Morpho-syntactic resources for the organization of same-turn self-repair: Cross-linguistic variation in English, German and Hebrew

Barbara A. Fox / Yael Maschler / Susanne Uhmann

Abstract

This paper presents the results of a quantitative and qualitative analysis of Recycle, Replacement and Recycle & Replacement self-repairs in English, Hebrew and German. The analysis revealed patterns of similarities and differences across the languages. Beginning with patterns of difference, we found first that English and Hebrew speakers engage in simple recycling about two-thirds of the time, while German speakers make less frequent use of simple recycling. Second, we found that English speakers frequently recycle back to the subject pronoun of a clause, while Hebrew and German speakers make much less use of subject pronoun as a destination of recycling. Third, we found that Hebrew and German speakers recycle back to prepositions much more frequently than do English speakers. With regard to similarities across the three languages, we noted that all three languages used function words as destinations of recycling more often than content words, while replacing content words at a disproportionately high rate. We claimed that entrenched word order patterns play a crucial role in explaining the facts we have observed; patterns of morphological dependence across collocates also shape self-repair practices in these languages. This study is thus further evidence of the shaping role that morpho-syntactic resources have on the self-repair practices of a speech community.

Keywords: self-repair, typology, discourse-functional syntax, comparative syntax.

German Abstract

Dieser Beitrag stellt die Resultate einer primär quantitativen Analyse formaler Eigenschaften von turninternen Selbstreparaturen vor. Untersuchungsgegenstand sind Recycling, Replacement und Recycling & Replacement im Deutschen, Englischen und Hebräischen. Im Sprachvergleich zeigten sich große Übereinstimmungen, aber auch interessante Unterschiede: So sind in allen drei Sprachen Inhaltswörter häufig von Replacement betroffen, während Funktionswörter als Zielpunkt von Recyclingstrukturen fungieren. Zu den auffälligsten Unterschieden kann die Beobachtung gezählt werden, dass Sprecher/innen des Englischen und Hebräischen in dem von uns ausgewerteten Datenmaterial wesentlich häufiger von Reycling-Strategien Gebrauch machen als dies Sprecher/innen des Deutschen tun. Darüber hinaus gibt es Unterschiede in Bezug auf die Recycling-Muster: Im Englischen wird mit deutlich höherer Frequenz das Subjektpronomen als Zielpunkt des Recyclings gewählt als dies in den deutschen und hebräischen Interaktionen der Fall ist – im Deutschen und Hebräischen wiederum spielen Präpositionen bei der Ausdehnung des Recyclings eine wichtige Rolle, die ihnen im Englischen nicht zuzufallen scheint. Ziel dieses Beitrags ist es, weitere Argumente dafür zu sammeln, dass bestimmte strukturelle Eigenschaften von Selbstreparaturen in direkter Abhängigkeit von morpho-syntaktischen Eigenschaften der jeweiligen Sprache sprachtypologischer Variation unterliegen.

Keywords: Selbstreparatur, Typologie, Funktionale Syntax, Vergleichende Syntax.

1. Introduction

This paper explores same-turn self-repair patterns in three languages: English, German and Hebrew.

The main focus of our paper is on the interdependency of certain morpho-syntactic resources and the shape of same-turn self-repair patterns in the three languages. While inspired by work in conversation analysis, the current study does not address interactional facets of these self-repair patterns.

Same-turn self-repair is the process by which speakers of a language stop, abort, repeat, or alter their turn before it comes to completion and it has been known for some time that same-turn self-repair (hereafter: self-repair) is highly organized. That is, self-repair is not produced randomly but is highly patterned, both phonetically and morpho-syntactically (Jesperson 1924; see also Maclay/ Osgood 1959; Hockett 1967; Schegloff/Jefferson/Sacks 1977; Schegloff 1979; Levelt 1982). What has not been known until recently, however, is that the organization of self-repair varies from language to language. For example, while repetition of an entire clause occurs in English with some frequency, in Japanese it

is extremely rare (Hayashi 1994; Fox/Hayashi/Jasperson 1996). Moreover, while replacement of one bound morpheme with another occurs in Japanese, Korean and Finnish, it has not to date been found in English (Hayashi 1994; Fox/Hayashi/Jasperson 1996; Yang 2003; Karkkainen/Sorjonen/Helasvuo to appear).

Cross-linguistic variation in patterns of self-repair are particularly significant because previous studies suggest a relationship between the typological characteristics of individual languages and patterns of self-repair (Fox/Hayashi/ Jasperson 1996; Fincke 1999; Uhmann 2001; Wouk 2005; Karkkainen/Sorjonen/Helasvuo to appear). It appears that a range of typological features, such as word order, favored anaphoric devices, morphological complexity of words, degree of syntactic integration, and presence or absence of articles and adpositions, influence self-repair in a variety of ways.

The current paper presents results from a comparison of self-repair in English, German and Hebrew. Our results suggest that in spite of the close genetic relationship between English and German, typological characteristics that distinguish them produce markedly different self-repair patterns. English is actually much more similar to Hebrew in its self-repair patterns, despite the lack of genetic relationship between them. Our findings lend support to the claim that it is typological features, rather than, for example, genetic closeness, which produce patterns of self-repair.

In this paper we will focus on same-turn self-repair in which repetitions and/or replacements occur. Some English examples of the kinds of data included in our study are given below:

(1)   Hey would you like a Trenton::, (.) a Trenton telephone directory

(2)   and the the moo- thing was the Dark at the Top of the Stairs

(3)   he's all they were talking about the J- the Niners somehow they started comparing the Niners and the Jets

Example (1) illustrates simple recycling, that is repetition of words already produced by the speaker without any other process involved. Example (2) illustrates simple replacement of a word; here the speaker replaces what is likely the beginning of the word *movie* with the word *thing*. In example (3) we have an instance of recycling + replacement, as the speaker repeats the definite article and replaces the name of the team (*Jets* is replaced with *Niners*).

The current paper focuses on the frequency of these three categories of self-repair: recycling, replacement, and recycling + replacement. We have found that more than half of the self-repairs in our English and Hebrew corpora are recyclings, with replacement and recycling + replacement occurring much less commonly. In German, recycling is less frequent than in English and Hebrew, and both replacement and recycling + replacement are more common than in English and Hebrew. Recycling is still more common than the other two types of repair in German, but the strength of the preference is less than we find in English and Hebrew. We have also found fascinating differences in the distribution of these repair types across different syntactic categories. The goal of the paper is to present these findings, to offer explanations for them, and to suggest implications of the differences for the organization of self-repair and for the organization of morphosyntax more generally.

