

Interpretation of Bridging Reference: A Generative Lexicon Approach

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1. Introduction

In the literature on reference assignment, it has been observed that the interpretation of the following italicized noun phrases involves some inference process, in which we associate what the noun phrases refer to with the content of the preceding sentence(s):

- (1) a. Tom entered the room. He walked over to *the window*. (Sanford and Garrod 1981: 97)
- b. Fred was discussing an interesting book in his class. He is friendly with *the author*. (Hawkins 1978: 86)
- c. I couldn't use the box you gave me. *The bottom* fell out. (Erk  and Gundel 1987: 533)
- d. Horace got some picnic supplies out of the car. *The beer* was warm. (Clark and Haviland 1977: 21)
- e. The man drove past our house in a car. *The exhaust fumes* were terrible. (Hawkins 1978: 123)
- f. Mary put the baby's clothes on. *The material* was made of pink wool. (Sanford and Garrod 1981: 106)

To explain this process, the term "bridging" was introduced by Herbert Clark, and this kind of referential phenomenon, called "bridging reference", has been dealt with by various researchers through various approaches.¹

The ultimate goal of the approach I adopt is to give a satisfactory explanation of how these noun

phrases are interpreted. Although several studies have been made on bridging reference over the past two decades, the focus has been on the problems of reference assignment and appropriateness conditions. To be more specific, such studies have given answers to the following questions: (i) What are the factors affecting bridging reference assignment? (ii) What makes some cases of bridging appropriate and others inappropriate? There is therefore little research on what mechanisms determine precisely how the interpretations of such bridging expressions are composed in association with preceding context. In this paper, still at a preliminary stage of the research, I just try throwing a new light on the compositional procedure for the interpretation of a few basic instances of bridging reference by introducing Generative Lexicon Theory, which is put forth in Pustejovsky (1995) and employed in Johnston and Busa (1996) and Busa (1996) with necessary modifications.

2. Past Studies of Bridging Reference

In this section, I will examine some of the explanations in the past studies of bridging reference and expose their defects. To put matters in more concrete terms, let us reconsider some of the above examples of bridging reference, repeated below:

- (2) a. Tom entered the room. He walked over to *the window*. [= (1a)]
- b. Fred was discussing an interesting book in his class. He is friendly with *the author*. [= (1b)]

In both cases, the italicized noun phrases refer to an entity that is newly introduced, and there is no mention of the entity in the preceding sentence. The problem with these examples is that the noun phrases that denote a newly introduced entity include a definite article, which is usually used to refer to an entity that has already been mentioned. To resolve this contradiction, we interpret the noun phrases by associating them with the content of the preceding sentence(s). For example, the italicized noun phrases in (2) are associated with another noun phrase in the preceding sentence, and their referents are interpreted as having some relation with the referent of the other noun phrase. The interpretations of (2a) and (2b) can therefore be explained as (3a) and (3b), respectively:

- (3) a. The reader will identify *the window* as Given, and so set up a search for an antecedent. The outcome of this search is to create the bridge: The room mentioned has a window. This is the antecedent for the window. (Sanford and Garrod 1981: 97)
- b. On this occasion there is no preceding indefinite reference to *an author*. Mention of *an interesting book* is sufficient to permit the immediately following first-mention definite description, the author. When the definite article is used in this way the native speaker will tell us that the person referred to by the author is understood as being *the author* of the previously mentioned book. (Hawkins 1978: 86-87)

At first sight, these explanations seem clear and fraught with no problems at all. However, they are inadequate for the purpose of this paper. In (3a), it is pointed out that “the room” is the antecedent for “the window”, but there is no mention of the interpretation itself of “the window”. Though, in (3b), “the author” is paraphrased as “the author of the previous-

ly mentioned book”, an explanation of how native speakers make this interpretation is demanded.

3. Theoretical Framework of Generative Lexicon

Thus far, we have looked at a few examples of bridging reference and their explanation. In this section, I will introduce a simplified version of the Generative Lexicon representation, which is employed in Busa and Johnston (1996), Busa (1996) and Maekawa (2001). Busa and Johnston (1996) explains their framework as follows:

- (4) For the purpose of this paper, we will simplify the representational structure of a GL [i.e. Generative Lexicon] lexical entry to include four levels of representation: *type structure*, *argument structure*, *event structure* (for verbs), and *qualia structure*. The latter in turn expresses four aspects of the meaning of the lexical item: FORMAL, CONSTITUTIVE, TELIC, and AGENTIVE.

