage of transitive *overeat*

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[11] Corpus of Global Web-based English consists of informal English, such as English in company websites or public service websites. That is why some English dictionaries such as Oxford English Dictionary (OED) and Oxford Advanced Leaner's Dictionary do not admit the transitive use of *overeat*

is approximately 7 % (This means 93% of the verb *overeat* is used intransitively). Even though the corpus collects linguistic data in informal registers, the retrieved data clearly shows that the intransitive *overeat* is not rare. Based on the data, it is inaccurate to say that *overeat* should be used as an intransitive verb, as Lieber (2004) claims.

I would argue that Iwata (2008) is right about his observation of *overeat*. However, I feel obligated to point out that his view about the syntactic features of *overheat* is questionable. In the next section, along with the review of Bauer et al. (2013), I demonstrate that there remains room for improvement in previous studies by analyzing the argument structures of *over-V*s.

2.4. Bauer et al. (2013)

Bauer et al. (2013) conducted a comprehensive study of morphology, using corpora data. One of the authors is Rochelle Lieber, who has already carried out her in-depth research on the argument structures of *over-V*s (*see.* Section 2.2.). Thus, although it is a comprehensive reference book of morphology, a relatively large part of the book focuses on transitive alternation caused by *over*-affixation.

Lieber (2004) indicated that *overeat* is the only *over-V* whose argument structure is changed with *over*-affixation. However, it seems that the massive expansion of corpora data in recent years has enabled the authors to preform more in-depth and statistical analysis of the argument structures of *over-V*s.[12] Bauer et al. (2013:352) claimed that the prefixation of *over-* allows for the deletion of an argument, so that a normally transitive verb can be used as an intransitive verb. There are several normally-transitive-verbs in addition to *eat*, whose argument structure is changed with *over*-affixation.

(10)   a. It's cheaper to **buy** direct from the manufacturer.   (LDOCE)
       b. We want all our students to **achieve** within their chosen profession.
                                                                          (LDOCE)
       c. Pros are strategic in what storage containers they have clients purchase,
          whereas someone desperate to declutter in a single weekend will tend
          to **overbuy**.   (Bauer et al. 2013/ *reprinted of [1b]*)

(Both dictionaries define *overeat* as an intransitive verb).

[12] These days, we have seen the rapid expansion of corpora data. The data available from corpora has been increased dramatically, because of the advent of the Web and online data source (Rayson 2015:37). They can expand the data base far quicker and easier than before, by obtaining copies of written materials from various Web sites. These online materials make today's massive-sized corpora such as Corpus of Global-Web English (GloWbE), News on the Web Corpus (Now Corpus) and I-Web Corpus, which are increasing the data sizes on daily basis.

    d. Solving problems others created or succeeding for someone else's benefit develops stress or a compulsion to **overachieve**.

                  (Bauer et al. 2013/ *reprinted of [1c]*)

Just in a similar way that the verb *eat* is used intransitively, *buy* and *achieve* can be realized as unergative intransitives, as in (10a, b). Both Longman dictionary and Collins Cobuild dictionary describe when the object of *buy* is construed as some sort of product, the verb is used intransitively, as (10a) shows. In such a context, what you buy is not important, so that it is often backgrounded.

   The verb *achieve* can also be used intransitively, as in (10b) for the same reason. When *achieve* is used as an intransitive verb, it is construed that the missing object is type of goal, aim or purpose. Even if the object is deleted, we have no difficulty in retrieving missing information from the context.

   Recall the discussion in 2.1., where we clarify that when a normally transitive verb is used intransitively with the inferable object backgrounded, they are called unergative intransitives. Besides, we have also discussed previous studies that confirm that the implicit object is even more likely to be backgrounded with *over*-affixation. Therefore, both *overbuy* and *overachiev*e above are categorized as unergative intransitives.

   Bauer et al. (2013) do not provide any specific explanation of why *over*-affixation can affect the argument structure of *buy* and *achieve*. However, because they cite Liber (2004) as a reference, it is suggested that *overbuy* and *overachieve* are used as unergative intransitives in addition to *overeat*.

   More specifically, what is omitted in (10c) is readily inferable, that is, some products or items available at supermarkets or department stores. In (10d) too, though what the students achieve is not clarified in context, we can easily construe that the missing object is each student's goal or aim. Hence, it is now revealed that the way *overbuy* or *overachieve* is realized as an intransitive verb is the same as *overeat*.

