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/eə/ or /ɛː/?: Monophthongization of SQUARE words in RP and Transcription in Dictionaries

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1. Introduction

In RP, there are supposedly three centring diphthong phonemes: /ɪə, ɛə, ʊə/ of words like *near*, *hair*, and *moor*, respectively. These are sometimes written with varying symbols, e.g. /iə, eə, uə/, but what both transcriptions are trying to express is the diphthongal quality of the pronunciations of the phonemes in question.

However, certain dictionaries published by the Oxford University Press in the 1990s began to use a symbol for the vowel found in SQUARE words[1] (the pronunciation of the vowel in words like *square* and *hair*) that supposes a monophthong. I wrote in Akasu et al. (2000), when analyzing the pronunciation of headwords in the then newly published *NODE* (1998), that its transcription for the RP vowel sound in SQUARE words as /ɛː/ instead of the usual /eə/ or /ɛə/ "looked strange" and since the actual pronunciation tended towards a diphthong word-finally, suggested that "the more natural phonemic transcription would be to use /ɛə/ instead of /ɛː/." Windsor Lewis (2003)'s opinion on the transcription of this phoneme is in line with mine, but with much more detailed reasoning.

However, recent publications on phonetics such as Collins and Mees (2003: 97) state that "SQUARE /ɛː/ is typically a steady-state vowel in present-day N[on] R[egional] P[ronunciation]. For past generations, a centring diphthong of an [ɛə] type was usual, and this is still to be heard as a variant pronunciation." They go on to say that the symbol used in most textbooks to describe the sound in this word group as [eə] "certainly does not reflect the typical pronunciation of the twenty-first century."

In this paper, I would like to survey this particular phoneme to find out the state of affairs at the start of the 21st century. I will first look back at the history of this phoneme, and then return to the present situation. I will also consider the force behind the change, if there is a change, before coming to a decision of whether this sound should be considered a diphthong or a monophthong.

2. History

The /ɛə/ vowel comes "from ME [a:] + [r] (*care, hare, mare*); ME [ɛi] or [æi] + [r] (*their, air, hair, fair*); ME [ɛ:] + [r] (*bear, there, where, swear*)."[1] In the 17th century, [a:], [ɛi] or [æi], and [ɛ:] all seem to have coalesced into [ɛ:] when [r] followed, and the three groups converged. Then, in the 18th century, Pre-R Breaking[2] occurred: i.e. a schwa was inserted before [r]. Later on, this [r] was dropped, thus giving [ɛ:] + [ə], which in turn was shortened to [ɛə].

According to Daniel Jones' earlier explanations, this sound "tends towards and is often replaced by ((æə)). When final it tends towards and is often replaced by ((ɛʌ)) or ((æʌ))."[3] In other places, he describes the same vowel as "a diphthong which starts about half-way between the English [v]owels . . . e and æ[4] and terminates at about ə3."[5] This last symbol is the most open variety among the three different tongue positions of the schwa allophones that Jones (1960) gives, and is an "ʌ-like sound."[6] Here again, Jones notes the variants of the phoneme in RP as [æə] or with a much higher starting-point, close to [e]. The end-point variation is also mentioned, and his notation is [ʌ], the same as his explanation in the *EPD*. Mention is made of the monophthongal long pronunciation [ɛ:], but that by Southern speakers and [e:] in certain contexts by Londoners.[7]

Gimson (1980:144) describes the RP glide /ɛə/ as a sound that "begins in the half-open front position, i.e. approximately C[ardinal] [ɛ], and moves in the direction of the more open variety of /ə/," a description almost exactly the same as that given by Jones. The RP variants that Gimson cites are again almost identical to those mentioned by Jones, but one difference is that Gimson refers to Advanced RP as using "a long pure vowel [ɛ:], often somewhat centralized, especially in a non-final syllable,

e.g. *careful, scarcely* . . . ." Gimson's term "Advanced RP" is the name given to the pronunciation of "young people of exclusive social groups—mostly of the upper classes, but also, for prestige value, in certain professional circles."[8] Gimson adds that although the Advanced variety may be judged by other RP speakers as "affected," it may well become the norm in the future.

When Cruttenden took over the classic book after Gimson's death, he rewrote considerable parts of it in order to update its content in accordance with results from new studies and emerging pronunciations. And just as Gimson had predicted, the monophthongal pronunciation [ɛ:], that he had attributed to speakers of Advanced RP, is commented on by Cruttenden to be "[n]owadays . . . a completely acceptable alternative in General RP."[9] Furthermore, Cruttenden (2001:82) adds to his list of pronunciation changes almost complete for General RP, the phoneme /eə/ being realized monophthongally as [ɛ:].

Wells (1982: 156) also describes RP /ɛə/ as starting from a front, unrounded, and approximately half-open vowel going towards a mid-central quality: [ɛə]. Although Wells takes the position that this phoneme is a diphthong in RP, he does add that "RP /ɛə/ often involves very little diphthongal movement."[10]

We saw above that in 2001, Cruttenden announced that /eə/ was being pronounced as a monophthong [ɛ:] by RP speakers, and we also saw at the beginning of this paper that Collins and Mees (2003) stated that this vowel was a glide-less, steady-state vowel [ɛ:] in present-day RP.

3. Transcription in Dictionaries

Next, we shall look at how the phoneme is transcribed in dictionaries. The transcription system usually reflects the viewpoint of the pronunciation editors of the dictionary, and it is natural that Jones' *EPD*1~13 should adopt /ɛə/.

Gimson's completely revised version of *EPD*14, which he took over after Jones' death, employed /eə/ instead of /ɛə/, but this was merely "for the sake of simplicity."[1] Gimson explains in the Introduction that "the first part of this diphthong is more open than the short vowel of 'pen.'"

We saw earlier that Gimson's explanation of the pronunciation of the vowel was almost exactly the same as that given by Jones.

As I mentioned in Ichikawa et al. (1996), *OALD*4, which was edited by Gimson, based its pronunciation on *EPD*14, and hence the /eə/ transcription. In 1991, *EPD*14 was transferred from Dent to Cambridge University Press, a rival publisher to Oxford, and after this, Oxford dictionaries, except for Gimson's learners' dictionary, apparently broke off from the *EPD* system and went their own ways. Thus we see the monophthongal /ɛː/ transcription in *SOD*4, *COD*9, *NODE*, and the pronunciation dictionary, *ODP*—all published after 1991. See Table 1 below.

Table 1 Publication year of important editions of the *EPD* and Oxford dictionaries and the transcription used for SQUARE words

1917~ *EPD*1~13	ɛə	1977 *EPD*14	eə	1988 *EPD*14	eə	1997 *EPD*15	eə	2003~ *EPD*16~	eə
Jones		completely revised by Gimson		revised by Ramsaran after Gimson's death		edited by Roach and Hartman		with CD-ROM Roach, Hartman and Setter	
1933 *OED*	ēᵊɪ			1989 *OED*2	ɛə				
				1989~ *OALD*4~	eə	1993 *SOD*4	ɛː		
				1990 *COD*8	eə	1995 *COD*9	ɛː		
						1998 *NODE*	ɛː		
						2001 *ODP*	ɛː		

In the Introduction to the *ODP* the editors distinctly state that "the mainstream sound is normally monophthongal, although it is sometimes attended by an off-glide, giving [ɛːə], particularly in a stressed final

syllable. A full diphthong [ɛə] in this position should now be taken to be especially a feature of a marked variety of RP."[2] And therefore, the transcription used in this pronunciation dictionary is /ɛː/.

Despite the fact that Wells (1982) was aware of the possible monophthongization of the vowel in the lexical set SQUARE, his pronouncing dictionary, *LPD*2, in 2000, maintains the diphthongal symbol /eə/ used in editions of *EPD* that Wells mentions foremost in his Acknowledgements. Learners' dictionaries published by Longman (Pearson Education) also use this diphthong symbol.

4. Actual Pronunciations

Windsor Lewis (2003) picked out approximately fifty tokens of /eə/ that appear in the context where the phoneme is least influenced by other sounds, namely in the stressed, word-final position. He then listened to the recordings that accompany "the texts of [*O*]*ALD* and *LPD* [sic],[1]" and found that among the total of ten or so speakers from the two CD-ROMs, there were "at least a couple who regularly used [ɛː], but the majority used fairly clearly diphthongal values." Some were doubtful tokens, and yet others alternated between the monophthong and the diphthong.

*EPD*17's CD-ROM search finds 1556 matches of /eə/. Of these, 305 appear word-finally, with or without primary stress, and 156 words have the vowel in this position with primary stress. Listening to the model pronunciations by about five different speakers, we find more instances of the vowel being pronounced as a monophthong, compared to Windsor Lewis' count. One female invariably pronounces [ɛː], and another female voice says [eə] in some words but [ɛː] in others. Among the male speakers, one person invariably realizes the phoneme in question as a monophthong, stressed or non-stressed, and yet another male speaker has a distinct diphthong that almost sounds like two syllables. One man pronounced the non-prominent *outerwear* with [ɛː] but the primary-stressed *O'Hare* with [eə]. In non-final syllables that do not carry primary stress, the monophthongal realization prevails for all speakers, except when there is a following /r/, and this allophonic difference is something that is often pointed out.

We must be aware of the fact that the speakers on the CD-ROM accompanying dictionaries, who are made to pronounce citation forms in a recording studio, are most likely to be pronouncing the words slowly with utmost care, and that this will naturally result in the more-than-average count of the diphthongal variant, compared to the same sound being pronounced in a sentence and in more natural situations. On listening to news readings and interviews on radio or TV, where the speakers are pronouncing the same phoneme much more quickly and unconsciously, one does get the impression that this phoneme is indeed already a monophthong, because it is used even in stressed, word-final positions: e.g. *Tony Blair*.