The paper is organized as follows. Section 2 provides a description of the data and methods of the study; section 3 presents our main findings. Section 4 gives the details of our findings for English. Section 5 presents our findings for Hebrew, and section 6 presents our main findings for German. Section 7 presents a comparison of the findings for the three languages; and section 8 offers implications of the research.

2. Data and Coding

2.1. Data Collection

The data for this study come from three corpora, one for each language – English, German and Hebrew. Each corpus consists of several audio-taped (and, for English, video-taped) casual face-to-face conversations among friends and family members, in interactions among 2-5 participants per interaction.

Self-repair tokens were collected as part of a larger project on self-repair (Fox/Wouk 2003) according to the guidelines for that project: up to 100 instances of self-repair were taken from each interaction. The total number of instances for English was 308, for Hebrew it was 251, and for German it was 274. For the English corpus, the data represented the speech of 19 speakers, across 6 interactions, totaling approximately 180 minutes of interaction. For the Hebrew corpus, this procedure resulted in investigating 64 minutes of discourse among a total of 51 speakers distributed across 23 different interactions from the Haifa Corpus of Spoken Israeli Hebrew (Maschler 2004). For the German corpus, this procedure resulted in investigating 130 minutes of discourse among a total of 7 speakers across 6 different interactions. All interactions were face-to-face-interactions among friends.

Although all of the data is from face-to-face conversations (dyadic or multi-party), there are differences across the languages. The Hebrew conversations tend to be quite short compared to the English and German conversations. In addition, the rate of overlap varies across the corpora, with English and Hebrew showing more overlap than German. Given that overlap tends to be an environment that can encourage recycling, some of the differences we note below may arise from differences in rates of overlap.

2.2. Data Coding

2.2.1 Coding according to Repair Type

All self-repair tokens were classified according to repair type: Replace, Recycle, and Recycle & Replace, as illustrated in the following English examples. An asterisk denotes the point of repair initiation, boldface+underline denotes the item replaced and the item replacing it, and boldface+*italics* denotes the items recycled.

An instance of repair was treated as *Replace* if a word (or multiple words) was replaced. Consider example (4) below. In this utterance the speaker produced the word *writing*, paused for half a second following the articulation of *writing*, replaced it with *spray painting*, and then proceeded to complete the question:

(4) What was this I heard about them going up to Monarch and **writing*** (0.5)
    spray painting something on Monarch?

We also included in the category Replace instances in which a speaker mispro-
nounced a word and then re-produced it with a more appropriate pronunciation, as
in example (5) below. In example (5), the speaker produces the beginning of the
name of a sports team, but produces a pronunciation that does not fit the name of
the team (*Jo-*). He then replaces that pronunciation with the more appropriate pro-
nunciation (*Jets*):

(5) is there a more perfect guy to fit the **Jo-* Jets** organization?

Instances in which the speaker repeats a word root and replaces affixes on that
root were also included in the category Replace. The change from the Hebrew
verb *haya* ('was', masc.) to the verb *hayta* ('was', fem.), with recycling of the root,
in utterance (6) below, for instance, was coded as Replace:[1]

(6)   . . . ze **haya***   **hayta**   hashxena,
                  it **was (masc.) * was (fem.)** the neighbor (fem.),

                  . . shera'ata 'et haporets.
                  who saw the burglar

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[1] Transcription Method: The Hebrew data uses the following transcription notations: Each line
    denotes an intonation unit (Chafe 1994) and is followed by an English gloss. In the cases in
    which this gloss is not close enough to an English utterance, it is followed by a third line
    supplying a usually literal (but sometimes functional) translation. Utterances under con-
    sideration are given in boldface. Transcription basically follows Chafe (1994), with a few
    additions. Conventions are as follows:
    . . . -- half second pause (each extra dot = another 1/2 second)
    . . -- perceptible pause of less than half a second
    (3.22) -- measured pause of 3.22 seconds
    , -- comma at end of line -- clause final intonation ('more to come')
    . -- period at end of line -- sentence final falling intonation
    ? -- question mark at end of line -- sentence final rising intonation
    ! -- exclamation mark at end of line -- sentence final exclamatory intonation
    ø -- lack of punctuation at end of line -- a fragmentary intonation unit, one which
       never reached completion.
    - one hyphen -- cutoff at repair initiation
    -- two hyphens -- elongation of preceding vowel sound
    square bracket to the left of two consecutive lines indicates
    overlapping speech, two speakers talking at once
    alignment such that the right of the top line
    is placed over the left of the bottom line indicates latching, no interturn pause
    /??????/ -- transcription impossible
    /words within slashes/ indicate uncertain transcription
    [xxxxx] -- material within square brackets *in the gloss* indicates exuberances of translation
       (what is not there in the original).
    {in curly brackets} -- transcriber's comments concerning paralinguistics and prosody, which
    do not have an agreed upon symbol in this transcription system.

An instance of repair was treated as *Recycle* if the speaker repeated one or more words. Consider example (7). In this example the speaker produces *you can get a,* pauses for 0.7 seconds, and repeats *you can get a*:

(7) I mean it- th't's pretty small ***you can get a**** (0.7) ***you can get a**** ah:: (1.1)
     you know you can get a pretty small one (01.) [now.

However, if an utterance involved the addition of an element and then recycling of a word already produced, it was excluded from the study, on the grounds that the recycling in such a case is just part of "blending" back in to the syntactic projection of the utterance. Thus utterances like (8) were not included in the study:

(8)   the interesting thing about the third one (0.4)
        is that ***it was made in**** I think ***it was made in*** 1990.

Instances of repair were coded as *Recycle & Replace* if the speaker replaced a word by first recycling to a word prior to the word to be replaced and then replacing the word in question. We refer to this subtype of repair as Prerecycle & Replace. Consider example (6) above and (9) below. In (9) the speaker replaced what looks like the beginning of an infinitive form of a verb starting with *g-* with the verb *do*, but this was done only after recycling back to the subject pronoun and repeating both it and the auxiliary:

(9) Yeah, ***we'll* g-*** *we'll* **do** that later.