    Let me quickly summarize what we have discussed so far. In this study, we analyzed three previous studies that examined the transitive alternation caused by verbs prefixed with *over-*. First, Liber (2004) claims that *over*-affixation normally does not affect the argument structure of the verbal stem, except *overeat*. Second, Iwata (2008) points out that with *over*-affixation to the base verb *eat*, not a particular food is almost obligatorily backgrounded. However, when we overeat some specific food to the extent that it can cause a physical or mental harm to our healthy living, it occurs as the object in context. For instance, if you eat too much fatty food, you are likely to be obese. Eating too much fatty food is, in turn, more likely to harm your healthy lifestyle than eating too much ordinary food. In a particular context like this, you can say '*you overeat fatty food*', using *overeat* as a transitive verb.

   Lastly, Bauer et al. (2013) provide further examples from corpora where normally-transitive-verbs such as *buy* and *achieve* are also used intransitively with *over*-affixation. This corpora-based study demonstrates that several *over-V*s are realized as unergative intransitives at fairly high frequencies. However, verbs prefixed

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with *over-* can also occur in different types of intransitive constructions where the Agent is backgrounded.

> (11)   a. Lithium-ion batteries using cobalt chemistry, popularly used in laptop computers and cellphones, have in the past shown a propensity to **overheat**, resulting in a few laptops going up in flames.
>
> (Bauer al et. 2013: 352)
>
>   b. The engine **was overheating** and the car was not handling well.
>
> (Cobuild)

Overheat is also defined as a verb that can be used both transitively and intransitively (Longman Dictionary, Collins Cobuild Dictionary). Though *overheat* in (11) is realized as intransitives, the syntactic structure is different from the examples given so far. When *overeat, overbuy* and *overachieve* are used intransitively, the object of each verb is inferable, and more importantly, the subject referents are all animate humans. However, in the case of *overheat*, inanimate machines such as *battery* and *engine* function as subject referents. To illustrate, consider the following examples.

> (12)   a. I try not to **overeat**. But I don't deprive myself either. I eat normally.
>
> (AU 2020/ Now Corpus)
>
>   b. She explains you may buy items that will expire or never use if you **overbuy**.   (US 2020/ Now Corpus)

As explained, with unergative intransitives, the inferable object of its verbal stem is more likely to be omitted in context, as in (12). However, in this intransitive construction, the Agent, which must be human or some sort of animate creature, is never backgrounded. In unergative intransitive constructions, the Agent serves as the subject referent, which is the most important element in a sentence, that cannot be erased in context. Consider the examples in (11). The way that *overheat* is realized intransitively is strikingly different from that of unergative intransitives in (12), because both *battery* and *engine*, which serve as the subject referent, are categorized as non-animate devices.

   The missing information in (11) is, without any doubt, the Agent. In other words, someone who overheated the battery or the engine is backgrounded, not mentioned in context. This means that *overheat* in (11) is realized as an unaccusative intransitive, where the Agent is backgrounded or deleted in context and in turn, the Patient serves as the subject referent.

3 *OVER-V*S IN UNACCUSATIVE INTRANSITIVE & MIDDLE CONSTRUCTION

In the preceding section, we observed that *over-V*s are realized intransitively as

unergatives. However, there seem to be verbs prefixed with *over-* such as *overheat*, whose syntactic structures (the intransitive usage) cannot be explained as unergatives. The recent corpora data illustrates that some *over-V*s serve as unaccusative intransitives.

3.1. Unaccusative over-V: overheat

The verb *heat* is normally used as a transitive verb in contemporary English (LDOCE, Cobuild). However, with *over-*affixation, *heat* (*overheat*) can be used intransitively. First, consider the following example, where *overheat* is used transitively.

> (13) Overcharging can kill a battery quicker than under-charging it. When a voltage control system fails in an alternator, it can quickly **overheat** the battery.   (CA 2018/ Now Corpus)

Recall the example in (11a), cited by Bauer et al. (2013), where the verb *overheat* is realized as an intransitive verb, with the noun phrase *the battery* as the subject referent. However, *the battery* serves as the object of *overheat*, as in (13).