5. Direction of the Change

Even if we were to count the SQUARE set vowel as a diphthong, there are only three centring diphthongs in RP. Of the three, we know that /ʊə/ is presently on the verge of disappearance, merging with /ɔː/ as in *poor*, *sure*, and even in *tour*. This brings to mind the fact that there used to be another centring diphthong in RP, namely /ɔə/, before it monophthongized and merged with /ɔː/, and the following used to be a minimal pair in RP: *pour* /pɔə/ vs. *paw* /pɔː/. The diphthongal transcription /ɔə/ could still be seen in *EPD*14 revised by Gimson, or in *OED*2. The old-fashioned [ɔə] variant disappeared from dictionaries from around *EPD*15. From this, and other evidences found in dialects like Australian English[1], we can see that centring diphthongs in English are rather unstable and moving in the direction of monophthongization.

If /eə/ were to become /ɛː/ to join the other long vowels, we can see that it fills in the gap at the front of the tongue (see Figure 1).

Figure 1 Approximate layout of monophthongal vowels that occur in open syllables

Considering the fact that the phonemes /iː/ and /uː/ both have slightly diphthongal realizations now, especially in the stressed, word-final context, there is no reason why we cannot include the SQUARE vowel here also, instead of in the centring-diphthong group, because this phoneme behaves in the same way as the two high "monophthongs."

6. Conclusion

Although my eyes were reluctant to accept the transcription /ɛː/ for /eə/ on seeing it for the first time in *NODE* almost ten years ago, after having looked at the history of the same phoneme, and after having listened to the actual sounds as pronounced by RP speakers, I have come to believe that this phoneme should indeed be included in the monophthong series and be transcribed as such.

Windsor Lewis expresses strong objection to Oxford's divergence from the *EPD* and their change of policy in transcribing the pronunciation of headwords in their dictionaries. However, for the change to /ɛː/ from /eə/, Windsor Lewis (2003: 148) admits that the substitution "is one with which one can have a great deal of sympathy." He also agrees that when this phoneme is used, the monophthongal variant is most often heard. But then, he listens to the recordings of citation forms of this phoneme in word-final position, and finds that the realizations are not uniform, and that the majority of the tokens still show diphthongal values or fluctuation between monophthong and diphthong sounds. Therefore, he concludes that the transcription for this vowel should remain diphthongal.

However, looked at another way, it can be said that this vowel was pronounced as a monophthong even in slow, formal speech of reading out citation forms, and the present writer considers that this is reason enough to admit the phoneme into the monophthong group. A few more reasons for the change have been mentioned earlier.

This change does not affect the total number of vowel phonemes (i.e., there are no mergers or splits) nor does it disrupt the vowel system of RP: e.g., *faired* differs from *fed* not by length alone but also by tongue height, as are the differences between /iː/ and /ɪ/ or /uː/ and /ʊ/).

NOTES

Section 1

1) Wells (1982).

Section 2

1) Cruttenden (2001: 144).
2) Wells (1982: 214).
3) *EPD* (1917: xxii).
4) Jones explicitly defines this as Cardinal Vowel ɛ on the following page.
5) Jones (1960: 113).
6) Jones (1960: 91ff.).
7) Jones (1956: 64).
8) Gimson (1980: 91).
9) Cruttenden (2001: 144).
10) Wells (1982: 157).

Section 3

1) *EPD*14 (1977: xvii).
2) *ODP* (2001: xiii).

Section 4

1) Could Windsor Lewis have meant *LDOCE*4 or *EPD*16? Neither *LPD* nor *LPD*2 is accompanied by a CD-ROM.

Section 5

1) In Australian English, there is virtually no centring diphthong, with /ʊə/ realized as [ɔ:], /eə/ monophthongized to [e:], and even /ɪə/ being pronounced [ɪ:] by Broad Australian English speakers.

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Connectives as Frame Connectors: An Extended FrameNet Approach to *while*[1)]

Satoru Uchida

1. Introduction

This paper aims to clarify meanings and functions of connectives[2)] by scrutinizing the combinational patterns of semantic frames evoked in the connected clauses based on the descriptions provided by FrameNet.[3)] Combinational patterns of frames observed with respect to a particular connective are termed as "frame valences" in much the same way as a verb having its own valances with compliments. The idea that each connective has distinct frame valences will allow us to describe characteristic usage patterns of connectives in terms of the semantic information these frames provide. This approach will prove more accurate and concrete in its descriptions of the meanings of connectives compared with any other attempts that have ever been made. The main focus of this paper will be placed on the use of the English connective *while*, which has various functions and hence deserves to be investigated.

Connectives are usually considered functioning as linking devices which connect clauses, propositions or discourse units. Halliday and Hasan (1976), for example, claim that a discourse connective links two discourse segments such as a clause it introduces and a clause that precedes. Schiffrin (1987), proposing an integrative notion of discourse, suggests that connectives may operate at any level of discourse unit such as action structures, idea structures, participation framework and information state. Other researchers such as Mann and Thompson (1986, 1988) and Sanders *et al.* (1993) have studied the types of relations realized by connectives. These studies have mainly concentrated on the meanings and functions

connectives have in a sentence, text or discourse, or coherence relations that connectives represent.

Although countless such detailed studies have appeared, little attention has been paid to the types of information conveyed by the linguistic units conjoined by the connectives. This lack of semantic information makes it difficult to differentiate the multiple meanings and functions of one connective. Previous studies also have difficulty in explaining the choices among connectives native speakers make in similar linguistic context. We will discuss this point later by taking *while* and *although* in concessive sentences as examples. It will be also pointed out that synonymous connectives are not given sufficient definitions to be distinguished in many of the monolingual learners' dictionaries.

This paper suggests that the meanings and the functions of connectives can be best described in terms of semantic frames evoked in the clauses combined by the connectives. In this respect, we will show that FrameNet, an online dictionary of semantic frames, provides powerful descriptive tool to pin down the semantic frames of each clause, and eventually, the valances of the connectives. If we assume that connectives also function at the level of frames, i.e., they combine the frames evoked in the clauses they connect, meanings and functions of a connective can be defined by describing the kinds of concepts, namely frames they combine. If this is the case, each connective is given much finer lexicographic descriptions regarding its usages. It is also hoped that the description of the meanings of connectives, in turn, constitutes important areas of FrameNet since FrameNet has not fully dealt with connectives and their meanings (cf. Ruppenhofer *et al.* 2006). These are the goals this paper attempts to attain in the widest perspective.

This paper is organized as follows: in Section 2, we will give an overview of some influential previous studies on connectives: examinations will be carried out in terms of conventional implicature (Grice 1989); Relevance Theory (Wilson and Sperber 1993, Blakemore 1987, Rouchota 1998); and Sweetser's theory (1990). All these studies have advantages in some respects. It will be shown, however, that they fail to give a unitary account and sophisticated descriptions when it comes to analyzing the

polysemous connective *while* and to differentiating synonymous connectives. In Section 3, we will overview the framework of FrameNet and discuss how connectives are defined in FrameNet. It will be shown that although FrameNet descriptions of word meanings are innovative and powerful in many ways, the current annotation system has the same problems as the previous studies regarding the descriptions of connectives. To solve these problems, in Section 4, an extended frame semantic way of describing connectives will be proposed. We will discuss the "frame valences" of each meaning of *while* and then try to reveal differences between *while* and *although* used in concessive sentences. Section 5 will summarize the discussion and will present implications and remaining tasks for future research.

2. Previous Studies on Connectives

This section deals with previous studies on connectives. There are a number of studies on them but we will concentrate on some of the most influential studies in this field: the analysis presented by Grice (1989) in terms of conventional implicature, the relevance theoretical analysis (Wilson and Sperber 1993, Blakemore 1987, Rouchota 1998), and the analysis in terms of cognitive domains (Sweetser 1990). Each of these approaches has its own advantages in some respects. It will be shown, however, that some problems arise when it comes to analyzing polysemous connectives such as *while*; most of the previous studies cannot give an adequate account for how various distinct meanings of one connective are related to and distinguished from each other and that only Sweetserian theory can give a unified account for the polysemy of *while*. However, it will be discussed that even Sweetserian theory fails to capture differences between synonymous connective such as *while* and *although* in concessive sentences.

2.1. Polysemy of *while*

While has various meanings as the following definitions from *OALD*7 indicate:[1)]

(1) (a) during the time that something is happening
(b) at the same time as something else is happening
(c) used to contrast two things
(d) (used at the beginning of a sentence) although; despite the fact that

These definitions clearly show that *while* is interpreted in completely different ways depending on linguistic and discourse context. It can serve as a temporal conjunction in the cases of (1–a) and (1–b). It can also express logical meaning such as contrasting two things (1–c), and can even carry out text organizational functions (1–d). This diversity of meanings causes problems if we are to provide a unitary account for *while* as a connective. As a matter of fact, previous studies have not succeeded in an adequate description of the meanings and the functions of *while*.

2.2. Connectives as markers of conventional implicature

This section examines connectives in terms of conventional implicature as presented in Grice (1989). Let us begin with a quick overview of Grice's idea about meaning.

Grice proposes a framework of describing meanings of words and puts forward an idea that the meaning of an utterance consists of "what is said" and "what is implied" (implicature). He adds that implicatures can be categorized into conversational implicatures and conventional implicatures. Conversational implicatures refer to such aspects of meaning that are not entailments of an utterance and are cancelable, context sensitive, non-detachable and calculable (cf. Cruse 2006, Levinson 1983). Take a simple example of making a phone call (Cruse 2006: 38):

(2) A: Can I talk to Jane?
B: Jane's in the shower.

The hearer of B would infer that Jane cannot answer the phone, but this is not an **entailment** from the utterance B. Levinson (2000: 14) points out the fact that such an inference "is based on some basic assumptions about the rational nature of conversational activity."[2)] This aspect of meaning is

what Grice calls conversational implicature.