We also included in this category cases in which the replacement preceded the recycling, as in the following case. In this instance the speaker replaced the preposition *in* with *on* and then proceeded to repeat the pronoun *our*:

(10) Yeah, my mom always got **in-** *our** (0.2) **on** *our* cases about it.

But this type of recycling – Replace & Postrecycle – is different from the recycling of material *preceding* the replaced item because the speaker has to repeat the recycled item in order to continue with the utterance. Pre-recycling, on the other hand, could be thought of as optional for a speaker. However, since Replace & Postrecycle is not that common in our data (only 5 instances in the Hebrew corpus, 18 in the German, and 20 in the English corpus),[2] we decided to include it in the Recycle & Replace category.

   Self-repair tokens which did not fit any of these categories were coded as 'Other', and will not be dealt with in this study. Cases in which a structure was completely aborted and a new one begun (type G in Fox/Jasperson 1995), and placeholder examples (Fox/Hayashi/Jasperson 1996:206) were ignored.

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[2]   Such cases were ignored when classifying Recycle & Replace cases according to syntactic category of first item to be repeated (see below).

2.2.2   Coding according to syntactic category

We coded our data for two features:[3] the syntactic category of the replaced item in Replace repairs and Recycle & Replace repairs; the syntactic category of the first item to be repeated in Recycle repairs, as well as items repeated in instances of pre-recycling in Recycle & Replace repairs:

Item Replaced: The replaced item in **Replace.**
                        The replaced item in Recycle & **<u>Replace</u>**

First item repeated: Destination of recycling in **Recycle**.
                        Destination of recycling in **<u>Recycle </u>**& Replace.

Thus, e.g., example (4) (What was this I heard about them going up to Monarch and <u>writing</u>* (0.5) <u>spray painting</u> something on Monarch?) was classified as Replace Verb, and example (9) (Yeah, we'll <u>g-</u>* we'll <u>do</u> that later) was also classified as Replace Verb, in the Recycle & Replace pattern. In example (7) (I mean it –th't's pretty small you can get a* (0.7) you can get a* ah:: (1.1) you know you can get a pretty small one (01.) now) the destination of recycling was Subject Pronoun, and for examples (6) and (9) (Yeah, we'll g-* we'll do that later.) the destination of recycling was Subject Pronoun.

3.   The major patterns

The current study reports two main findings. First, German shows a much lower rate of simple recycling and a higher rate of replacement repairs than do English or Hebrew. Second, all three languages show an association between recycling and function words on the one hand, and replacement and content words on the other. Table 1 illustrates the rate for each language of the three repair types.

As is clear from Table 1, the rate of the three repair types is quite similar in English and Hebrew (the difference between them is not statistically significant: chi-square = 1.5, p=.21), with recycling being by far the most common repair type; German, on the other hand, shows a lower rate of Recycle repairs and a higher rate of Replace and Recycle & Replace repairs than do the other two languages (the difference between German and English, and between German and Hebrew, is statistically significant: English/German chi-square = 19.9, p=.0000 Hebrew/German chi-square = 29.4, p=.0000). One of the goals of the paper is to provide an explanation for that difference.

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[3]   For the current study we did not code specifically for syntactic category of the item in which repair was initiated. For example, in example (7) we did not code for the fact that repair is initiated immediately after the indefinite article. For this study we focused on the syntactic category of the item(s) replaced, and on syntactic category of the item that was the destination of recycling.

	Recycle	Recycle & Replace	Replace	Other	Total
English	183 (59%)	35 (11%)	37 (12%)	53 (17%)	308
Hebrew	161 (64%)	32 (13%)	29 (12%)	29 (12%)	251
German	112 (41%)	75 (27%)	75 (27%)	12 (4%)	274

Table 1: Rate of each repair type for the three languages

The second major finding is an association between recycling and closed-class function words on the one hand and replacement and open-class content words on the other. That is, we have found that in all three languages speakers tend to recycle back to function words much more frequently than they recycle back to content words; and we have found that in all three languages content words are over-represented in replacement repairs (based on their total frequency). Table 2 on the next page gives the data for recycling and replacement repairs for function words and content words in each language.

In Table 2, the columns under the 'Destination of Recycling' heading provide the numbers for destinations of recycling in the corpus (whether accompanied by replacement strategies or not), with the exception of instances of postrecycling. The columns under the heading 'Replaced Item' give the numbers for the replaced items (both accompanied or not by recycling strategies). The 'Grand Total' column specifies the total number of repaired content vs. function words. Percentages to the right of the number of tokens refer to distributional frequencies within the row (e.g., in English 80% of all function words involving repair constitute recycling destinations); percentages underneath the number of tokens refer to distributional frequencies within the column (e.g., 85% of all destinations of recycling consist of function words).

We can see from Table 2 that recycling is associated with function words in all three languages, and that content words are overrepresented in replacement repairs in all three languages. In English, only 15% of the destinations of recycling are content words, while 40% of replaced items are content words. In Hebrew, 16% of the destinations of recycling are content words, while 62% of replaced items are content words. And in German, 17% of destinations of recycling are content words, while 41% of replaced items are content words. Thus, for all three languages, the percentage of recyclings that begin with content words is below 20%, while the percentage of replacements that replace content words is around 40% for English and German, and over 60% for Hebrew.

	Destination of Recycling			Replaced Item			Grand Total
English	Recycle	Recycle & Replace*	Total	Replace	Recycle & Replace	Total	Grand Total
Function	156 (85%)	12 (80%)	168 (80%) (85%)	22 (59%)	21 (60%)	43 (20%) (60%)	211
Content	27 (15%)	3 (20%)	30 (51%) (15%)	15 (41%)	14 (40%)	29 (49%) (40%)	59
Total	183	15	198	37	35	72	270
Hebrew	Recycle	Recycle & Replace**	Total	Replace	Recycle & Replace	Total	Grand Total
Function	134 (83%)	24 (89%)	158 (87%) (84%)	14 (48%)	9 (28%)	23 (13%) (38%)	181
Content	27 (17%)	3 (11%)	30 (44%) (16%)	15 (52%)	23 (72%)	38 (56%) (62%)	68
Total	161	27	188	29	32	61	249
German	Recycle	Recycle & Replace***	Total	Replace	Recycle&Replace	Total	Grand Total
Function	91 (81%)	46 (85%)	137 (61%) (83%)	35 (47%)	53 (71%)	88 (39%) (59%)	225
Content	21 (19%)	8 (15%)	29 (32%) (17%)	40 (53%)	22 (29%)	62 (68%) (41%)	91
Total	112	54	166	75	75	150	316