> (14) When a battery is in use, charged particles in the electrolyte move around to balance out the charge of the electricity flowing out of the battery. Electrolytes often contain flammable materials. If they leak, the battery can **overheat** and catch fire or melt.   (US 2021/ Now Corpus)

The noun phrase *the battery* serves as the subject referent with the intransitive *overheat,* as (14) shows. This linguistic evidence explicitly confirms that *overheat* is used as an unaccusative intransitive verb, which indicates that *over-*affixation can substantiate a different type of intransitive construction.

To illustrate, consider further examples where a noun phrase *the engine* can be both the object of the transitive *overheat*, and the subject referent with the intransitive *overheat*.

> (15) a. My guess is that when you lost enough coolant and **overheated** the engine, you damaged the head gasket…   (US 2015/ Now Corpus)
> b. The radiator would likely be destroyed, so the engine would **overheat**…
> (AU 2017/ Now Corpus)

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While the lack of coolant can lead to overheating, as in (15a), a broken radiator can cause the overheating, as exemplified in (15b). Although the cause of overheating is quite apparent, why is it that *overheat* can be used intransitively, as in the latter example? Based on the data retrieved from corpora, it is strongly suggested that, when the Agent cannot control the situation anymore, *overheat* is used intransitively with its Patient as the subject referent. For example, if the radiator is broken, the driver (the Agent) cannot stop the engine, as in (15b).

The same observation can be applied to the example in (14), where the breakdown of the battery probably makes it impossible for the car driver to control the situation. In the contexts such as (14) and (15b), *the battery* and *the engine,* the Patients of *overheat*, are often described as if they overheated autonomously.

Having confirmed in 2.1. that with unaccusative intransitives the event is described from the Patient's side rather than the Agent's, this is highly plausible. In contrast, when *overheat* is used transitively, there remains something that the Agent can do to control the situation. For instance, as in (13), if overcharging is identified as the cause of overheating, the driver (the Agent) just has to be a little careful not to provide too much electricity to the battery. Accordingly, there will not be any risk of the battery being heated too much.

The same thing is true of (15a), which implies that inadequate maintenance can trigger overheating of the engine. The problem can be easily handled by conducting proper maintenance, such as checking the coolant system regularly. It is noteworthy that the verb is used transitively when the Agent is regarded as still controlling the situation.

Incidentally, in many cases, some sort of machines, such as *engine, motor* and *battery* serves as subject referents with the unaccusative intransitive *overheat*, because they are often observed as autonomous entities.

Other car parts such as *tyres*,[13] which have no autonomous heating mechanism inside, can occasionally be used as the subject referent of the intransitive *overheat*, as in (16). Still, they are less commonly used as the subject referent with the unaccusative *overheat*.

> (16) F1 only demands fast degrading tyres. Not tyres which blister, not tyres which need extremely high tyre-pressures to ensure they don't explode, not tyres which need extremely strict camber levels to ensure they don't explode, not tyres which will **overheat** when you dare to push them for more than 2 sectors. (IE 2019/ Now Corpus)

In F1 races, where they force their vehicles to move at an extremely high speed, even overheating of tyres is rather common. It is totally understandable that the extremely high friction between tyres and road surface can cause the tyres to accumulate too much heat inside, as in (16). However, except in 'car racing' context above, *tyres* are

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[13] *'Tyres'* are also spelled *'tires'*.

rarely used as the subject referent with the intransitive.

(17) The problem with the Porsche is that if you **overheat** the rear tyres, you start to lose the back end of the car and … (IE 2019/ Now Corpus)

Tyres are commonly used as the object of the transitive *overheat*, because we usually think the driver is responsible when tyres are heated too much, as illustrated in (17). What is remarkable, though, is that the occurrence rate of the intransitive *overheat* is different, depending on what sort of the 'Patient' it occurs with. For instance, when combustion devices such as *engine*, *motor* and *battery* serve as the Patient of *overheat*, the verb is mainly used as an intransitive verb (There is 148/ 176 intransitive *overheat* in corpora data, in other words, 84% of the verb is used intransitively with these combustion devices as the Patient).[14]

On the other hand, when *tyres*, which do not have an autonomous heating system inside, serve as the Patient of *overheat*, the percentage of the verb being used intransitively almost halves (29/ 66 intransitives of *overheat* have been observed in corpora data, that is, 44% of the verb is used intransitively with *tyres* as the Patient).[15] To summarize, '*the engine is overheating*' is far more commonly used than '*someone is overheating the engine*', whereas '*the tyres are overheating*' is less widely used than '*someone is overheating the tyres*'.