Conventional implicatures, on the other hand, also refer to what is implied, but are not realized in the same way as the conversational implicatures are. Conventional implicatures are what is *coded* by linguistic expressions and they are "components of the meanings of utterances which are not propositional in nature, but which have a stable association with particular linguistic expressions and which therefore cannot be cancelled without anomaly." (Cruse 2006: 36)

Grice considered that connectives are included in the devices that can express conventional implicatures. Take *but* as an example, "Tom is poor. John is rich" and "Tom is poor *but* John is rich" are truth-conditionally identical, but the presence of *but* in the latter example implies that there is a contrast between the statement that Tom is poor and the statement that John is rich. This implicated meaning does not affect the truth condition of the sentence and cannot be "cancelled" unlike the cases of conversational implicatures. On the basis of this account, the meanings of *so* and *moreover* can be formalized as follows (cf. Blakemore 2004):

(3) *so*: The statement that P is an explanation for the statement that Q
(4) *moreover*: The statement that Q is additional to the statement that P

These attempts to conceptualize connectives as the devices to convey conventional implicatures revealed the fundamental aspects of connectives: they do not affect the truth condition of a sentence, and represent a conceptual representation of a relation between the two statements.

However, this approach cannot successfully explain the polysemy of the connective *while*. As seen above, it can provide only an abstract schema for each connective. This makes it impossible to describe the internal variety of meanings of *while*, from temporal to logical, mentioned in section 2.1. Here is an illustration of this problem. Remember the fact that *while* has two distinct logical meanings: contrast and concession as shown in (1–c) and (1–d). If we take the position of Grice, we would need to give a distinct formulation for each of the meanings (1–c) and (1–d) as follows:

(5) Contrastive meaning of *while*: The statement that P contrasts with the statement that Q
(6) Concessive meaning of *while*: There is a concession between the statement that P and the statement that Q

It is clear that these are not desirable solutions since they can explain neither why the connective can express these two distinct meanings nor in what situation one meaning is selected. In other words, it is inevitable to depend on the speaker's / hearer's intuition to determine which meaning is actually involved in a particular context. It can be hypothesized that the concrete description of the propositions appearing in P and Q would be helpful to determine the interpretation of the meaning of *while*. This is because, to think of natural linguistic communication, one can easily interpret the meaning of *while* according to what is said before and after *while*. However, this cannot be attained in the Gricean framework because they treat connectives in a similar way as they treat symbols of formal logic which have a mathematical relationship with abstract propositions.

2.3. Connectives in Relevance Theory

Let us now consider how connectives are treated in Relevance Theory. In this approach, connectives have a special status: connectives "reveal the type of inferential process a proposition is intended to undergo to achieve optimal relevance, thereby narrowing down the hearer's search space" (Wilson and Sperber 1993; cf. Blakemore 1987, Rouchota 1998). They are treated as a device related to cognitive aspects of linguistic communication. The Relevance Theory-based approaches classify kinds of connectives into the following three categories:

(7) Categorization of connectives in Relevance Theory
  (a) markers that encode concepts and contribute to the utterance's truth-evaluable content (Rouchota 1998: 34) e.g. *because, after, before, as a consequence, as a result, by contrast*
  (b) markers that contribute to higher-level explicatures (Ifantidou-Trouki 1993: 88) e.g. *confidentially, frankly, seriously*[3)]

(c) markers that encode information about the inferential process that a given representation is intended to undergo so that an optimally relevant interpretation is reached (Rouchota 1998: 34) e.g. *moreover, but, nevertheless, after all, although*

We will illustrate how the Relevance Theory-based analysis of connectives works by taking the case of *but* as an example.

(8) She's a linguist, *but* she's quite intelligent.
  (a) She's not intelligent.
  (b) All linguists are unintelligent.
(Blakemore 2000: 475)

In example (8), when the hearer interprets the utterance "She is a linguist," (a) naturally follows if (b) is assumed by the interlocutors. However, according to Blakemore, the presence of *but* encodes the procedural meaning that the hearer of (8) "is expected to access those contextual assumptions which allow him to interpret the second segment as communicating (that is, explicature or implicature) a proposition that contradicts a proposition derived from the first, and thus leads to its elimination." (2000: 479). In this way, Relevance Theory formulates each meaning of connectives as items helping the hearer's interpreting process.

In this framework of Relevance Theory, it is possible to give an account for the differences between the synonymous connectives *but* and *nevertheless*, which cannot be achieved in the Gricean approach (cf. Blakemore 2000, 2004, Rouchota 1998, Higashimori and Yoshimura 2003). The sentence (8) including *but* can be divided into two sentences by placing *nevertheless* at the beginning of the second sentence. This does not change the communicated meaning:

(9) She is a linguist. *Nevertheless* she is quite intelligent.

This shows that *but* and *nevertheless* affect the process of utterance interpretation in much the same way. However, the following examples show that there are differences between these two connectives. In the following set of excerpts, A is uttered by a child accompanied by some friends,

asking her mother, B, if there is something to eat left in the fridge.

(10) a. A: We're ravenous. Can we have that pizza in the fridge?
  B: Sure. *But* there's not very much left.
  b. A: We're ravenous. Can we have that pizza in the fridge?
  B: ?Sure. *Nevertheless* there's not very much left.
(Blakemore 2000: 480)

This contrast can be explained by assuming that *nevertheless* encodes different kinds of procedural meaning from that of *but*. Specifically, *nevertheless* encodes two types of procedural information: 1) the utterance is relevant as an answer to a question whose relevance has been established in the preceding discourse; 2) contextual effects are to be derived in a context which provides evidence for a contrary answer (Blakemore 2000: 481). In this, though both *but* and *nevertheless* express the contradiction to the intended contextual effects, the information can be introduced by *nevertheless* only when it is accessible for both the speaker and the hearer. In (10–a), the utterance "Sure" encourages speaker A to infer that there is enough pizza for her and her friend(s). The presence of *but*, however, renders A to eliminate the inference. *But* can appear in the position without causing any problem. *Nevertheless*, on the other hand, cannot be used in this context since the information that there is not very much pizza left is not accessible for speakers A and B at the time of the utterance. The Relevance Theory-based approach thus pays much attention to the pragmatic function of each connective and how it interacts with cognitive aspects of language.

In much the same way as the Gricean approach, however, the Relevance Theory-based approach cannot give any explanation for the polysemy of connectives. Pertaining to *while*, there are at least four kinds of meanings as seen in 2.1. It can be assumed that these four meanings are functioning at different levels of the inferential process in communication and thus related to the information processing of speakers in different manners. For example, when *while* is interpreted as expressing a contrastive meaning, it "encodes concepts and contribute to the utterance's truth-evaluable content." It would then be categorized into (7–a) in the

Relevance Theory-based approach. In contrast, when *while* is interpreted as expressing a concessive meaning, it would fall in (7–c) where other concessive connectives are classified. This implies that the Relevance Theory-based approach does not throw a light on these internal varieties of meanings expressed by one connective and thus cannot deal with *while* in a unified way.

2.5. Connectives in Sweetser (1990)

Sweetser's idea for analyzing connectives is that each connective has one meaning, but "a single semantics is pragmatically applied in different ways according to pragmatic context" (1990: 76). She argues that there are three cognitive domains, namely content, epistemic, and speech act and claims that "the choice of a 'correct' interpretation depends not on form, but on a pragmatically motivated choice between viewing the conjoined clauses as representing content units, logical entities, or speech act" (1990: 78). Content domain is the domain related to descriptions and statements about the real world, epistemic domain is to a speaker's belief or knowledge and speech act domain is to speaker's speech acts. Let us look at the sentences including *because* as an illustration of these concepts:

(11) John came back *because* he loved her. (content domain)
(12) John loved her, *because* he came back. (epistemic domain)
(13) What are you doing tonight, *because* there's a good movie on. (speech act domain)

Typically, *because* denotes a reason for something and the meaning of the marker differs according to each domain. *Because* in (11) is used in the content domain and expresses that his love was the real-world cause of his coming back. In (12), it is used in the epistemic domain in that the speaker's *knowledge* of John's return (as a premise) causes the *conclusion* that John loved her. Finally, *because* in (13) belongs to the speech act domain since the *because*-clause explains why the speaker performs the *speech* act by uttering the main clause (1990: 77). In this way, this theory can provide an explanation of the polysemy of each connective.

In Sweetserian term, the uses of *while* can also be classified into three

domains: content domain, epistemic domain, and speech act domain. What I have been called "the polysemy" of *while* is, on the basis of her account, considered as a "pragmatic ambiguity" of the interpretation of the core meaning of *while*. What is the core meaning then?

I shall be proposing that the core meaning of *while* relates to its temporal uses to express a certain kind of temporal overlap or simultaneity between given two situations, as exemplified by example (14):

(14) Would you look after the children *while* I do the shopping? (*LDOCE*4)

In this example, the two situations are narrated with an indication of the simultaneity of their occurrences. Since the *while* clause describes the real-world situation, this use of *while* can be counted as a use of content domain.

On the other hand, the content domain use of *while* include another type of utterance. Consider the following example:

(15) They arrived *while* we were having dinner. (*LDOCE*4)

In much the same way as (14), *while* in (15) also indicates a temporal relation between events appearing in the main and the subordinate clauses. The difference is that, because one of the events is expressed as temporally bounded in (15), the temporal overlapping is limited in its duration. This is the use which is defined in the dictionary as presented in (1–a): during the time that something is happening.

More logical or textual uses of *while* are hypothesized to have been derived from these types of temporal uses. Or, at least, they are interpreted by the speakers by an analogy with the temporal meaning of overlapping. The following serves as an example:

(16) Tom is very confident *while* Katy is shy and quiet. (*CALD*)

While in (16) connects two statements comparing two persons' personalities. Although the temporal overlap may play a role in the interpretation of

this utterance, the focus of the utterance is put on the parallels between the people and their contrastive characters. The example can be rephrased as "the knowledge that Tom is very confident *contrasts* with the knowledge that Katy is shy and quite." Thus, it is not real world events or actions that exist simultaneously and contrast with each other, but it is the speaker's knowledge or belief that contrasts. In this sense, the contrastive use of *while* is purely epistemic.