The simple schematic form of a lexical item α under this system is as follows:

$$(5) \left[\begin{array}{l} \alpha \\ \text{TYPESTR} = \left[\text{ARG1} = \text{the type of } \alpha \right] \\ \text{ARGSTR} = \left[\text{D-ARG1} = \text{other arguments/} \right. \\ \left. \text{events in the qualia} \right] \\ \text{EVENTSTR} = \left[\text{E1} = \text{events in the qualia} \right] \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = \text{isa-relation} \\ \text{CONSTITUTIVE} = \text{parts of } \alpha \\ \text{TELIC} = \text{purpose of } \alpha \\ \text{AGENTIVE} = \text{how } \alpha \text{ is brought about} \end{array} \right] \end{array} \right]$$

In this model, a noun such as “knife” is analyzed as having the following entry (cf. Busa and Johnston 1996):²

(6)	[knife]
		TYPESTR = [ARG1 = x: artifact_tool]	
		ARGSTR = [D-ARG1 = y: physobj D-ARG2 = w: creature D-ARG3 = z: creature]	
		QUALIA = [FORMAL = x CONSTITUTIVE = { blade, handle,... } TELIC = cut_act (e₂, w, x, y) AGENTIVE = make_act (e₁, z, x)]	

Let us look at each structure. To begin with, TYPE STRUCTURE specifies what type of entity the lexical item refers to. In the case of “knife”, the information that knives are artifacts and tools is stored here. Then, in ARGUMENT STRUCTURE, those arguments are enumerated which exist in QUALIA STRUCTURE but are not registered in TYPE STRUCTURE. D-ARG stands for a DEFAULT ARGUMENT, which is defined by Busa (1996: 39-40) as follows:

- (7) DEFAULT ARGUMENTS: these arguments are logically part of the expressions in the qualia, but do not need to be obligatorily realized syntactically; e.g.
- (8) a. John built a house *out of wood*.
b. John built a house.
- (9) a. the author *of the book*
b. the author

In (6), participants in the **cut_act** other than the knife itself are listed as default arguments D-ARG1 and D-ARG2, and the person who has made the knife is registered as the third default argument D-ARG3. Finally, as already mentioned in (4), QUALIA STRUCTURE expresses four aspects of the meaning of the lexical item. Each aspect is defined as follows:

- (10) a. CONSTITUTIVE: the relation between an object and its constituents, or proper parts.
b. FORMAL: That which distinguishes the

object within a larger domain.

- c. TELIC: Purpose and function of the object.
- d. AGENTIVE: Factors involved in the origin or “bringing about” of an object.

(Pustejovsky 1995: 85-86)

In addition, the same variable in some slots means that they share the same content or semantic value among different parts of the semantic representation.

4. Interpretation of Bridging Reference and Generative Lexicon

In this section, I will explore the applicability of Generative Lexicon Theory to the interpretation of bridging reference. Let us begin by having another look at the following example:

- (11) Tom entered the room. He walked over to *the window*. [= (1a)]

As already mentioned in (3a), when we read this passage, we usually associate “the window” with “the room” in the preceding sentence, and consequently “the window” is understood as belonging to “the room”. Moreover, we intuitively know that their relation is expressed by the phrase “the window of the room” and “the window” in (11) is really interpreted as “the window of the room”. However, the question remains how this interpretation is achieved, or more precisely, composed, and I will demonstrate that Generative Lexicon can give an informative answer to this question.