It is suggested that it is hard to regard the overheating of tyres as a natural cause or an autonomous event, so that, with tyres regarded as the Patient, the percentage of *overheat* being used intransitively is low. At any rate, there is considerable evidence that indicating that *overheat* is used as an unaccusative intransitive,[16] whereas previous studies have provided the examples where *over*-affixation deprives only unergative intransitives. However, *overheat* is not only *over-V* that serves as an unaccusative intransitive.

3.2. Unaccusative over-V: overgrow

The verb *grow* is used either transitively or intransitively. When the verb is used

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[14] As mentioned, the linguistic data demonstrated in this paper is retrieved from Wordbanks Corpus and Now Corpus, and the data are collected only from native English speaking countries. The percentages as to how frequently *overheat* is used intransitively are calculated by collecting the examples of these two Corpora together. Besides, Wordbanks Corpus and Now Corpus have different data sources respectively, so that there is no overlapping in the relevant data.

[15] The corpora data clearly shows that, in motor circuit contexts, tyres tend to serve as the subject referent with the intransitive *overheat*, as in '*Because tyres had been overheating and blistering on a newly resurfaced Phillip Island circuit, the race distance should be cut from 27 laps to 19.*' (Wordbanks).

[16] In addition to *engine, battery, motor*, we can observe many entities which serve as the subject referent of *overheat* in corpora data, such as *car, laptop, machine, socket,* and *phone*. Normally, when *overheat* is used intransitively, some sort of device functions as the subject referent.

intransitively with some plant as the subject referent, the Patient serves as the subject referent. In other words, *grow* is categorized as unaccusative intransitive. To illustrate, consider the following examples.

(18) a. Giving no concern to what it took to **grow the tree**, what it needed to get it to harvest & the nasty chemicals used in it to produce it.

(US 2015/ Now Corpus)

b. **a tree** which **will grow** well in most types of soil   (LDOCE)

c. Anybody who has roses, and I **grow roses**, knows that you have to cut the roses back or they can't grow for the next season.   (Wordbanks)

d. The station had **roses growing** at each end of the platform.   (Cobuild)

The transitive *grow* normally takes some plant such as *trees* and *flowers* as the object, as exemplified in (18a) & (18c). However. when *the tree* or *the rose* is seen as an autonomous entity, the Patient serves as the subject referent with the verb used intransitively, as in (18b) & (18d).

Put differently, when the tree is described as growing autonomously without any involvement of humans, *grow* is used intransitively. In contrast, when the involvement of the Agent *(humans)* is salient, *he* or *she* cannot be omitted in context, and as a result, *grow* is used transitively. With *over*-affixation, though, *grow (overgrow)* is predominantly used as unaccusative intransitives.

(19) a. …thus non-pathogenic organisms may **overgrow** pathogenic bacteria.

(*hardydiagnostics.com*/ Santa Maria, CA/ I-web)

b. ….**bacteria can overgrow** if your salivary glands aren't producing enough saliva, and that bacterial overgrowth can lead to bad breath …

(AU 2019/Now Corpus)

The noun phrase *bacteria* serves either as the object of the transitive *overgrow* or as the subject referent with the intransitive *overgrow,* as illustrated in (19). The Agent, *non-pathogenic organism* is the direct cause that triggers *'bacteria'* to increase too much, as illustrated in (19a). In a context like this, the *non-pathogenic organism* is regarded as responsible for the overgrowth of the bacteria. Therefore, *overgrow* is realized as a transitive verb, although the verb is rarely used transitively.

In contrast, *overgrow* is used intransitively with *bacteria* as the subject referent, as exemplified in (19b). This example implies that if your salivary glands do not work properly, the bacteria inside your mouth will inevitably increase, leading to bad breath. In a context like this, the overgrowth of bacteria is observed as an autonomous event, and therefore *overgrow* is used intransitively.