There is another type of the epistemic use. Let us now consider example (17):

(17) *While* I agree with you, I do not believe that your way is best. (*MED*)

In this example, *while* combines two clauses expressing two psychological states experienced by one subject. What *while* represents in this example is a concessive meaning the speaker expresses toward the two beliefs occurring to him simultaneously. In fact, *while* in example (17) can be replaced with *although*, which is a common concessive marker. This causes no change in meaning:

(17′) *Although* I agree with you, I do not believe that your way is best.

The main clause presents the assertion that the speaker tries to make whereas *while* clause provides the premise or mitigation for the assertion. In this sense, the *while* clause serves as a conceptual background to which the main clause is anchored.

A caution is necessary pertaining to the point that this paper takes different approach from that of Sweetser's with respect to the treatment of concessive meaning. According to Sweetser (1990: 79), *although* can be used in three domains as the following examples illustrate:

(18) *Although* he didn't hear me calling, he came and saved my life. (content domain)
(19) *Although* he came and saved me, he hadn't heard me calling for help. (epistemic domain)

(20) *Although* I sympathize with your problems, get the paper in tomorrow! (speech act domain)

Whereas Sweeter categorizes (18) as an example of content domain use of *although*, it is designated as an example of epistemic domain use under the definition of this paper; the two conjuncts do not clash in the real world but in the conceptual world that the speaker has. The approach of this paper is supported by the argument of Verhagen (2005). He claims that all instances of the concessive use of *although* belong to the epistemic domain:

> . . . the idea that all uses of *although* (more generally: contrastive conjunctions) have an epistemic character is implied by the intersubjectivity approach, because the contrast involved is one between mental spaces. (2005: 174)

Quirk *et al.* (1985: 1098) also put forward that "concessive clauses indicate that the situation in the matrix clause is contrary to *expectation* in the light of what is said in the concessive clause" (emphasis added). In addition, Mann and Thompson (1992: 39) note that speakers make use of concessive relations "to promote a particular *belief* or action in the presence of apparent contrary information" (emphasis added). As a matter of fact, Sweetser herself holds that the contrastive connective *but* lacks its content domain use since all the contrast and conflict between two propositions are epistemic in nature (1990: 100–111). I believe this explanation can be applied to the discussion on concessive. Taking all these arguments into account, this paper takes the position to consider that all of the concessive relations have epistemic readings.

Going back to the polysemy of *while*, *while* clauses can be placed before imperatives, which is exemplified if we replace *although* in (20) with *while*. Consider the following example.

(21) *While* I sympathize with your problems, get the paper in tomorrow!

Just as the *although* clause in (20), *while* clause in (21) provides background information as to the psychological state of the speaker as a

preliminary for performing the speech act by uttering the main clause. At the same time, in the case of (21), a concessive meaning is inevitably conveyed such as "I command you, in spite of my sympathy" (cf. Sweetser 1990: 79).[4] Hence, this kind of examples can be the speech-act domain use of *while*.

It seems that what I call the "polysemy" of *while* is explained clearly by applying the Sweetserian approach proposing the notion of pragmatic ambiguity in the interpretation of the meanings of connectives. The different meanings are not intrinsic to *while*, but derived from the choice of domains where the utterance including *while* is understood. Nevertheless, I have to point out the fact that Sweetser's analysis fails to explicate another important aspect of the semantics of *while*; it cannot provide any convincing explanation as to paradigmatic relations between synonymous connectives. For example, in the following three sets of examples, (22)–(24), only *although* is fully acceptable as a connecting device. How can this restriction be described?

(22) a. *Although* he came and saved me, he hadn't heard me calling for help.
b. ?*While* he came and saved me, he hadn't heard me calling for help.

(23) a. *Although* I was only six, I can remember seeing it on TV. (*COBUILD*5)
b. ?*While* I was only six, I can remember seeing it on TV.

(24) a. *Although* the tickets were expensive, the kids really enjoyed it.
b. ?*While* the tickets were expensive, the kids really enjoyed it.

In order to clarify the differences between synonymous connectives such as *while* and *although*, more attention should be paid to the details of semantic and linguistic components that affect the choice made by speakers. In addition, pragmatic context needs more detailed scrutiny. To repeat Sweetser's claim, "the choice of a 'correct' interpretation depends not on form, but on a pragmatically motivated choice between viewing the conjoined clauses as representing content units, logical entities, or speech act" (1990: 76). Though the "pragmatic motivation" is made mostly clear in her original analysis, some room is still left for discussion as to how it is

semantically as well as grammatically represented in actual utterances. Specifically, the following points are left unspecified: what semantic and linguistic features are associated with uses in each domain; and what makes the speaker choose one among several synonymous connectives. Those are topics discussed in the following sections.

2.6. Summary

In this section, we have overviewed previous research studies on connectives: approaches based on conventional implicature, Relevance Theory and Sweetserian theory. Though the first two approached have their own advantages, they equally fail to analyze the polysemy of *while* in a unified way. As for Grice (1989), the formulations of connectives cannot predict what types of conventional implicature are realized in each case of the distinct meanings of *while*. With regards to Relevance Theory, although it provides detailed descriptions on the human cognitive process concerning connectives, the formulations do not tell us the types of information actually appearing in each of the connected clauses. In addition, *while* has a problematic status in the Relevance Theoretic categorization of connectives, where *while* cannot be treated consistently. Among these previous literatures, only Sweetserian theory seems to be capable of explaining the different meanings of *while* in a unified way, but does not succeed in revealing semantic and grammatical features of each meaning of *while* and in differentiating synonymous connectives.

3. FrameNet

This section provides an overview of FrameNet, which will be our source of frame information to describe the contents of connected clauses. FrameNet is an online dictionary based on Frame Semantics which is developed by Fillmore (1975, 1982). The central idea of Frame Semantics is that "word meanings must be described in relation to *semantic frames*—schematic representations of the conceptual structures and patterns of beliefs, practices, institutions, images, etc. that provide a foundation for meaningful interaction in a given speech community" (Fillmore *et al.* 2003a: 235). FrameNet aims to "document the range of semantic and

syntactic combinatory possibilities-valences-of each word in each of its senses, through computer-assisted annotation of example sentences and automatic tabulation and display of the annotation results" (Ruppenhofer *et al.* 2006: 5).

This section first introduces basic concepts of FrameNet and then examines how connectives are defined in the dictionary. Although the descriptions of verbs, nouns and adjectives are innovative in many ways, it will be pointed out that the current system of annotation has problems in differentiating the internal variety of meanings of *while* and in distinguishing synonymous connectives. This suggests that we need to extend the framework of FrameNet with regards to the descriptions of connectives.

3.1. Overview of the project

3.1.1. Frames and frame elements

Let us first briefly introduce the notion of semantic frame. Semantic frames are human knowledge or beliefs about the world that are related to frequently occurring situations (Fillmore 1975, 1982, Bednarek 2005). FrameNet assumes that frames are evoked by words such as verbs, nouns and adjectives, and gives definitions of frames and a list of frame evokers. To take a simple example, the verb *buy* evokes a Commerce_buy frame, which is defined as follows: "(t)hese are words describing a basic commercial transaction involving a buyer and a seller exchanging money and goods, taking the perspective of the buyer" (taken from FrameNet). As is clear from the definition, frames include some elements (frame elements: FEs) that are typically involved in the evoked situation. In the case of the Commerce_buy frame, it contains *buyer, goods, place, purpose, time* etc. as its FEs. There are mainly three types of FE, that is, core, non-core and extra-thematic. Roughly speaking, core elements are the ones that are usually realized in the subject or object position of a sentence and non-core frame elements are peripheral non-obligatory constituents that are typically categorized as adjuncts in most grammatical theories. Extra-thematic element, according to Atkins *et al.* (2003a: 268), are "not directly introduced by the head predicate but by some frame-external structure, such as a prepositional phrase or a restructuring of a syntactic valence." In

the Commerce_buy frame, for example, *buyer* and *goods* are the core elements, and *place, purpose, time* etc. are non-core. See Ruppenhofer *et al.* (2006) for more specific details.

A frame is not specific to a word but can be evoked by several words. For example, in addition to *buy*, the verb *purchase* also evokes the Commerce_buy frame. It should be also noted that polysemic words may evoke several frames. Take *fry* for example, it evokes Apply_heat and Absorb_heat frames. The frame evoking unit is called lexical unit (LU) and polysemic words have several LUs.

Let us now look at how sentences are analyzed in terms of FrameNet. FrameNet first identifies the frame evoking element in a sentence and then assigns frame elements to the constituents of the sentence. Consider the following example:

(25) Matilde *fried* the catfish in a heavy iron skillet.

In this example, the verb *fry* evokes the Apply_heat frame. This frame has *cook, food* and *heating_instrument* as its core FEs and (25) can be annotated as follows:

(25′) [<*cook*>Matilde] friedTgt [<*food*>the catfish] [<*heating_instrument*>in a heavy iron skillet]. (Ruppenhofer *et al.* 2006: 5)

Tgt stands for "target" and denotes the word is a frame evoker and the frame elements are given in brackets. In this example, *fry* is marked as Tgt and other constituents "Matilde," "the catfish" and "in a heavy iron skillet" are given *cook, food* and *heating_instrument* labels respectively.

3.1.2. Frame relations

Frames are not standalone notion, but are closely related to others. FrameNet defines the types of relationships between frames. Definitions of some important relations are listed below:[1)]

Inheritance: An IS-A relation. The child frame is a subtype of the parent frame, and each FE in the parent is bound to a corresponding

FE in the child. An example is the Revenge frame which inherits from the Rewards_and_punishments frame.