Table 2: Distribution of repair type by syntactic class

*excluding 20 instances of replace + postrecycle
**excluding 5 instances of replace + postrecycle
***excluding 21 instances of replace + postrecycle

Figure 1 below is a visual representation of these findings. Figure 1 gives the percentage, for each language, that speakers recycle back to a function word or a content word (fw= function word; cw=content word). It is clear that all three languages recycle function words much more frequently than they do content words:

```
100% <---------E H G-------------------------------------------------G H E------------ > 0%
            85% 84% 83%                                         17%16% 15%
             fw  fw  fw                                          cw  cw  cw
```
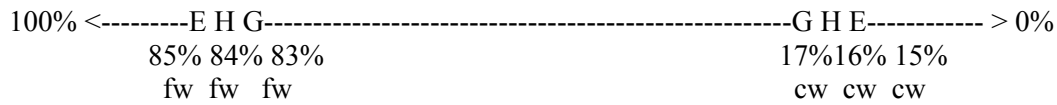
Figure 1: Destinations of Recycle repairs and syntactic class for all 3 languages

Figure 2 provides similar data for replaced items. As can be seen from Figure 2, function words are less frequent as replaced items than they were as recycled items, and content words are much more strongly represented as replaced items than they were as recycled items. This pattern holds for all 3 languages, although it is strongest for Hebrew (in Hebrew, content words actually outnumber function words as replaced items):