We confirmed that two other *over-V*s are realized as unaccusative intransitives, both of which have remained unmentioned in previous studies. These *over-V*s are predominantly used intransitively as unaccusatives, whereas *overeat* is predominantly used intransitively as unergatives, indicating several *over-V*s are highly inclined to

take one argument predication. The syntactic structure of *over-V*s is, however, even more intriguing. This study provides further linguistic evidence that, with adverbials, some *over-V*s can be used intransitively even in middle constructions.

3.3. Over-Vs in Middle Constructions

Unaccusatives and middles share two essential properties. In both constructions, the Agent is backgrounded, and the Patient serves as the subject referent with the verb used intransitively. However, there is a strikingly different property between the two intransitive constructions; that is, the Patient is not conceptually autonomous in middle construction. It may be useful to provide examples here to illustrate this, although a large number of previous studies have investigated how a normally transitive verb is used intransitively in middle construction.

> (20)   a. The book **doesn't sell**.
>   b. Boca burgers **cook like real meat**, but they're meatless.
> (Yoshimura & Tayler 2014: 293)

Yoshimura & Tayler (2014) point out that, middle expressions constitute a subcategory of intransitive, one-argument predications. Normally, verbs such as *sell* and *cook* are used transitively, but they are occasionally used intransitively, as exemplified in (20).

Consider the noun phrases, *the book* and *Boca burgers,* which cannot be regarded as autonomous under no circumstance, actually serve as the subject referents. While *car, battery,* or *engine* is frequently used as the subject referent of an unaccusative intransitive, *book* or *burger* does not have the internal mechanism that enables itself to take any action. After all, they cannot be *sold* or *cooked* without human interactions. The intransitive use of *sell* or *cook* is only allowed when they are realized in middle constructions. Although there has still been ongoing, heated controversy about what makes a middle construction acceptable, it is necessary to recognize two well-known key properties the construction has.

First, middles normally require some type of adjunct to be acceptable.[17] Second, with middle expressions, the verb phrase (the predicate) describes the characteristics of the subject referent, and it does not describe any specific event unlike unergative or unaccusative intransitives. For instance, as illustrated in (20a), the verb phrase consists of the verb *sell* and the adjunct '*doesn't,*' and the combination of these two

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[17] Adjuncts are part of the verb phrase in a clause, although they are less closely related to the verb than any complements that may be present (Aarts 2011). In dictionaries, adjuncts are treated as adverbials, which are not key elements of the syntactic structure of a sentence. Still, they should be regarded as important constituents for analyzing the semantic aspects, because adjuncts indicate the *'when', 'where', 'how',* or *'why'* of a situation, and can express a very wide range of meanings (*See.* Aarts 2011: 40).

constituents describes the characteristics of *the book*. Hence, it is implied that the book is not expected to be sold, no matter where it is sold, or no matter what marketing effort is made. As in (20b), '*like real meat'* serves as the adjunct of the verb *cook*, and the verb phrase describes what sort of burgers Boca burgers are. To sumarize, even non-autonomous entities can become the subject referent with intransitive verbs in middle construction. Bearing this in mind, consider the following examples.

(21)   a. Will you help me **load the dishwasher**?   (LDOCE)
        b. Every year there were a few more volunteers in Harrington to **load the truck** and …   (USA Today 2006/ COCA Corpus)
        c. ⋯ and drivers are under pressure to meet unrealistic deadlines, to speed, drive for longer than is allowed, to **overload their trucks** and …   (AU 2015/ Now Corpus)

The verb *load* is usually used transitively, as exemplified in (21a), with a container *(dishwasher)* as a typical object. Vehicles such as *truck* shown in (21b) and *boat* can be regarded as a sort of container, so that they are often realized as the object of *load*.

   The argument structure is not changed with *over*-affixation, so that *overload* is predominantly used as a transitive verb. To illustrate, consider the example above in (21c), where *truck* serves as the object of *overload*. The verb *load* cannot be used as unaccusative intransitives, because the Patient arguments such as *dishwasher* and *vehicle* are not seen as autonomous, or capable of performing the action (*loading*) by itself. It is hard to imagine that a dishwasher is automatically loading dishes into itself. Besides, a majority of people do not believe that a track can collect the luggage and put it onto its carrier on its own.

   We might evoke scenes like these somewhere in science fiction, but so far, no example where *overload* is used as an unaccusative intransitive has been observed in corpora data. At any rate, at this moment, in 2021, technology has not entirely replaced humans yet. The time has not come for humanoid tracks with robotic arms to collect luggage automatically.