Using: The child frame presupposes the parent frame as background, e.g the Speed frame "uses" (or presupposes) the Motion frame; however, not all parent FEs need to be bound to child FEs.

Subframe: The child frame is a subevent of a complex event represented by the parent, e.g. the Criminal_process frame has subframes of Arrest, Arraignment, Trial, and Sentencing.

(Ruppenhofer *et al.* 2006)

These relationships can be visualized by the system called FrameGrapher. The following figure describes frames related to the Apply_heat frame; it *inherits from* the Activity and the Intentionally_act frames:

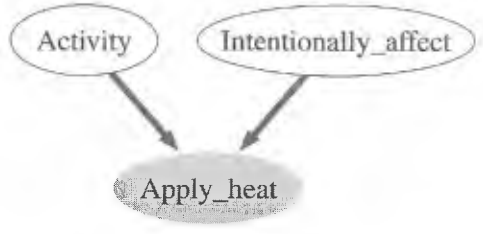

Figure 1 A FrameGrapher description of frame relations

These descriptions on frame relations enable us to categorize each meaning of words into the superordinate groups. Take Apply_heat frame for example, it can be categorized into the Activity frame since Apply_heat frame *inherits from* the Activity frame as illustrated in the figure above. In the later sections, we will set up some general categories in the similar way.

3.1.3. Indexes of FrameNet

To provide the kinds of descriptions mentioned above, FrameNet has two types of indexes and entries; one is the index of LUs and, just as in ordinary dictionaries, the user can search the entry by the alphabetically ordered index to find out what kind of frame the target word evokes. In addition, these entries include the definition of the LU, a table of frame

elements and their syntactic realizations, and a table of valence patterns (syntactic patterns for each possible group of semantic roles). The other is frame index that enables the user to access the entries on semantic frames. These entries contain definitions of frames, tables of FEs involved in the frame, the list of words that evoke the frame and the list of frame relations.

3.2. Connectives in FrameNet

Connectives, unlike verbs or nouns, are not treated as frame evokers and not contained in the list of LUs. Let us consider the following examples with connectives taken from the annotated sentences in FrameNet:

(26) [<*convict*>He] was sentencedTgt [<*sentence*>to death] [<*time*>in 1983], *although* the sentence was commuted to a 20-year prison term in 1991.

(27) *Because* Dustin had eaten a few hours previously, [<*agent*>the anaesthetist] had to insertTgt [<*theme*>a tube] [<*goal*>in his mouth] to stop him choking on his own vomit.

(28) [<*time*>*While* Vernon and Lily were serving breakfast] [<*self_mover*>she] sneakedTgt [<*source*>out] and hid the crucifix behind a pile of Mr Harcourt's empty cardboard boxes in the backyard.

(29) [<*interlocutors*>They] sat chattingTgt [<*depictive*>together] [<*time*>*while* Elizabeth waited for trade to pick up again].

The first point to be noted is that for (26) and (27) the subordinate clauses headed by *although* and *because* are not given any labels. In future version, however, according to Ruppenhofer *et al.* (2006), FrameNet plans to integrate these elements as extra-thematic frame elements. To take *although* for example, the subordinate clause will be treated as "concessives." Ruppenhofer *et al.* (2006: 154) writes:

Concessives

•Meaning: This FE signifies that the state of affairs expressed by the main clause (containing the target) occurs or holds, and something other than that state of affairs would be expected given the state of affairs in the concessive clause. In other words, given only the facts of the Concessive, one would expect them to cause the world to be

the opposite of what is protrayed in the main clause.
- Form: a clause or phrase headed by *although*, (*even*) *though*, *despite*, *notwithstanding*, *nevertheless*, etc.

(30) Many teachers favor charter schools [*although* their unions don't].
(31) [*Nevertheless*], it would have been interesting had he won in '92.
(32) Movie Industry revenue is booming [*despite* the current level of piracy].
(33) [*Although* no longer a minister], Smithers still officiated at weddings.

It is true that clauses conjoined by connectives are the "extra-thematic" part of sentences that are dominated by the main verbs. However, this way of treating connectives is not sufficient when it comes to differentiating connectives with similar meanings. Take *although* and *nevertheless* for example. Obviously, these connectives have different meanings and different syntactic behaviors as example (34) illustrates:

(34) *Although*/**Nevertheless* no longer a minister, Smithers still officiated at weddings.

It follows that the "connectives as heads of extra-thematic frame element" approach is incapable of explaining the differences between *although* and *nevertheless*.

As for (28) and (29), they include the connective *while* and the clauses with *while* are given the *time* label. In this case, *time* elements are treated as non-core frame elements, but again it fails to capture the different meanings of *while* used in the sentences; in accordance with the analysis we did in Section 2.5., (28) designates duration whereas (29) indicates simultaneity. This implies that the current annotation system does not successfully explain the internal variety of meanings of *while*.

3.3. Summary

This section has introduced the framework of the FrameNet project. FrameNet defines words as frame evokers and lists typically involved elements. Frames are related to one another, which enables categorization of frames into general groups. We saw that connectives are not defined as frame evokers unlike verbs and nouns and they are (will be) treated as non-core frame elements or extra-thematic elements. Although FrameNet descriptions are innovative and useful in many ways, it was pointed out that the current system of annotation does not sufficiently capture the differences between synonymous connectives and the internal variety of *while*.

4. An Extended Frame Semantic Approach to *while*

In order to give solutions to the problems raised in Section 2 and Section 3, this section proposes an extended frame semantic approach to connectives. Meanings of connectives can be better illustrated if we postulate that it is the frames evoked in the main and the subordinate clauses that are combined by a connective. In this approach, differences among the diverse uses of *while* can be explained by the combinational patterns of frames, which we will call **frame valences**. This approach does not only give a unitary account for each meaning of *while*, but also enables us to make clear distinctions between synonymous connectives such as concessive *while* and *although*. The reason I use the term "extended" lies in this point that the descriptions both for main and subordinate clauses can be only gained through the FrameNet data, though the treatment of the subordinate clauses are entirely different from that of FrameNet.

After introducing the methodology and data used in the discussions, we will tackle the problems of explaining the polysemy of *while* and of differentiating synonymous connectives such as *while* and *although* in the cases of their concessive readings. It will be shown that each meaning of *while* has distinct frame valences. Furthermore, we will see that frame valences of *while* and *although* are clearly different from each other, which accounts for their distinct behaviors. In addition, some considerations of definitions of learner's dictionary will also be presented.

4.1. Methodology

This section introduces how an extended frame semantic analysis of connectives can be used. If it is supposed that connectives are frame connectors, we need to investigate what kinds of frames are evoked in both

main and subordinate clauses. Let us look at a simple example:

(35) Someone called, *while* you were out. (*MED*)

In this example, there are two clauses connected by *while*: "someone called" and "you were out." If we apply the current version of FrameNet annotation, the subordinate clause headed by *while* would be treated as the *time* element and the frame evoking element would be *call* which evokes a Contacting frame in the main clause as the following example illustrates:

(35)′ [<*communicator*>Someone] calledTgt, [<*time*>*while* you were out].

However, the subordinate clause also contains a frame evoker, i.e. *out*. This word evokes an Expected_location_of_person frame. If we assign labels to both clauses, the annotation will be as follows:

(36) [<*communicator*>Someone] calledTgt1, *while* [<*person*>you] were outTgt2.

While in the above example is assumed to be connecting the Contacting frame in the main clause and the Expected_location_of_person frame in the subordinate clause. Thus, a sentence including *while* can be conceptualized as a combination of clauses each of which evokes its own frame. Based on this notion, I present the following schemas representing combinational patterns of the main and the subordinate clauses of *while* sentences:

(a) Sm Fm *while* Ss Fs
(b) *While* Ss Fs, Sm Fm

"S" and "F" stand for subject and frame respectively, and "m" and "s" designate main clause and subordinate clause respectively. For example, Sm indicates the subject in the main clause and Fs the frame in the subordinate clause. Eventually, the combinational patterns of Fm and Fs are what I call "frame valences," which will be added to each example in

parentheses in the sections to follow.

In addition to the frame valences of the specific frame level, we will examine "generalized frame valences" to capture the general tendency of frame valences of connectives. The generalized frame valences will be determined according to the following classification of frames: Activity, Attribute, Change, Location, Mental Attitude and State. These types are mainly determined by the frame relations and the frame elements. Activity frames are, directly or indirectly, related to Intentionally_act, Intentionally_affect, Activity or Motion frames; frames which are not related to those but contain an animate element in the subject position and describe an activity are also considered as Activity frames. Attribute frames indicate attributions of things or persons, such as price, age and so forth. Change frames typically have a frame element *final_state* or *final_value*, which indicate the result of the change from the *initial_state* and *initial_value*. Location frames are usually related to the Locative_relation frame. Mental Attitude frames refer to frames which have a *congnizer* or *experiencer* element and are typically related to the Emotion frame. Finally, State frames refer to the frames which *inherit from* the State frame (which we can find in the FrameNet entry) or subframes of the State frame. In addition, some frames denoting continued process such as Sleep and frames related to the Possession frame are also included in this category. Thus, as to example (36), we have Activity (Fm)-Location (Fs) as a generalized frame valence (See 4.3.2. for details). It should be noted, however, that the categories set up here are tentative classifications. Although they are useful criteria for the present analysis, some refinements may be needed in the future version of this approach.

4.2. Data

The example sentences examined in the sections to follow are mainly taken from annotated sentences in FrameNet (abbreviated as FN) and from major learner's dictionaries including *COBUILD*5, *MED*, *LDOCE*4, *OALD*7 and some English-Japanese dictionaries. It should be noted that since FrameNet is an ongoing project, there are many cases where we cannot assign annotations due to the lack of entries of FrameNet. The

examined examples amount to about 50, but no statistical analysis will be carried out since the data is inevitably filtered by the limitation of the FrameNet data available. In addition, in order to make the discussion clear, I intentionally chose relatively simple examples from the sources mentioned above.