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100% <-------------------------------H G E--------E G H--------------------------------> 0%
                                 63% 59% 51%  49% 41% 37%
                                  cw  fw  fw    cw  cw  fw
```
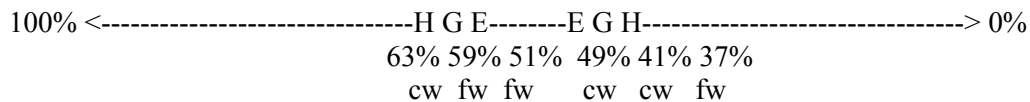
Figure 2: Replaced items and syntactic class for all 3 languages

A second goal of the paper is to explain these correlations. Smaller patterns of interest will be noted along the way. We turn now to an examination of same-turn self-repair patterns in English.

4. Repair patterns in English

Let us begin by examining the frequency of the three repair types in the English data. Table 1 above gives the relevant figures.

In English, as in Hebrew (see below), the majority of self-repairs are of the recycle variety (59%). Given the basic function of recycling as delaying the next item due (Fox/Hayashi/Jasperson 1996; Fox/Wouk et al. to appear), and the wide range of uses to which this device can be put, the high rate of recycling is perhaps not surprising. However, as we'll see below, German shows a lower rate of simple recycling than we found for English and Hebrew.

4.1. Function vs. Content words in Repair

The three repair types are not used symmetrically for all syntactic classes. As Table 2 above indicates, recycling is strongly associated with function words, while replacement strategies are less so, being used moderately frequently to replace content words.

In Table 2 we can see that content words in English are the destination of recycling and prerecycling only 15% of the time, compared to 85% of the time for function words. However content words make up 40% of the replaced items. This fascinating distribution can be explained by the very different functions of recycling and replacing.

It is not common in conversation for native speakers of English to have trouble finding a function word; rather, function words, in English at least, tend to precede content words, and thus function words can serve as devices on which to produce prospective repair if there is trouble with an upcoming content word (Fox/Hayashi/Jasperson 1996). For example, subjects are overwhelmingly pronominal in English (function words), and subject pronouns tend to precede verbs, which are content words. So recycling a subject pronoun – a very common practice in English conversation – can be a device for managing trouble with an upcoming verb. Similar arguments can be made for determiners, and prepositions – all function words that typically precede content words.

Similarly, content words may pose a range of troubles for speakers and may thus be targets for replacement repair. Because content words tend to be less frequent than function words, and because there is a vast number of them, speakers may have trouble finding the appropriate word; they may also have trouble adjusting the syntactic requirements of the word they have selected with the syntactic format they have embarked on. Of course, function words can also pose troubles for speakers – pronouns, determiners, auxiliaries, and prepositions can all require adjustment. Hence content words, at least in English and German, do not constitute a majority of replaced items.

If we now look in detail at syntactic class and repair type, we will see these patterns borne out. Table 3 presents the relevant data.We can see that function words – subject pronouns, determiners, prepositions, wh-words, the existential item *there*, and connectives – make up a higher proportion of the destinations of recycling (80%), while content words – adverbs, nouns, adjectives, and verbs – make up a correspondingly lower proportion of destinations of recycling (20%), showing instead an unusually high presence in replacements (49%). The association between recycling and function words on the one hand, and replacement and content words on the other, is thus fairly strong in English.

The four main categories that show different distributions in recycling versus replacement are subject pronoun, noun, verb and adjective. Subject pronouns make up 44% of all destinations of recycling but only 17% of all replacements. Nouns, verbs and adjectives all increase in frequency in replacement versus recycling: nouns make up 3% of destinations of recycling and 14% of items replaced (chi square is 11.2, p = .0008); verbs make up 5% of destinations of recycling and 11% of items replaced (chi square = 3.9, p = .05); and adjectives make up 3% of destinations of recycling and 10% of items replaced (chi square = 6.4, p = .01). These patterns make sense given what we have said about the functions of recycling and replacing.

There are three lexical categories that stand out as exceptions to the association between content words and replacement and function words and recycling, however: auxiliaries and the copula show an unusually low rate of recycling given the fact that they are function words, and adverbs show an usually high rate of recycling given that they might be thought of as content words. The unusual behavior of these three word types will be taken up below.

	Destination of Recycling			Replaced Item		Grand Total	
English	Recycle	Recycle & Replace*	Total	Replace	Recycle & Replace	Grand Total	
Function words							
Subject Pronoun	83 (45%)	4 (27%)	87 (88%) (44%)	6 (16%)	6 (17%)	12 (12%) (17%)	99
Wh-word	17 (9%)	1 (7%)	18(100%) (9%)	0 (0%)	0 (0%)	0 (0%) (0%)	18
Determiner	16 (9%)	1 (7%)	17 (68%) (9%)	4 (11%)	4 (11%)	8 (32%) (11%)	25
Preposition	11 (6%)	0 (0%)	11 (69%) (6%)	3 (8%)	2 (6%)	5 (31%) (7%)	16
Aux	10 (5%)	0 (0%)	10 (63%) (5%)	0 (0%)	6 (17%)	6 (37%) (8%)	16
Existential	4 (2%)	1 (7%)	5 (100%) (3%)	0 (0%)	0 (0%)	0 (0%) (0%)	5
Copula	2 (1%)	1 (7%)	3 (43%) (2%)	3 (8%)	1 (3%)	4 (57%) (6%)	7
Connective	2 (1%)	0 (0%)	2 (67%) (1%)	1 (3%)	0 (0%)	1 (33%) (1%)	3
Other	11	4	15	5	2	7	22
Subtotal			168 (80%)			43 (20%)	211
Content words							
Adverb	9 (5%)	1 (7%)	10 (71%) (5%)	2 (5%)	2 (6%)	4 (29%) (6%)	14
Verb	7 (4%)	2 (13%)	9 (53%) (5%)	4 (11%)	4 (11%)	8 (47%) (11%)	17
Adjective	5 (3%)	0 (0%)	5 (42%) (3%)	2 (5%)	5 (14%)	7 (58%) (10%)	12
Noun	6 (3%)	0 (0%)	6 (38%) (3%)	7 (19%)	3 (9%)	10 (63%) (14%)	16
Subtotal			30 (51%)			29 (49%)	59
Total	183	15	198	37	35	72	270

Table 3: Syntactic category and repair type for English

Before turning to a discussion of the exceptions to our basic pattern, it is worth commenting on the most striking pattern in the English data: the extremely high rate of subject pronoun as a destination of recycling. Examples (11) and (12) illustrate the practice in English of recycling back to a subject pronoun:

(11) but ***it was-*** (.) ***it was*** bad
(12) ***You're li-* you're like*** o- o- operating in terms of a m- of a slightly more
    organized life, than you might

Subject pronouns make up by themselves nearly half (44%) of all destinations of recycling in English. No other lexical category in the database makes up more than 6% of the destinations of recycling, so this predominance of subject pronouns is truly striking. We have noted elsewhere this strong tendency that English speakers have to recycle back to the subject pronoun (Fox//Jasperson 1995; Fox/Hayashi/Jasperson 1996), but this is the first quantitative evidence for the claim. Moreover, as has been pointed out in prior studies (Fox/Hayashi/Jasperson 1996; Wouk 2005; Fincke 1999), and supported by the findings presented in the current study, English is quite unique in its great enthusiasm for this particular practice.