(22) Truckers claim that they have already covered their responsibility, because they absorbed a 150 percent tax hike after a 1982 federal study showed that heavy trucks cause nearly ten thousand times the damage to highways as do automobiles. Predictably, railroads disagree, alleging that **trucks continually overload**…   (Wordbanks)

Overload is used intransitively only in middle constructions. Consider the example above in (22), whose context is, though, slightly complicated. The example above implies that trucks with overloaded luggage have imposed significant damages on roads.

   In this context, it is suggested that these track drivers have not much responsibility

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for damaged road surfaces. Because of a massive tax hike, the example implies that drivers have to load the vehicles with as much luggage as possible. It is presumed from the context, if they are asked who is responsible for damaging the highways, they may claim that the law enforcement or the government is to blame.

However, who is responsible does not matter in middle constructions, because the example above just describes the characteristics of the trucks running on the highway. Although the example expresses only a subjective view from people in the railroad industry, it is noteworthy to realize that, using 'middle constructions', they effectively encourage the government to develop more railways, without blaming anyone. Bearing this in mind, consider the following examples where another *over-V*, *overvalue* is used intransitively in a middle construction.

(23) a. As the index rises toward 100 it means that investors are probably
buying too heavily and **overvaluing the market**.
(US 2020/ Now Corpus)
b. It is a free market, and the market **does not overvalue**.　(Wordbanks)

In the courses of commercial transactions, investors opt to overestimate the value of a market. Therefore, *overvalue* is normally used transitively with a noun phrase like *the market* as the object, as exemplified in (23a). In general, people investing their money are salient, and hence they are not expected to be deleted in context.

However, the investors can be backgrounded in specific contexts, as illustrated in (23b). This example implies that *'in a free market, the market value cannot be underestimated'*. It is provided in a context where the speaker urges you to pay whatever cost you need to recruit talented people in global business. The verb phrase (the predicate) describes the characteristics of the market, so that *overvalue* is allowed to be used intransitively as a middle intransitive.

We confirmed that two other *over-V*s, namely, *overload* and *overvalue,* are used intransitively in middle constructions. Note that these intransitive *over-V*s with adjuncts describe the characteristics of the Patient of the verb.

Recall the discussion in 3.1. & 3.2. about *overheat* and *overgrow*, which are used as unaccusative intransitives. These *over-V*s can be used intransitively because the objects are seen as autonomous entities. In unaccusative intransitive construction, the same event is described from a different angle. In middle constructions, however, the verb phrase describes the Patient's characteristic, which serves as the subject referent.

3.4. Other over-Vs as Unergative Intransitives

So far, we observed several linguistic evidence where *over-V*s can occur in different types of intransitive constructions in addition to unergative intransitives: unaccusative

intransitives and middle intransitives, which have not been mentioned in previous studies. *Overheat* and *overgrow* occur as unaccusative intransitives, whereas *overload,* and *overvalue* are realized as intransitives in the middle construction.

Before formalizing the discipline of the link between the form and meaning of *over-V*s in three intransitive constructions, however, I feel obligated to provide several more examples where *over-V*s are used as unergative intransitives, that have not been dealt with in previous studies.

(24) a. Can I **pay** by credit card?   (LDOCE)
      b. I don't need to **pay money** to join a gym. The world is my gym. The hills, the trees, the rivers.   (*Peep Show*. 2007/ TV Corpus)
      c. They will certainly **overpay** for a business that is virtually worthless, …   (Wordbanks)

The verb *pay* can be used both transitively and intransitively, as exemplified in (24a, b). When it is used intransitively, the missing object is *non-specific money*, which is easily inferred from (24b). Therefore, they are categorized as unergative intransitives.

With *over*-affixation, the inferable object *money* is more likely to be backgrounded, and *pay* (*overpay*) is predominantly realized as an intransitive verb, as (24c) illustrates. More precisely, while the inferable object *money* is optionally backgrounded with its verbal stem *pay*, the inferable object is obligatorily backgrounded with *overpay*.[18] Of course, in a similar way that the verb *overeat* is used transitively, a *specific type of money* can occur in the context as the object of *overpay*. Put differently, *overpay* can be used transitively with a particular type of money as its direct object.[19] Money for some specific purposes, *fees* and *expenses*, cannot be backgrounded, and they occur as the object of *overpay,* as exemplified in (25).