Each constituent of the sentences is marked as FEs and frame evokers are given Tgt (target) labels. The assignment of labels will be based on the FrameNet policy, although it is inevitable in some cases to depend on intuition to determine what types of frame are actually evoked. The speech act domain use of *while* will not be discussed due to the lack of examples and to the principle that FrameNet does not consider speech act constructions (cf. Ruppenhofer *et al.* 2006: 157). Consequently, this study primarily aims to provide an overview of a new approach to connectives based on frame semantics and to set up a discussion on the basis of empirical data of typical uses of *while*.

4.3. Temporal use of *while* and frames

This section deals with *while* related to temporal meanings, that is, what I categorized into content domain use in Section 2. As we saw in that section temporal *while* designates simultaneity and duration. The difference between simultaneity and duration, which the current annotation does not distinguish, will be clearly explicated by frame valences and the aspectual difference.

4.3.1. Simultaneity *while* and frame valences

We will start by looking at the example with simultaneity *while*. Consider the following example:

(37) They sat chatting together *while* Elizabeth waited for trade to pick up again. >= (29)

The frame evoking element in the main clause is *chat*, which evokes the Chatting frame, and *wait* in the subordinate clause evokes the Waiting frame. Thus, the evoked frames are Chatting and Waiting and the annotation will be as follows:

(38) [<*interlocutors*>They] sat chattingTgt1 [<*depictive*>together] *while* [<*protagonist*>Elizabeth] waitedTgt2 [<*expected_event*>for trade to pick up again].
(Fm = Chatting, Fs = Waiting)

When we consider the generalized type of the frame valence, Chatting and Waiting both belong to the category of Activity, since the former frame involves interlocutors and indicates an activity and the latter *uses* Intentionally_act frame. Thus, we may say that the simultaneity *while* takes frames related to Activity both in Fm and Fs. The following are examples of this kind:

(39) [<*perceptive_agent*>They] listenedTgt1, doubts to the fore, *while* [<*speaker*>I] explainedTgt2 [<*topic*>the rudiments]. (*COBUILD*5)
(Fm = Perception_active, Fs = Statement)

(40) [<*protagonist*>I. waitedTgt1 *while* [<*agent*>he] gatheredTgt2 up [<*individuals*>his papers]. (*G*)
(Fm = Waiting, Fs = Gathering_up)

Example (39) contains Perception_active in Fm and Statement frame in Fs. The former frame contains *speaker* as a frame element and denotes an activity, and the latter *inherits from* the Intentionally_act frame. Similarly, (40) contains the Waiting frame which *uses* the Intentionally_act frame in the main clause, and the Gathering_up frame which *inherits from* the Intentionally_affect frame in the subordinate clause. Hence, all the frames evoked in the clauses of (39) and (40) belong to the category of Activity. These examples show that one of the typical frame valences of simultaneity *while* is Activity (Fm)-Activity (Fs).

In addition to this valence, there is another type that the following example illustrates:

(41) He used to bring along [<*agent*>his pet Alsatian, who] satTgt1 patiently *while* [<*agent*>we] practisedTgt2 [<*action*>bandaging paws], she recalls. (FN)
(Fm = Posture, Fs = Practice)

In this example, the frame evoked in the main clause is Posture. This frame inherits *from* the State frame. As for Fs, the evoked frame is Practice which *inherits from* the Intentionally_act frame. Thus, the frame valence in this example is generalized as State (Fm)-Activity (Fs).

4.3.2. Duration *while* and frame valences

Let us now turn to the durative use of *while*. The following serves as an example:

(42) [<*theme*>They] arrivedTgt1 *while* [<*ingestor*>we] were havingTgt2 [<*ingestibles*>dinner]. >=(15)

Frames evoked in each of Fm and Fs are Arriving and Ingestion frames respectively. The Arriving frame is related to the Motion frame, which suggests that this frame is one of the Activity frames. As for Ingestion, it *inherits from* the Intentionally_affect frame, which means that this frame is also a member of the Activity frames. Thus, like simultaneity, one of the typical frame valences is represented as Activity (Fm)-Activity (Fs). Other examples of this type are shown below:

(43) [<*experiencer*>She] had sprainedTgt1 [<*body_part*>her ankle] *while* ([<*participant1*>she] was) playingTgt2 [<*competition*>tennis]. (*MED*)
(Fm = Experience_bodily_harm, Fs = Competition)

(44) *While* [<*helper*>Vernon and Lily] were servingTgt1 [<*focal_entity*>breakfast] [<*self_mover*>she] sneakedTgt2 [<*source*>out] and hid the crucifix behind a pile of Mr Harcourt's empty cardboard boxes in the backyard. >= (28)
(Fm = Self_motion, Fs = Assistance)

The Experience_bodily_harm frame in the main clause of (43) *uses* the Intentionally_act frame, and Competition in the subordinate clause also *uses* the Intentionally_act frame. As for the frames evoked in (44), both Self_motion and Assistance frames *inherit from* the Intentionally_act frame. To summarize, I propose that the Activity (Fm)-Activity (Fs) relation is one of the basic schemas, which provides the *while* sentence with the

reading of duration. It seems, however, simultaneity *while* and duration *while* share the same generalized frame valence, a point which we will discuss later.

Let us now consider some other types. Unlike simultaneity *while*, duration *while* takes frames related to State and Location in the subordinate clauses. Consider the following examples:

(45) I expect [<*self_mover*>the crew] had tiptoedTgt1 [<*path*>down] [<*manner*>very gently] [<*source*>from the bunk above] *while* [<*sleeper*>he] sleptTgt2. (FN)
(Fm = Self_motion, Fs = Sleep)

(46) [<*communicator*>Someone] calledTgt1, *while* [<*person*>you] were outTgt2. > = (35)
(Fm = Contacting, Fs = Expected_location_of_person)

In these examples, all frames evoked in the main clause denote some kind of activity: Self_motion *inherits from* the Intentionally_act frame and Contacting frame involves the frame element *communicator* and describes an activity of making a phone call. Turning to Fs, (45) has the Sleep frame, which is one of the State frames, evoked by the adjective *asleep*. As for (46), Fs is Expected_location_of_person. Since this frame inherits from Locative_relation, this frame is a member of Location frames.

From the discussion above, it has turned out that all the frames evoked in the main clauses denote an Activity and the frames evoked in the subordinate clauses are related to Activity, State and Location. Thus, we can assume the following three frame valences for duration *while*: Activity (Fm)-Activity (Fs), Activity (Fm)-State (Fs) and Activity (Fm)-Location (Fs).

4.3.3. Differentiating simultaneity from duration

It seems that both simultaneity and duration *while* share the same valence, that is, Activity (Fm)-Activity (Fs). However, there is an important difference between Activity frames in Fm of simultaneity and duration *while*. Let us compare the lexical units in each usage. Verbs in Fm of simultaneity include *chat, listen, wait* and *sit*, whereas verbs in the dura-

tion use include *arrive, sprain, serve, tiptoe*, and *call*. One may notice that there are aspectual differences between them: the verbs in duration are punctual whereas verbs in simultaneity are not. This can be explained by their semantic valences as to whether the *duration* element exists or not. The *duration* element is expressed by a phrase such as "for 8 minutes" as in the following example:

(47) SteamTgt [<*food*>the carrots and broccoli] [<*duration*>for 8 minutes]. (FN)

We may assume that frames in Fm of simultaneity must have *duration* element and frames in duration may lack this element. Looking at the FEs of each frame, we found that all the frames in simultaneity have the *duration* element and most of the LUs such as, *arrive, sprain* and *call* in Fm of duration *while* do not have this element (see Uchida 2006 for a complete description). Hence it can be concluded that the Activity frames in the main clauses of simultaneity and duration have different characteristics in their aspectual properties.

Turning to Fs, it is expected that all the frames have durative nature since they denote actions carried out in parallel to Fm or the span of an action or an event described in Fm of simultaneity and duration respectively. In accordance with the examination we did for Fm, all frames and LUs are supposed to have the *duration* element, but we find that *explain* and *with* do not have this element in each entry. However, they can be used as follows:

(48) I *explained* it for three hours and he finally understood it.
(49) I was *with* Bob for five hours yesterday.

These examples show that they are durative frames in spite of their lack of the *duration* element in the FrameNet descriptions. This might not be enough to prove insufficiency of the FrameNet descriptions, but some refinements may be needed as to the aspectual properties of each frame.