4.1. The Lexical Entry for “window”

To begin with, I assume that a noun such as “window” has the following entry, taking Maekawa (2001: 108) as a model:

$$(12) \left[\begin{array}{l} \text{window} \\ \text{TYPESTR} = \left[\begin{array}{l} \text{ARG1} = \mathbf{x: phys_obj} \\ \text{ARG2} = \mathbf{y: aperture} \end{array} \right] \\ \text{ARGSTR} = \left[\text{D-ARG1} = \mathbf{w: phys_obj} \right] \\ \text{QUALIA} = \left[\text{FORMAL} = \mathbf{hold (w, x)} \right] \end{array} \right]$$

In this representation, irrelevant parts to my explanation are omitted for the sake of simplicity. TYPE STRUCTURE of “window” contains two pieces of information: **phys_obj** and **aperture**. This means that windows are physical objects, and at the same time, apertures. The FORMAL role in QUALIA STRUCTURE has the value of **hold (w, x)**, which expresses the relation in which a physical object (**w**) holds another physical object (**x**, “window”). To put it the other way round, the latter is part of and included in the former. In ARGUMENT STRUCTURE, **w** is registered as a default argument. Windows do not usually exist alone, but constitute part of an entity referred to by **w**, such as a room, a house, an apartment, a building, and so on. Information on this matter therefore should be included as part of the meaning of “window”, but need not to be syntactically expressed, and such referent is encoded as a default argument.

The question now arises: When the default argument **w** is realized syntactically, what form does it take? Pustejovsky (1995: 66) describes that “default arguments can be satisfied by full phrasal expression as a PP [i.e. Prepositional Phrase],” but, as Maekawa (2001: 110) points out, what prepositions are used and under what conditions they are used are not specified. The following examples provide the answer to this question:

- (13) a. As she recrossed the square she saw Helen and Mr. Bast looking out of *the window of the coffee-room*, and feared she was already too late. (E. M. Forster, *Howards End*: 239)
- b. The husband opened *the window of his*

house. (Linford Christie and Tony Ward, *Linford Christie: An Autobiography, BNC*)

- (13) shows that the default argument **w** in (12) is verbalized into a possessive expression containing “of”.

4.2. Interpretation of “window” and Generative Lexicon

Having set up the lexical entry for “window”, let us consider how to explain the semantic relation between the PP whose head is “of” and the head noun “window”. Maekawa (2001: 105) deals with this kind of expression through a Generative Lexicon approach.³ More specifically, he assumes that “of”-phrases used to show possession perform the following interpretive function.

(14) The function of “of”-possessives

Among the arguments in the FORMAL role of the head noun, they choose an argument that is not included in TYPE STRUCTURE, and fill its value. (cf. Maekawa 2001: 105)

I accept his assumption and regard the function of “of”-phrases in (13) as filling the value of **w** with their content. To put it more concretely, “the coffee-room” and “his house” are used to fill the value of **w** in (13a) and (13b), respectively. Through this procedure, semantic association is achieved and the whole noun phrase (the window + “of”-phrase) is interpreted successfully.

With these points in mind, let us return to bridging reference. As has been suggested, bridging expressions have a interpretive similarity to noun phrases with a “of”-possessive. To be more specific, with respect to the interpretation of (11), we usually fill the value of **w** in “the window” with the referent of its antecedent, that is, “the room” in the preceding sentence. This suggests the applicability of a similar mechanism to bridging reference. At this stage, I ten-

tatively propose that antecedents for bridging reference have the following function:

(15) **The function of antecedents for bridging reference**

Among the arguments in the FORMAL role of the bridging expression, they choose an argument that is not included in TYPE STRUCTURE, and fill its value.

In the case of (11), in a similar way to cases of “of”-phrases, it is thought that “the room” is used to fill the value of *w*, and as a result, “the window” in (11) takes on the interpretation as “the window of the room”.

How can we ascertain the validity of the analysis attempted in this section? In the next section, I will

5. Semantic Distinction in Nominals and Bridging Reference

In this section, I will introduce the semantic distinction among nouns and explore its relation to Generative Lexicon and Bridging Reference.

5.1. Semantic Distinction in Nominals

It is well known among linguists that there is the distinction between stage-level and individual-level predicates. Pustejovsky (1995: 229) states that this distinction “might extend to the nominal domain as well,” and add the following explanation:

- (16) There is a difference between “role-defining” nominals such as *physicist*, *linguist*, and *violinist*, and “situationally-defined” nominals such as *pedestrian*, *student*, *passenger*, and *customer*. I will refer to these two classes as *individual-level* nominals (ILNs) and *stage-level nominals* (SLNs), respectively.