(25) The SEC itself, within days of the DOL private equity guidance, issued a risk alert that warned of deficiencies the staff had identified among private equity advisers that may have caused investors to **overpay fees** and **expenses.**   (US 2020/ Now Corpus)

The same observation can be applied to another *over-V, overspend* which is also used as unergative intransitives.

(26) a. I don't **spend** much on clothes.   (LDOCE)

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[18] **They overpay money'* is often regarded as ungrammatical. At least, there are few examples observed in the corpora data extracted from native English countries.

[19] The Recipient, the person who receives the money, can occur as the indirect object, as in the following example. *'It all turned out wrong because the political masters have ended up overpaying **the arts bureaucrats** and underpaying the artists'.* (Wordbanks)

   b. I made a lot of money working but I never worked hard just to make money. I like to **spend money**.   (Wordbanks)

   c. The researchers were surprised to find that despite perceptions that people always **overspend**, chronic under-spending was far more widespread than thought with tightwads outnumbering spendthrifts by a 3 to 2 ratio.   (Wordbanks)

   d. I propose to make it illegal for a department to **overspend its budget**.

(Canada 2017/ Now Corpus)

The prototypical object of the verb *spend* is *money*,[20] which is exactly the same as that of the verb *pay,* as exemplified in (24a, b). While the inferable object is optionally backgrounded with the verbal stem *spend*, as illustrated in (26a, b), with *overspend* the implicit object is almost obligatorily omitted in context, as (26c) illustrates.[21] Besides, in a similar way that the verb *overpay* is used transitively, *money for specific purposes* cannot be backgrounded with *overspend*. Consider the example in (26d), where the verb is used transitively with *its budget* as the object (the Patient).

4 Transitive Alternation with *over-V*s

This paper discussed that *over-V*s can be realized in three types of intransitive constructions; unergatives, unaccusatives and middles. The three constructions can be represented in the following schemata, as in (27). The formula in the first parenthesis is the form of the expression, showing how the meaning of the expression is described as a sentence. On the other hand, the formula in the second parenthesis after the double-pointed arrow (↔) refers to the actual meaning, the semantic representation. In the round bracket, what kind of participants are used in the specific construction is described.

   The particular semantic structures of each construction cannot be realized without appropriate participants fused into each argument structure (Goldberg 1995). For instance, the object of *over-V*s in (27a) should be 'an indefinite omissible entity' such

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[20] What I mean *money* here is non-specific money which is used for any purpose. When the verb *spend* is used intransitively, we assume the implicit object is *money*. For example, as we see the sentence like '*the company believed demand was growing from parents prepared to **spend on education**'* (Wordbanks), we presume that *money* is hidden in the context between the verb and the prepositional phrase (so that the verb phrase can be interpreted as *'spend money on education'*).

[21] Both with *overpay* and *overspend,* the implicit object *money* is backgrounded at an extremely high frequency. With *overpay*, the percentage where the inferable object occurs in context is almost zero, and we can rarely see *money* used as the object of *overspend*. One of exceptional examples is '*… make sure that they're not overspending **money** on things…* (CA/ Now Corpus)'. There are only a few examples of these in the corpora data, while there are thousands of examples where *money* is used as the object of the verbal stem *spend*.

as *food in general* for *overeat*, or *a non-specific item* for *overbuy*, which we can easily infer from the meaning of the verbs. On other hand, the subject slot in (27b) is filled by 'uncontrollable patient' which must be more salient than the Agent backgrounded in context.

Incidentally, in English or maybe in many other languages, the Agent normally serves as the subject referent in the sentence, so that when a noun phrase (NP1) as the subject referent refers to the animate agent, especially a human, there is often no mention of what semantic role is given to NP1 (*see.* [27a], there is no mention of what semantic role is given to NP1, but that means that NP1 is the Agent [X: the Agent]). Now that we confirmed what these formulae represent, let us observe each construction and their constructional meaning.