To summarize the point of this section, aspectual differences of the Activity frames of simultaneity and duration *while* make the frame valences distinct and we can formulate as follows:

(50) a. simultaneity *while*: Activity<-pun>(Fm)-Activity<-pun>(Fs)[1)]
b. duration *while*: Activity<+pun>(Fm)-Activity<-pun> (Fs)

4.4. Epistemic use of *while* and frames

4.4.1. Contrastive *while* and frame valences

We now move on to the discussion of meanings of *while* in its epistemic use. We will begin with the following example of contrastive *while*:

(51) [<*group*>In Japan], [<*attribute*>sales] have plummetedTgt1 [<*difference*>20 percent] [<*time*>during that period], *while* [<*attribute*>European sales] have fallenTgt2 [<*difference*>12 percent]. (FN)
(Fm = Change_position_on_a_scale, Fs = Change_position_on_a_scale)

For the example above, it is remarkable that the frames evoked in Fm and Fs are the same frame, namely, Change_position_on_a_scale. This is one of the characteristics of contrastive *while*. Some other examples are given below:

(52) [<*goods*>The first two services] are freeTgt1, *while* [<*goods*>the third] costsTgt2 [<*asset*>£35]. (*COBUILD*5)
(Fm = Expensiveness, Fs = Expensiveness)
(53) [<*entity*>The south of the country] continues to growTgt [<*final_state*>richer], *while* [<*entity*>the north] growsTgt2 [<*final_state*>poorer]. (*MED*)
(Fm = Becoming, Fs = Becoming)
(54) [<*time*>Since then], [<*attribute*>sales] have jumpedTgt1 [<*initial_value*>from 6.86 billion francs] [<*final_value*>to 8.56 billion] [<*time*>in 1992], *while* [<*attribute*>pre-tax profits] have soaredTgt2 [<*final_value*>to 443 million francs] [<*initial_value*>from 130 million] [<*time*>in 1988]. (FN)
(Fm = Change_position_on_a_scale, Fs = Change_position_on_a_scale)

Like example (51), the same frames are evoked in the main and subordi-

nate clauses; both the main and subordinate clauses in (52) contain the Expensiveness frame; (53) contains the Becoming frame in both clauses; the Change_position_on_a_scale frame is evoked in both Fm and Fs of (54). This means that the contrastive meaning of *while* is realized not in the time domain but between frames with a parallel relation in main and subordinate clauses. If we consider the generalized frame valences of contrastive *while*, we may note that the evoked frames in the examples above are frames related to Change such as Change_position_on_a_scale and Becoming, which have the FE *final_state*, and frames of Attribute such as Expensiveness. To summarize, we can assume the following two generalized frame valences for contrastive *while*: Change (Fm)-Change (Fs); Attribute (Fm)-Attribute (Fs). It is worth mentioning here that the parallel relation is not only realized at the level of the generalized frame valence, but also at the level of the specific frame valence. In the present analysis, we have only proposed two patterns of generalized frame valences, but it can be predicted that there are other frame valences of such a kind realized in the use of contrastive *while*.

4.4.2. Concessive *while* and frame valences

This section examines the concessive use of *while*. We will first consider the frames evoked in the subordinate clauses. Fs of this usage tend to be frames of Mental Attitude. Consider the following examples:

(55) *While* [<*cognizer*>I] agreeTgt1 [<*cognizer2*>with you], [<*cognizer*>I] do not believeTgt2 [<*content*>that your way is best]. >= (17)
(Fm = Certainty, Fs = Be_in_agreement_on_assessment)

(56) And *while* [<*experiencer*>I] likeTgt1 [<*content*>my job], [<*experiencer*>I] wouldn't wantTgt2 [<*event*>to do it] forever. (*CALD*)
(Fm = Desiring, Fs = Experiencer_subj)

(57) *While* [<*experiencer*>I] likeTgt1 [<*content*>the shape of the bag], [<*experiencer*>I] don't likeTgt2 [<*content*>its color]. (*G*)
(Fm = Experiencer_subj, Fs = Experiencer_subj)

(58) *While* [<*experiencer*>she] was very fondTgt1 [<*content*>of him], [<*experiencer*>she] didn't wantTgt2 [<*event*>to marry him]. (*YP*)
(Fm = Desiring, Fs = Experiencer_subj)

(59) *While* [<*cognizer*>I] am willingTgt1 [<*activity*>to help], [<*owner*>I] do not haveTgt2 [<*posession*>much time available]. (*OALD7*)
(Fm = Possession, Fs = Willingness)

Frames in the subordinate clauses are Be_in_agreement_on_assessment in (55), Experiencer_subj in (56), (57), (58) and Willingness in (59). A close look at FEs of these frames makes it clear the fact that these frames indicate Mental Attitudes. These frames have either *experiencer* or *cognizer* elements, which typically mark individuals in frames who make judgments against something. This means that frames which contain these frame elements are epistemic in nature and hence is strong support for assuming this use as epistemic denoting the mental attitude of the subject. Thus, it is reasonable to assume that frames evoked in the subordinate clauses of concessive *while* are typically related to Mental Attitude.

Such tendency is also observed in the main clauses. Evoked frames in the main clauses of (55), (56), (57) and (58) are Certainty, Desiring, Experiencer_subj and Desiring. The Certainty frame contains *cognizer* and the others have *experiencer* as frame elements. This suggests that they are related to Mental Attitude and hence we can assume that one of the typical generalized valences of concessive *while* is Mental Attitude (Fm)-Mental Attitude (Fs). In addition to this frame valence, the main clauses of concessive use of *while* can also contain frames which are not related to Mental Attitude such as Possession in (59). This frame can be seen as related to State and hence we can assume another frame valence, i.e. State (Fm)-Mental Attitude (Fs).

4.5. Other factors

So far, we have concentrated on the semantic properties of frames evoked in the clauses conjoined by connectives. This section in turn examines grammatical aspects especially focusing on the clause order and the relationship between subjects in main and subordinate clauses.

4.5.1. Clause order

Concerning the order of the clause, concessive use of *while* is remarkable in that *while* clauses seem to be restricted to the initial position of a sentence. In fact, all the examples which we examined have the (b) type order, namely, "*While* Ss Fs, Sm Fm." This contrasts sharply with the other uses of *while* in that the *while* clauses of other uses can be placed after the main clause. Consider the following examples:

(60) an example of simultaneous meaning of *while*
  (a) They listened, doubts to the fore, while I explained the rudiments. > = (39)
  (b) *While* I explained the rudiments, they listened, doubts to the fore.
(61) an example of durative meaning of *while*
  (a) Someone called, *while* you were out. > = (46)
  (b) *While* you were out, some called.
(62) an example of contrastive meaning of *while*
  (a) In Japan, sales have plummeted 20 percent during that period, while European sales have fallen 12 percent. > = (51)
  (b) *While* European sales have fallen 12 percent, in Japan, sales have plummeted 20 percent during that period.
(63) an example of concessive meaning of *while*
  (a) *While* I am willing to help, I do not have much time available. > = (59)
  (b) ?I do not have much time available, *while* I am willing to help.

The constraint on the clause order in the case of the concessive meaning of *while* may be ascribed to its peripheral status as a grammatical device for marking concession. Günthner (2000) points out "corrective use" of concessive connective in German, correcting the validity of the content expressed in the main clause. *Although*, a typical concessive marker, in the following example can serve this function whereas *while* cannot.

(64) I'm innocent, *although*/**while* I know you won't believe me. (Sweetser 1990: 81)

As we can see in this example, *while* has yet to be established as a concessive connective as to correct or cancel the validity of the statement presented in the main clause. What *while* can do is to express the two mental attitudes contrasted to each other, which are often *pragmatically* understood as related by a concessive reasoning since the two states are not expected to coexist. This, in turn, implies that the concessive use was derived from the core meaning of temporal overlap and its application to epistemic reasoning. This derivational process may be better explained by applying theories of grammaticalization (cf. Brinton 1996, Traugott 1988, 1995), but we do not elaborate on this point, since such a historical examination is out of the scope of this paper.

4.5.2. Subjects of the clauses

Let us now look at how subjects of the clauses in *while* sentences are related to each other, namely, the relationship between Sm and Ss. I will propose that there are mainly two types to be considered: 1) Sm = Ss and 2) Sm ≠ Ss.

Looking at the examples of simultaneity *while*, we will notice that all the examples discussed above have different subjects, i.e., "they" and "Elizabeth" in (38), "they" and "I" in (39), "I" and "he" in (40) and "Alsatian" and "we" in (41). This can be attributed to the fact that simultaneity *while* typically denotes the actions of different persons. In some cases, however, the same subject can appear both in Sm and Ss as example (65) and (66):

(65) He sang *while* he did the washing-up.
(66) She knitted garments *while* she watched the news on TV.

In English, there seems to be no important difference between these types and in fact (65) and (66) have the same frame valence Activity<-pun> (Fm) and Activity<-pun> (Fs) as (38)–(40).[2] It should be noted, however, that in Japanese these two types are realized by different linguistic items, that is, *nagara* for type 1 and *aida* for type 2. Consider the following examples:

(67) Kare wa utai *nagara* araimono o shita.

He-TOP sing while-CONJ washing-up-ACC do-PAST
(He sang *while* he did the washing-up.)

(68) Karera ga shabetteiru *aida* watashi wa sotode matteita.
They-NOM chat-PROG while-CONJ I-TOP outside wait-PROG-PAST
(*While* they were chatting, I waited for them outside.)

In (67), although the subject of the subordinate clause is eliminated, it can be stated that the verbs "utai" and "shita" have the same subject. In this case, the clauses are conjoined by *nagara*, one of the typical temporal markers of Japanese. On the other hand, in (68), where different subjects appear in the main and subordinate clauses, the subordinate clause is marked by *aida*. We do not go into specific detail of the differences between Japanese and English (since a contrastive study is out of the scope of this paper), but we may at least assume that the relationship between Sm and Ss can be an important aspect in defining types and meanings of connectives.

As for the duration *while*, both 1) and 2) types are used: (43) belongs to the first type and (42), (44), (45) and (46) belong to the second type. Due to the lack of examples, we cannot generalize the patterns of subjects of each frame valence, but there is one thing to be pointed out here; in the case of the first type (Sm = Ss) of Activity<+pun> (Fm)-Activity<-pun> (Fs), verbs in subordinate clauses are, in most cases, progressive and the subject of the clause can be eliminated. Example (43) has the Activity<+pun> (Fm)-Activity<-pun> (Fs) valence and has the same subject "she." If we eliminate the subject in the subordinate clause, the sentence can be changed as follows:

(43') She has sprained her ankle *while* playing tennis.

In this connection, it should be also noted that the elimination is realized in a different way from that of simultaneity *while*. Consider the following example:

(66') Watching the news on TV, she knitted the garments.

Whereas (43') requires *while*, it is not contained in (66'). This suggests that simultaneity and duration *while* have different properties and the differentiation of theses uses, which the current version of FrameNet does not support, is a reasonable decision.

Contrastive *while* predominantly has the second type (Sm ≠ Ss), namely, "Japanese sales" and "European sales" in (51), "the first two services" and "the third" in (52), "the south of the country" and "the north" in (53), and "sales" and "pre-tax profit" in (54). Consequently, it is Sm and Ss that are contrasted in each example.