Moreover, he argues that their semantic difference is

reflected by the configuration of QUALIA STRUCTURE of the nominals.

- (17) This distinction can be brought out in the semantics as a difference in qualia structure, where the situational reading of an SLN can be identified with the AGENTIVE quale of the noun (cf. [(18a)]), while the generic readings available for ILNs are associated with the TELIC role of the noun, cf. [(18b)].

- (18)
- a.
$$\left[\begin{array}{l} \text{pedestrian} \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = x \\ \text{AGENTIVE} = \text{walk_act}(e, x) \\ \dots \end{array} \right] \end{array} \right]$$
- b.
$$\left[\begin{array}{l} \text{violinist} \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = x \\ \text{TELIC} = \text{play}(e, x, y: \text{violin}) \\ \dots \end{array} \right] \end{array} \right]$$
- (Pustejovsky 1995: 230)

Interestingly enough, as Busa (1996: 212) mentions, some nouns, such as “painter”, “baker”, “writer”, and “builder”, “alternate between an ILN and a SLN interpretation.” In other words, they are polysemous between two readings. She adduces the following examples:

- (19) a. the builder
 b. the builder of the house
 c. the house builder
- (20) a. the painter
 b. the painter of the portrait
 c. the house painter (Busa 1996: 212)

She describes their interpretive difference as follows:

- (21) The forms without a complement [i.e. (19a), (19c), (20a), and (20c)] have an ILN interpre-

tation, whereas the forms with the complement [i.e. (19b) and (20b)] are interpreted as SLN. (Busa 1996: 213)

She thinks that their ILN sense is primitive and suggests that, with the semantic contribution of the complement (that is, the “of”-phrase), the SLN sense is derived by the co-composition rule, which she explains as (22) and schematizes as (23):

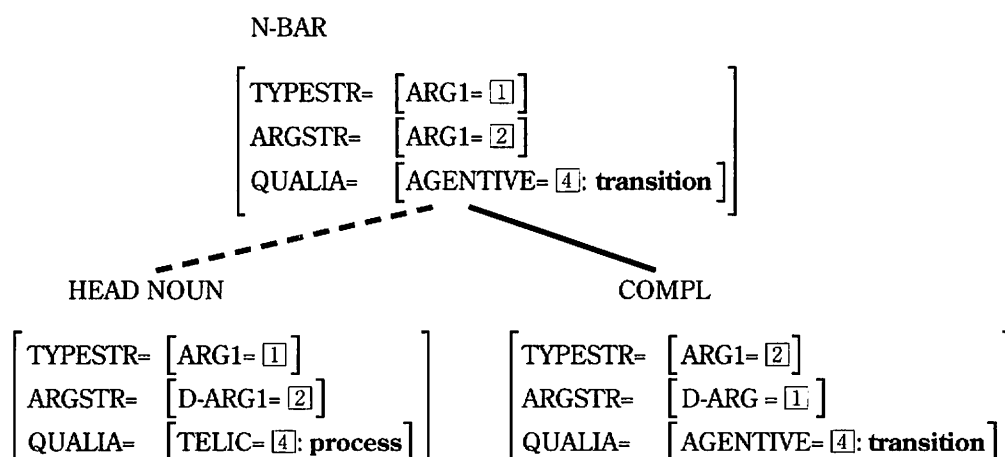
- (22) The co-composition results in the derived sense of the noun, where the TELIC role of the head noun, and the AGENTIVE role of the complement unify, and the AGENTIVE role of the complement becomes the AGENTIVE role of the NP structure. (Busa 1996: 213)

Unfortunately, she does not show the representation with the slots filled with specific values. In the next part of the paper, I will utilize this schema and show the interpretive mechanism of bridging reference.

5.2. Interpretation of “author”, Generative Lexicon, and Bridging Reference

Having introduced the semantic distinction among nominals and their treatment by Generative Lexicon, let us re-examine the following example:

(23)



(Busa 1996: 214)

- (24) Fred was discussing an interesting book in his class. He is friendly with *the author*. [= (1b)]

In this passage, how is the italicized bridging expression interpreted?