(27) a. [NP$_1$ *over-V*] $\leftrightarrow$ [X$_1$ *V* (Y) *too much*]
       (Y: indefinite omissible object)
       overachieve (goal, target), overbuy (product), overeat (food), overpay (money), overspend (money)

[unergative]

       b. [NP$_1$ *over-V*] $\leftrightarrow$ [(Y) *V* X$_1$ *too much*]
       (X: uncontrollable patient/ Y: non-salient agent)
       overheat, overgrow

[unaccusative]

       c. [NP$_1$ (MOD) *over-V*] $\leftrightarrow$ [(Y) (MOD)*V* X$_1$ *too much*]
       overload, overvalue

[middle]

First, *over-V*s that can be used as unergative intransitives are listed in (27a). The verbal stems that can be incorporated into this intransitive construction are also categorized as unergative intransitives. However, there is a striking difference between unergative *over-V*s and their verbal stems. Both of them have the inferable object, but while the inferable object of the verbal stem is optionally backgrounded, the inferable object is almost obligatorily backgrounded with *over-V*s. Therefore, as a result of *over*-affixation, the verb (*over-V*) is far more likely to be used as an intransitive verb.

Furthermore, in this intransitive construction, specific objects cannot be backgrounded. As discussed in 2.3., specific food that might be harmful to your health when you overeat can be realized as the object. For instance, for people who are obese, eating too much sugary food is especially hazardous to their health. It is relatively acceptable to say '*you are overeating sugary food*' in a situation like that.

Second, *over-V*s that are used as unaccusative intransitives are listed in (27b). In this intransitive construction too, the verbal stems are more likely to be realized as intransitives with *over*-affixation. For instance, while *heat* is rarely used as intransitives, *overheat* is frequently used intransitively. Besides, with *over*-affixation *grow* (*overgrow*) is predominantly used intransitively, although *grow* is occasionally

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used as an intransitive verb. It is noteworthy that when *over-V* is realized in this intransitive construction, the implicit agent is backgrounded and then the Patient serves as its subject referent, mainly when the Agent seems to have no responsibility for the situation.

For instance, as in '*he overheated the engine*', the animate agent *he* is regarded as responsible for the overheating of the engine. It is presumed from the context that careful driving or proper maintenance could have prevented the engine from being heated too much. On the other hand, as in '*due to the breakdown of the radiator the engine overheated*', we are not sure whether the driver was responsible for the overheating of the engine. The only thing we know from the context is that the direct cause was the broken radiator.

Lastly, *over-V*s that can be used as middle expressions are listed in (27c). These intransitive *over-V*s share some properties with *overheat* and *overgrow* in (27b), which are used as unaccusative intransitives, but they are different. While in both intransitive constructions the implicit agent is backgrounded, the Agent is construed as non-autonomous in middle constructions. For example, *truck* cannot load itself with luggage by itself; *market* does not value itself on its own, as exemplified in (28).

(28) a. Predictably, railroads disagree, alleging that **trucks** continually
          overload …   (*reprinted of [22]*)
      b. It is a free market, and **the market** does not overvalue.
                                                          (*reprinted of [23b]*)

When it comes to middle constructions, the verb phrase serves to describe the Patient's characteristics rather than a particular event. It is necessary to note, though, that for *over-V*s in middle to be acceptable, the verb usually occurs with some adjunct, which help us to interpret that the verb phrase is realized as middle expressions.

5 CONCLUSION

In the present study., we confirmed that verbs prefixed with *over-* are realized in three different intransitive constructions: unergatives, unaccusatives, and middles. As for the productivity of each construction, the majority of intransitive *over-V*s are realized as unergative intransitives, which have already been examined in previous studies. Although the number of examples where *over-V*s are used intransitively as unaccusative and middle intransitives is relatively small, it is necessary to realize that other types of *over-V*s are used intransitively with implicit agents backgrounded.

I feel satisfied with what I have found, for sure. However, I should also remind myself of the fact that most linguistic evidence I have provided in the present paper could not have been retrieved even one decade earlier. Thanks to increasing accessibility to massive-sized corpora data, we can now analyze the syntactic and

semantic structures of infrequent words, including verbs prefixed with *over-*(*over-V*s). This means that it is fully expected that more and more English linguists will investigate the forms and meanings of derivatives and compounds by corpora shortly.

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CORPORA

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COHA Corpus. BYU （https://corpus.byu.edu/now/）

I-web Corpus. BYU （https://corpus.byu.edu/iweb/）

Now Corpus. BYU （https://corpus.byu.edu/now/）

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