As has been suggested elsewhere (Fox/Hayashi/Jasperson 1996; Wouk 2005; Karkkainen/Sorjonen/Helasvuo 2007), English speakers' predilection for recycling back to subject pronouns arises from an unusual set of factors. First, English speakers produce overt subject pronouns in nearly every clause in conversation (with a small class of exceptions; Oh 2005), in striking contrast to most other languages whose conversational patterns have been studied. As we might say, you can't recycle what you haven't got, so speakers of most languages don't recycle back to subject pronouns simply because subject pronouns are not commonly produced in those languages. Second, subject pronouns always occur in English at the beginnings of utterances, in contrast with other languages (like German) where subject pronouns may take up a range of other locations in the utterance. Third, the high level of bonding between the subject and the verb in English – manifested at least in part by the cliticization of auxiliary and copula forms to subject pronouns – makes the subject-verb complex a deeply entrenched grammaticized unit (Bybee 2006), one that is rapidly available to the speaker (Rieger 2003). Fourth, the beginning of a turn is a moment of heightened interactional significance especially with regard to turn-taking in English (Sacks/Schegloff/Jefferson 1974; Schegloff 1987), and there are a variety of reasons for re-doing the beginnings of turns (for example if the first attempt was produced in overlap; Schegloff 1987; or to achieve recipient gaze; see Goodwin 1979; 1981). And fifth, it has been argued that speakers tend to recycle more at the beginnings of complex syntactic units (Clark/Wasow 1998), and subject pronouns in English occur at the beginnings of clauses/sentences, which are very complex syntactic units.

There is no other language that we are aware of – including the sister Germanic language, German – that displays all of these characteristics, making the prevalence of subject pronoun recycling quite unique to English. We will see below that German speakers do not recycle back to subject pronouns with the same frequency as English speakers do (Rieger 2003).

Returning now to the exceptions to the basic pattern concerning function words vs. content words, we find three subpatterns: adverbs, auxiliaries and the copula. Although adverbs are technically an open-class category, in conversation they tend to come from a highly restricted set: *really, very, just, too* and *kinda* (kind of) make up 52% of the recycled adverbs, the other 48% being mostly closed-class sentential adverbs like *maybe, now, until* and *after*. Adverbs in conversational English are thus best treated as function words.

Auxiliaries show an unusually high rate of replacement, even though they are function words. The reason for this is that they often form a contrast set which carries tense-aspect distinctions. Speakers may find themselves having produced the auxiliary for one tense-aspect and then find that tense-aspect to be problematic, as in the following example:

(13) **Did** *you-** **Have** *you* asked him yet?

In addition, auxiliaries show a low rate of recycling; in fact, they are the destination of recycling in only 14 instances, 12 (86%) of which are interrogatives and thus have the auxiliary as the first element in the utterance:

(14) *Did I** did I* ever tell you about that?

The fact that auxiliaries are the destination of recycling when they are utterance-initial and not when they are later in the utterance lends support to the claim that utterance-initial position is an important destination of recycling for English speakers.

Though small in number of instances, the copula, like auxiliaries, also shows an unusually high rate of replacement and an unusually low rate of being the destination of recycling. Almost all of the replacements involving the copula involve changing the tense of the copula, as in the following example:

(15) if there was ever a league *that* **was-** *that* **is** in desperate need of a revenue sharing plan.

These cases are thus somewhat different from most other replacements in English, since they do not involve the substitution of one word for another; rather they display a shift in form of what we consider to be the same 'word'.

In addition, the copula is the destination of recycling in only 4 instances, 3 of which involve overlap resolution. Consider the following example (the participants are discussing whether Beth and John, the parents of two boys, care about the gender of their future child):

(16) Chinese Dinner

Don: Do you [have [your uh
Beth: [But
John: [(No,)
Don: Are you (opposed [   )
John: [(All the) different kinds of numbers [*are* **diff-** *are*
      interesting.

In this example the speaker, John, is overlapped as he is producing an answer to Don's second question. In fact he is overlapped just as he is producing the copula. He cuts off during the adjective and recycles back to the copula, then produces a new adjective that is heard as replacing the adjective that was cut-off. Recycling in the context of overlap is a common strategy for overlap resolution (Schegloff 1987), and 38% of the recycling repairs in the English corpus occur in the environment of overlap.

Outside of overlap, the copula is very rarely the destination of recycling (in one instance only, and that involves a simple repetition of the copula). This pattern is no doubt in part due to the fact that the copula is typically cliticized in English, and English speakers do not use clitics as a destination of recycling. In fact there are 20 instances in which the speaker recycles back to a subject pronoun+clitic combination, which suggests that speakers choose to maintain the word unit even though it contains two syntactic categories, showing more orientation to word structure than to syntactic structure.

4.2. Summary of English self-repair patterns

English shows a general preference for recycling over the other two repair types, with 59% of the database being recycling repairs. However in examining syntactic category it is clear that function words tend to be involved in recycling more frequently than in replacing, and that content words are over-represented as replaced items in replacements. In the next section we examine self-repair patterns in Hebrew.

5. Hebrew Self-Repair Patterns

Table 1 above gave the distribution of Hebrew self-repair tokens according to repair type:[4]

The distribution of repair types in Hebrew resembles the distribution in English. From Table 1 we can see that in Hebrew, the majority of all repair types – 64% – are of the Recycle variety. The strategy of Replace is quite rare (12%), and it is about as frequent as the strategy of Recycle & Replace (13%), a pattern almost identical to what we observed in English.

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[4] These figures include cases involving additions and deletions as detailed below:

Replace
  Replace + Add = 2

Recycle + Replace
  Recycle + Replace + Delete = 3
  Recycle + Replace + Add + Delete = 1

Recycle
  Recycle + Delete = 14
  Recycle + Add = 2
  Recycle + Delete + Add = 1

5.1. Content words vs. Function words and repair type

As in the case of English, the three repair types are not used symmetrically for all syntactic categories. As Table 2 above indicated, in Hebrew replacement repairs are used more often for content words, while recycling tends to be favored by function words:[5]

For Hebrew we see that function words constitute 84% (158/188) of all recycling destinations, whereas content words constitute only 16%. In addition, 87% (158/181) of all function words involved in self-repair constitute recycling destinations. The correlation 'function-recycle' is thus quite strong. On the other hand, content words constitute 62% (38/61) of all replaced items, whereas function words constitute only 38%. In addition, only 56% (38/68) of all content words involved in self-repair undergo replacement. The correlation 'function-recycle' is thus stronger than the correlation 'content-replace'; nonetheless, in Hebrew, content words are strongly overrepresented as the replaced item in replacement repairs. The correlation is, in fact, stronger in Hebrew than in our other two languages.

Let us now examine the breakdown of each repair type into the various syntactic categories. We see that indeed function words constitute recycling destinations far more often than they are replaced. Table 2 showed us that 87% of function words involved in self-repair serve as destinations of recycling, and only 13% are replaced items. From Table 4 we learn that within the category of function word, 83% of subject pronouns serve as destinations of recycling but only 17% are replaced; 93% of prepositions are recycled vs 7% replaced; 92% of determiners are destinations of recycling and only 8% are replaced; 91% of discourse markers are destinations of recycling vs 9% replaced; the pattern continues for question words (88% vs. 12%), connectives, subordinators and negatives (100% vs. 0%). On the other hand, content words are replaced somewhat more often than they serve as recycling destinations: 40% of nouns that are involved in the repairs in question are recycled and 60% are replaced, 43% of verbs are recycled and 57% are replaced, and noun phrases, infinitive clauses, adverb + verb, and verb + preposition combinations ('Other (content)') occur only as replaced items. Adjectives are too few to draw any conclusions from, but they seem not to contradict the pattern for content words (50% vs. 50%).