The important point is that the noun “author” has two meanings, as seen in the following definition:

- (25) 1. The **author** of a piece of writing is the person who wrote it.
.. Jill Phillips, author of the book ‘Give Your Child Music’...
 2. An **author** is a person whose job is writing books.
Haruki Murakami is Japan’s best-selling author.

(COBUILD³)

(25) shows that these two meanings are usually distinguished by whether the noun occurs with an “of”-phrase or not. When the noun “author” occurs alone, it has the second meaning. The noun “author” accompanied by an “of”-phrase is interpreted as the first meaning.

This fact about “of”-phrases reminds us of the nominals discussed above, which are polysemous between a SLN and an ILN reading. I suppose that

the noun “author” is also one of those polysemous nominals and argue that the first meaning in (25) corresponds to its SLN interpretation, whereas the second meaning makes an ILN interpretation of this noun. The following example also buttresses my argument:

- (26) Armstrong is currently a visiting scholar at Harvard and *the author* of nine books on religion. (*NEWSWEEK WEB EXCLUSIVE* 2001/10/29)

Here, the nominal that defines the role of Armstrong is “a visiting scholar”. “The author” does not define his role, but just refers to his past situation, in which he wrote nine books on religion. Therefore, in (26), it is clear that “the author” has an SLN interpretation.⁴

Having observed the interpretation of “author”, let us offer its reasonable explanation in terms of Generative Lexicon. In all the above examples, the relevant part of the sentences includes only two nouns: “author” and “book”. Here, I assume their lexical entries as follows (Following Busa (1996), I suppose that the primitive lexical entry of “author” encodes an ILN interpretation and its SLN interpretation is derived by the process of co-composition):

- | | | |
|---------|-----------------------------|----------------------------|
| (27) | ARGSTR= | author (ILN) |
| | | TYPESTR= [ARG1 = x: human] |
| | | [D-ARG1 = w: infomation] |
| | | [D-ARG2 = v: physobj] |
| QUALIA= | [infomation · physobj_lcp] | |
| | FORMAL = x | |
| | [TELIC = write (e, x, w.v)] | |
- (cf. (18b), Busa 1996: 84-94, Busa and Johnston 1996)

- | | | |
|---------|----------------------------|---------------------------------|
| (28) | ARGSTR= | book |
| | | TYPESTR= [ARG1 = x: infomation] |
| | | [ARG2 = y: physobj] |
| | | [D-ARG1 = w: human] |
| QUALIA= | [D-ARG2 = v: human] | |
| | [infomation · physobj_lcp] | |
| | FORMAL = hold (y, x) | |
| | | TELIC = read (e, w, x.y) |
| | | AGENTIVE = write (e', v, x.y)] |
- (cf. Pustejovsky 1995: 116, Busa and Johnston 1996)

The first thing that we notice by the comparison of (27) and (28) is that the TELIC role of “author” and the AGENTIVE role of “book” have the same value. As shown by (22) and (23) above, these two roles unify, and the AGENTIVE role of “book” becomes the AGENTIVE role of the whole noun phrase. The resultant structure of the lexical entry is as follows (cf. (18a) and (23)):

- | | | |
|---------|---------------------------------|----------------------------|
| (29) | ARGSTR= | author (SLN) |
| | | TYPESTR= [ARG1 = x: human] |
| | | [ARG2 = w: infomation] |
| | | [ARG3 = v: physobj] |
| QUALIA= | [infomation · physobj_lcp] | |
| | FORMAL = x | |
| | [AGENTIVE = write (e', v, x.y)] | |

Finally, let us return to “the author” in the example (24). In this case, even though there is no “of”-phrase complement, the bridging expression is interpreted in an SLN meaning. “the author” in (24) does not denote a professional writer, but just describes that the person has written an interesting book referred to in the preceding sentence. In other words, “the author” without an “of”-phrase is interpreted as if it accompanied an “of”-phrase when it is used as a bridging expression. Again, it is observed that there is a striking interpretive similarity between bridging reference and noun phrases with an “of”-phrase.