Finally, as for concessive *while*, all the examples we discussed belong to the first type. Although it is not reasonable to make generalization from a few examples, we may at least assume that in the case of concessive *while* with Mental Attitude in Fs, Sm and Ss tend to be identical. It remains one of the future tasks of this study to find out other frame valences of each meaning of *while* and to reveal the Sm-Ss relationship in each valence.

4.6. Discussions

Having shown that the frame valences of each meaning of *while* successfully explain the internal variety of *while*, we now turn to discuss how this approach will solve the other problem raised in Section 2 and 3, namely, the differentiation of synonymous connectives. To demonstrate this point, *while* and *although* with concessive readings will be examined in the next section. In addition, some suggestions will be presented on how descriptions gained through this approach will improve the definitions of connectives in learner's dictionaries.

4.6.1. Differentiating *while* from *although*

As pointed out previously, an analysis based on Sweetserian theory and others are incapable of explaining the different distributions of *while* and *although*. Examples are repeated here:[3)]

(22) a. *Although* he came and saved me, he hadn't heard me calling for help.
b. ?*While* he came and saved me, he hadn't heard me calling for help.

(23) a. *Although* I was only six, I can remember seeing it on TV. (*COBUILD*5)
b. ?*While* I was only six, I can remember seeing it on TV.
(24) a. *Although* the tickets were expensive, the kids really enjoyed it.
b. ?*While* the tickets were expensive, the kids really enjoyed it.

I argue that these distributional differences can be accounted for by applying the notion of frame valence. We noted that concessive *while* typically takes frames related to Mental Attitude in the subordinate clauses. If we examine frames in the subordinate clauses of the sentences above, we find that they are Arriving (come), Age (six) and Expensiveness (expensive). Arriving is, as mentioned above, related to Activity, and Age and Expensiveness are frames of Attribute.

The unacceptability of the examples with *while* can be explained by the fact that frames related to Activity and Attribute cannot appear in *while* clauses, where mental attitudinal frames are expected to be evoked. On the other hand, these frames can appear in *although* clauses and hence the examples with *although* are acceptable. It follows that the concessive *while* does not typically involve the frame valence Activity (Fm)-Activity (Fs) (= (22)), or Mental Attitude (Fm)-Attribute (Fs) (= (23) and (24)). This can be explained by the fact that Activity frames are typically evoked in the temporal use of *while* and Attribute frames are in contrastive meaning of *while*; in other words, they are not usually evoked in the clauses of concessive *while*. Thus, the frame semantic analysis of connectives successfully provides an explanation to this problem simply and elegantly.

4.6.2. Definitions in learner's dictionary

How then can these descriptions improve the definitions of connectives in learner's dictionaries? As a starting point, I re-present the definitions of *while* in *OALD*7:

(1) (a) during the time that something is happening
(b) at the same time as something else is happening
(c) used to contrast two things
(d) (used at the beginning of a sentence) although; despite the fact that

Two problems can be pointed out here: the difference between (a) and (b) is not evident and the definition (d) does not differentiate the different properties among *while, although* and *despite the fact that*. This case is not special to *OALD*7 for many dictionaries find it difficult to define connectives as Schourup and Waida (1988: 5) point out: "it is not possible to give simple dictionary definitions for them [connectives] in the way that we can for most other English words and phrases." This is because the syntactic and semantic characteristics of connectives cannot be captured by grammar (such as sentence patterns) and collocation, which are usually employed in defining ordinary content words.

A solution to these problems is to present the generalized frame valences of each meaning. What follows are the definitions of *while* with frame valences:

(1') (a) [Activity<+pun>-Activity<-pun>/Location/State] during the time that something is happening
(b) [Activity<-pun>/State-Activity<-pun>] at the same time as something else is happening
(c) [Change-Change; Attribute-Attribute] used to contrast two things
(d) [Mental Attitude/State-Mental Attitude] (used at the beginning of a sentence) although; despite the fact that

With these descriptions, the user can understand the difference between (a) and (b) by looking at the frame valences (and perhaps at examples with certain annotations) and he/she can find out the differences between synonyms by comparing the frame valences of each item. In addition, if we take subject relationships into consideration, finer correspondences between languages such as English and Japanese can be achieved in bilingual dictionaries. Although the categories set up in this paper are tentative and will need to be more sophisticated, and some refinements will be required as to layout or example sentences, these descriptions are expected to improve the definitions of connectives in learner's dictionaries and grammar books.

4.7. Summary

We proposed in this section an extended frame semantic approach to connectives. I scrutinized the combinational patterns of frames evoked in the connected clauses as well as their syntactic realizations. By assuming that connectives are connectors of frames evoked in the main and subordinate clauses, we can describe each meaning of *while* in a simple and concrete way. The following table summarizes the discussion:

Meanings	Fm	Fs	Order	Subject
simultaneity	State	Activity<–pun>	a,b	1,2
	Activity<–pun>	Activity<–pun>	a,b	1,2
duration	Activity<+pun>	State	a,b	1,2
	Activity<+pun>	Location	a,b	1,2
	Activity<+pun>	Activity<-pun>	a,b	1,2
contrast	Change	Change	a,b	2
	Attribute	Attribute	a,b	2
concession	Mental Attitude	Mental Attitude	a,b	1
	State	Mental Attitude	b	1

Table 1 A summary of descriptions of *while*
Notes: 1) "a" and "b" indicate "Sm Fm *while* Ss Fs" type and "*While* Ss Fs, Sm Fm" type respectively. 2) "1" and "2" denote "Sm = Ss" type and "Sm ≠ Ss" type respectively.

As we have seen, these descriptions not only provide a unitary account for the polysemy of *while*, but they also provide explanations for the differences found between synonymous connectives. In addition, they can be helpful guides for the user of a dictionary to determine the meaning of *while* in context and to find out correct translations.

5. Concluding Remarks

This paper has proposed a new approach to the descriptions of the meanings and the functions of connectives: what I call a "connectives as frame connectors" approach. This is an idea derived from FrameNet,

where word meanings are commented on in terms of their relations to other words and concepts that they conventionally co-occur with. Based on the data and the analysis presented in the previous sections, I conclude that lexicographic descriptions of connectives can be only achieved by scrutinizing the combinational patterns of frames evoked in the connected clauses. This conclusion would lead us to consider that connectives are not only functioning as linking devices of clauses or sentences, but also connecting the frame level information referring to the contents of the connected clauses. Consequently, we can assume that the examination of the relationships between a connective and the associated frames gives us a clearer picture of the meanings and characteristic usage of the connective. The position of this paper sharply differs from those of previous studies, but it should be noted that the view proposed here is firmly underpinned by the insights of previous works and, in turn, gives a better understanding of what was said before about the descriptions of meanings of connectives.

Since this thesis primarily aims to propose a new approach to connectives, some refinements of the approach may be necessary. First, a statistical analysis will be required to reveal frequency and distributions of each frame valence of *while*. We have concentrated on typical examples of each usage, but we need to analyze more examples to complete the list of frame valences of each meaning of *while*. It will also be necessary to examine the validity of the categories of frames which we set up to generalize the tendency of frame valences. We have tentatively classified frames into six general categories, but finer categorizations may be needed if we consider semantic properties of other connectives. Although there remain a number of problems to solve, we hope that the present paper has somehow shed light on the behaviors of connectives.

NOTES

Section 1

1) The present article is a revised version of my MA thesis submitted to the university of Tokyo. I would like to express my deepest gratitude to my supervisor Dr. Seiko Fujii, whose support and guidance was invaluable throughout the course of this study. I am also truly grateful to Dr. Charles J. Fillmore and Dr. Collin F. Baker for permitting me the use

of the FrameNet data, and to Chigusa Kurumada and Yasutada Sudo who gave me many insightful comments.

2) Connectives refer to linguistic items such as *and, because, but* and *so*. The cover terms for them are diverse: discourse markers by Schiffrin (1987), pragmatic markers by Brinton (1996) and Fraser (1996), discourse particles by Schourup (1985) and so on. In order to avoid confusion, I will use the term **connectives** as a theory-neutral general term for them in this paper.

3) http://framenet.icsi.berkeley.edu/

Section 2

1) Although these definitions cover the major aspects of the meaning of *while*, there can be others such as additive meaning. See Uchida (2006) for details.

2) Grice (1989) proposes Cooperative Principle and four maxims to explain such assumptions. The Cooperative Principle states; "Make your contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice 1989: 26). The maxims are the following four: the maxim of quality, the maxim of relation, the maxim of quantity and the maxim of manner. See Grice (1989) for details.

3) They are confined in the case that these markers are used in the sentence initial position as follows: *Frankly*, I think nuclear power should be abandoned completely.

4) A difference between *although* and *while* in concessive sentences lies in the fact that *although* clause can be placed *after* the main clause whereas *while* clause cannot. See 4.5.1. for details.

Section 3

1) See Ruppenhofer *et al.* (2006) or visit the website for details.

Section 4

1) *pun* stands for punctuality; "+" and "–" indicates whether the frame is punctual or not.

2) FrameNet currently does not contain the entries of *washing-up* and *knit*, but it may be safe to assume that these two verbs denote a durative activity.

3) Some of the native informants point out that these expressions are not totally unacceptable, though they are unnatural sentences. In the end, the awkward frame valences do not always cause ungrammaticality but do cause unnatural wordings.

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訂正とお詫び　　*Lexicon* No. 36 の会員研究業績で次の方のお名前が間違っていました．
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論文審査委員

編集後記　今年の *Lexicon* は量的にやや寂しい感じがする．来年は小島義郎教授の傘寿の記念号になるのでぜひ充実したものにしたい．特に若手の会員諸君の奮起を期待する．思えば岩崎研究会も創立から 40 年を越え，役員の新旧交替も行わなければならない時期になっている．私を含めて大幅な人事の刷新を考えなければならないであろう．

(S. T.)