These findings corroborate earlier studies on English and German, according to which function words are repeated far more often than are content words (Maclay/Osgood 1959; Lickley 1994; Rieger 2003), but this is the first study documenting this quantitatively and for Hebrew as well, and relating also to replacement.

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[5]   In this table, we ignore for the moment the category 'Other Type of Repair'. Compared with Table 4 below, this table includes the categories infinitive clause and participle in the content words category, as these are sub-categories of the category V. The one case of Replace (V + Prep) is counted in the content word category because the preposition is replaced here as a consequence of replacing the verb. On the other hand, the case of Replace (Subj (Pro) + V) is counted in the function word category because in all three cases in this category, the verbal stem (though not the declined verb!) remains fixed and it is the subject pronoun that is replaced.

	Destination of Recycling			Replaced Item			Total
	Recycle	Recycle & Replace	Total	Replace	Recycle & Replace	Total	Grand Total
Function Words							
Subject Pronoun	36	8	44 (83%) (23%)	3	6	9 (17%) (15%)	53
Preposition	33	4	37 (93%) (20%)	3	0	3 (7%) (5%)	40
Discourse Marker	19	2	21 (91%) (11%)	1	1	2 (9%) (3%)	23
Connective	14	2	16 (100%) (9%)	0	0	0	16
Q-word	14	0	14 (88%) (7%)	2	0	2 (12%) (3%)	16
Determiner	7	4	11 (92%) (6%)	1	0	1 (8%) (2%)	12
Subordinator	5	2	7 (88%) (4%)	0	1	1 (12%)	8
Negative	5	1	6 (100%) (3%)	0	0	0	6
Other (function)	1	1	2 (29%) (1%)	4	1	5 (71%) (8%)	7
Content Words							
Noun	8	2	10 (40%) (5%)	7	8	15 (60%) (25%)	25
NP	0	0	0	0	1	1 (100%) (2%)	1
Verb	10	0	10 (43%) (5%)	5	8	13 (57%) (22%)	23
CTP-V of saying	4	1	5 (100%) (3%)	0	0	0	5
Adjective	3	0	3 (50%) (2%)	0	3	3 (50%) (5%)	6
Adverb	2	0	2 (67%) (1%)	0	1	1 (33%) (2%)	3
Other (content)	0	0	0	3	2	5 (100%)	5
Total	161	27	188(76%) (100%)	29	32	61 (24%) (100%)	249

Table 4: Distribution of repair type by syntactic category in Hebrew

The major exception to the Hebrew 'function-recycle: content-replace' pattern involves Complement-taking predicate verbs-of-saying. Subject pronouns also show a somewhat unusual pattern, being somewhat more likely to be replaced than most other function words. Adverbs may also constitute an exception, but they are too few to comment on in this corpus.

In what follows, we elaborate on the particularities of Hebrew grammar resulting in these repair patterns.

5.2. The Hebrew 'Function-Recycle' Correlation

From Table 4, we see that the syntactic categories contributing most to the high rate of Hebrew recycling are: subject pronoun (23% of all recycling destinations) and preposition (20%). Other syntactic categories contributing to this high rate, though somewhat less significantly, are discourse marker (11%), connective (8%), and question word (7%).

5.2.1 Recycling for Delaying Next-item-due

One of the most common functions of recycling has to do with delaying production of the next item due (Fox/Hayashi/Jasperson 1996; Rieger 2003). This can be done for various reasons, both cognitive and social, such as in order to gain additional cognitive planning time for the ensuing word or construction, to secure recipient gaze (Goodwin 1981), to postpone a possible transition-relevance place (TRP) (Sacks/Schegloff/Jefferson 1974) etc.

Example (17) illustrates the most common form of recycling throughout the Hebrew data -- recycling the subject personal pronoun in a verbal clause (34 out of 44 instances involving recycling back to a subject pronoun (77%)):

(17) ('Car Thief')

1   . . <u>'az hevanti   she***hu-***</u>*
      so understood-I that ***h****
      so I understood that h*

2   . . ***hu*** <u>xaza--r</u>,
      he returned-he,
      he returned,

Intonation unit 1 is a fragmentary intonation unit (Chafe 1987; 1994), ending with a cutoff on the subject pronoun of the embedded clause. The speaker then begins a new intonation unit, repeating the subject pronoun but not the complementizer procliticized to it. We see that, unlike the case of English, recycling can begin at a boundary between a clitic and the word it is cliticized to. Of course, in English clitics always follow the words they are cliticized to, while in Hebrew they tend to precede their hosts; so in utterances like (17) the speaker is recycling the host and not the clitic, something that English speakers do not have the opportunity to do.

Example (18) provides an illustration of the remaining 10 cases, involving a demonstrative pronoun in a nominal clause:

(18) ('Mutuality')

1 Miri: *ze--**,
     this [is],

2 Tirtsa: 'em.
       uhm.

3 Miri: *ze*   mishpatim shemegi'im.
        this [is] sentences that arrive
        these are sentences that do get said.

Here we find vowel lengthening of the subject pronoun at line 1 – another strategy for delaying next item due. Note that Miri recycles the singular form of the demonstrative in this nominal clause, not maintaining agreement with the following plural nominal predicate *mishpatim* ('sentences'), in contrast to what we would expect according to Hebrew grammar.[6] Subject-predicate agreement is not always maintained in spoken discourse. Nevertheless, the pattern of recycling the subject pronoun is common in these cases as well, suggesting that the delay here is for the purpose of delaying the content words rather than for agreement with the grammatical morphemes bound to them. Interestingly, in all 10 cases, it is the unmarked masculine singular form of the demonstrative pronoun (*ze*) that serves as destination of recycling.

In Modern Hebrew, generally an SVO language (Ravid 1977), recycling the subject pronoun returns the speaker back to the beginning of the clause. By recycling back to this initial element, a speaker in part gains time for further processing of the ensuing clause, in agreement with Chafe's Light Subject Constraint (1994:91). English subjects, according to Chafe, are typically 'light'; i.e., not much linguistic material is employed in order to verbalize them, such as an unstressed pronoun. Hebrew is a so-called 'Pro-drop' language, which results in Hebrew subjects often being even 'lighter' than they are in English, manifested only through a verbal suffix (and/or prefix, in the case of the future). This explains the much lower rate of recycling back to the subject pronoun in Hebrew compared to the English rate of 44%. However, many sentences do begin with a subject pronoun, thus enabling subject pronouns to serve as the destination of recycling in almost a quarter of all recycling cases (23%) – still the largest category serving as destination of recycling in Hebrew.

For the second largest syntactic category contributing to the high rate of Hebrew recycling, the preposition (20% of all recycling destinations), observe the following excerpt:

(19) ('Wounded in Lebanon')

1 . . 'ani yoshevet sham,
    I'm sitting   there,

---

6   Intonation and context show that this is not a Hebrew cleft sentence.

2 . . ***be--**** . . ***be***toranut,
   o--n*   **on** duty,

The Hebrew preposition *b(e)-* ('in'), procliticized onto the noun (as are the most common Hebrew prepositions: *b(e)-* ('in'), *l(e)-* ('to'), *m(e)-* ('from')), is lengthened, and then, following an intonation-unit internal pause, repeated preceding the verbalization of the noun *toranut* ('duty') in this prepositional phrase functioning as adverbial argument of the verb. These additional delaying phenomena provide further support that recycling here is related to delaying next content word due.