According to the Generative Lexicon view adopted by Busa (1996), the SLN reading of the noun “author” is not primitive, but is derived by co-composition. Taking this into consideration, we are impelled to assume that the interpretation of bridging reference employs a mechanism of semantic composition similar to that shown by (22) and (23), in which the referent of the antecedent corresponds to that of the noun in the “of”-phrase. This might take the following form:

- (30) The semantic association of bridging expressions with their antecedent results in the derived sense of the noun, where the TELIC role of the bridging expression, and the AGENTIVE role of the antecedent unify, and the AGENTIVE role of the antecedent becomes the AGENTIVE role of the bridging expression.

6. Conclusion

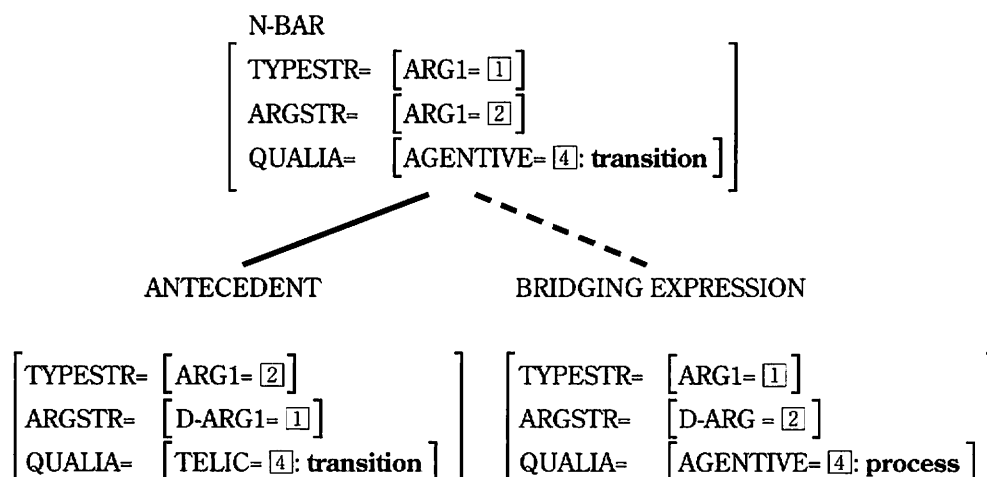
In this paper, I have analyzed the interpretation of bridging reference in terms of the Generative Lexicon. The bridging expression taken up in this paper has an interpretive similarity to the noun phrase with its “of”-phrase complement. Based on this similarity, I have argued that these two linguistic

phenomena use similar interpretive mechanisms. By using as models the studies on the interpretation “of”-phrases in terms of Generative Lexicon, I have proposed my own explanation of the interpretation of bridging expressions. Given that the number of examples discussed here is much limited, to reach the ultimate goal of this approach is still a far-fetched dream, but I hope that by applying Generative Lexicon to various linguistic phenomena, the theory itself will develop further and give us more knowledge and insight.

Notes

1. For various approaches to bridging reference, see Haviland and Clark (1974), Clark and Haviland (1977), Hawkins (1978), Sanford and Garrod (1981), Erku and Gundel (1987), Yoshida (1995), Matsui (2000), and the works referred to therein. Also see Kosaka (2001) for an interesting discussion of understanding of bridging reference by Japanese ESL learners.
2. Here, EVENT STRUCTURE is omitted for ease of explanation and not discussed, because it is irrelevant to the purpose of this paper.
3. Maekawa (2001) proposes an interesting explanation of the difference between “of”-possessives and “to”-possessives. In concrete terms, he discusses the semantic difference between “the door of the room” and “the door to the room” through a Generative Lexicon approach. His explanation of “of”-possessives is exceedingly helpful for thinking out my explanation of bridging reference.

(31)



4. Note that, as Pustejovsky (1995: 229) remarks, “There are cases, however, where a SLN may appropriately refer even after the situation identifying the individual has occurred, as in [(i)].”

(i) Hey, you’re the *passenger* from my flight yesterday!

He continues, “What is important to point out about such examples, however, is that the situation referred to by the NP *the passenger* is still existentially quantified over, unlike the generic readings available for ILNs.”

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