In the case of a procliticized preposition preceding a definite noun, recycling the preposition entails recycling also the determiner fused with it, as in example (20):

(20) ('Archaeology')

1 Limor: . . . dibarnu 'al ha'avoda,
           talked-we about the work,
           we talked about the work,

2   bidyuk.
        just now.

3 Alon: . . . . ken,
         yes,

4   . . 'al   ha'avoda ***ba--****
         about the work in the*

5   . . . . ***ba***ku--rs   haze.
         in the course the this
         in this course.

The preposition *b(e)-* ('in') of line 4 fuses with the definite article *ha-* to form the proclitic *ba-* ('in the') procliticized onto the noun. Both elements are then recycled prior to articulation of the noun *kurs* ('course'). In Hebrew, by far the most common determiner preceding the noun is the definite article.[7] Since many definite articles are fused with the preposition preceding them, as in example (20), this ex-

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[7]   There is only one self-repaired determiner preceding the noun which is not a definite article in the entire corpus -- the nonspecific pronoun *'eizeshehi* ('some' fem. sg.). There is no indefinite article in Hebrew. Hebrew demonstratives *follow* the noun, after repetition of the definite article, as in example 20, line 5:

                baku--rs   haze.
                in the course the this
                in this course.

   We see that the definite article occurs twice in this phrase: once fused with the preposition *be-* in the form of *ba-*, the second time preceding the demonstrative *ze*. Hebrew possessive pronouns also follow the noun.

plains the fact that Hebrew determiners constitute only 6% of all recycling destinations.

Similar arguments about recycling back to a function word in order to delay next-item-due can be made for Hebrew discourse markers, connectives, subordinators, negatives, and question words. The high rate of Hebrew recycling, then, is enabled by several syntactic and morphological facts in the grammar of Hebrew:

- Modern Hebrew is generally an SVO language.

- Hebrew grammatical elements generally *precede* the lexical elements they function as satellites to (unlike Japanese, e.g., Fox/Hayashi/Jasperson 1996). Subject pronouns, prepositions, discourse markers, connectives, determiners,[8] subordinators, negatives, and question words, tend to appear *preceding* the verb, noun, phrase, clause, or conversational action (Ford/Thompson 1996) they serve as satellites to, thus enabling the speaker to delay production of the lexical element while pausing on the grammatical ones preceding it. As Fox, Hayashi, and Jasperson note, "lexical items are more contributionally consequential, semantically richer, and perhaps possibly less available (e.g., during word searches) than the more restricted class of grammatical morphemes" (1996:232).

- Apart from subject pronouns, Hebrew function words do not vary for person, number, or gender. They can be recycled while searching for the ensuing utterance, because they do not depend on its properties for their form (unlike the situation in German, see below). Indeed, the subject pronoun, which does agree with the predicate following it in form (in person, number, and gender), shows a significantly lower ratio of recycling vs. replacement phenomena (83% vs. 17%) compared to the ratios for the other function words, providing a partial explanation for the somewhat unusual pattern of subject pronouns in Table 4.

5.2.2. Overlap

Another reason for the prevalence of recycling is discourse-cultural and has to do with the relatively high rate of overlap in Israeli Hebrew casual conversation. Speakers often recycle more items at a time in the environment of overlap, as in example (21) below.

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[8] This does not include the definite article preceding an element modifying a definite noun, such as an adjective or demonstrative (such as the *ha-* ('the') preceding *ze* ('this') in the preceding footnote).

(21) ('Ideal Woman')

1 Anat:	'ani lo 'ohevet she'osim	'alay focus kaze!
	I not like-I that do-they	on me focus like this
	I don't like [it] that they put	on me such a focus!

2 Avi:		*'at ro'a 'et ze**
		*you see def. D.O. marker it**

3   . . . *'at ro'a 'et   ze* betsura--   . . me'od me'od,*
         you see def. D.O. marker it in a way [that is] very very,*

4   . . 'ani makir 'et ze.
         I know this [kind of situation].

As a result of the overlap in lines 1-2, perhaps in order to ensure that his utterance is heard, Avi recycles all the way back to the beginning of his utterance, resulting in the recycling of 4 items (Schegloff 1987). Recycling in order to produce an overlapped utterance in the clear may be motivated not only socially, but also cognitively. An overlap may result in delays in production of next-item-due because of listening to an overlapping utterance while speaking. This seems to be the case in the excerpt above, as the continuation of intonation unit 3 is verbalized with additional disfluencies such as vowel lengthening, an intonation-unit internal pause; and finally, aborting the structure and beginning a new one altogether at line 4.

In the Hebrew data, 22% of simple recyclings occur in the environment of overlap.

It is worth noting here that 38% of recycle repairs in English occur in the environment of overlap, while only 10% of recycle repairs in the German corpus occur in this environment. Overlap might thus be a significant factor in the somewhat higher rate of recycling in Hebrew and English, compared to German. We return to this possibility in section 8 below.

5.3. Syntactic category and repair type in Hebrew

Self-repair strategies involving replacement are typically employed in the Hebrew corpus when the speaker has made a lexical or grammatical error – that is, retrospective repair – unlike the strategy of delaying next-item-due motivating recycling – that is, prospective repair.

The syntactic categories contributing most to the strategy of Replace are noun (25% of all replaced items) and verb (22%). Next come the subject pronouns (15%). Adjectives contribute only 5% and adverbs only 2%. Since these last two categories do not exhibit sufficient tokens for making any generalizations, we do not elaborate on them here. Because of a lack of space, we leave discussion of Hebrew nouns and of replacing subject pronouns for another paper (Fox/Maschler/Uhmann forthcoming).

5.3.1. Verbs

Examining Table 4, we see that repair types involving verbs are distributed across recycling vs. replacement strategies such that there is a preference towards replacement strategies (57%).

Hebrew verbs include an obligatory bound morpheme agreeing with the subject, sometimes in addition to an overt subject, sometimes without an overt subject (as in the case of so-called 'Pro-drop' languages). Technically, this morpheme gets recycled in all cases of replacing the verb.[9] However, because the subject morpheme is an obligatory morpheme on every Hebrew verb, these cases are classified here as 'Replace' rather than as 'Recycle & Replace'.

5.3.2. Replace Verb

The strategy of Replace Verb is illustrated in example (22), concerning a second grade teacher who went through every single student of the class in order to determine whether or not to punish him or her:

(22) ('Porter')

1   . . . . . . <u>vehi 'avra</u>,
           and she passed-she,
           and she passed,

2   . . <u>yeled yeled</u>,
       boy boy
       every single boy,

3   . . <u>kaxa shehi</u> **'amd*a****
       so that she **stood**-*she* (intransitive)*
       so that she stood*

4   **he'emid*a***   <u>'oto</u>,
       stood-*she* (causative) him,
       made him stand,

5   <u>leyad haluax</u>,
       by the blackboard,

The intransitive verb *'amda* ('stood') is replaced by the causative verb *he'emida* ('made stand'), with recycling of the root *'.m.d.* (relating to the concept of standing) and the obligatory 3[rd] person feminine singular suffix *-a*. Note that the 3[rd] person pronoun *hi* ('she') preceding *'amda* (line 3) does not get repeated. The source of this repair is a lexical choice error on the part of the speaker, which was repaired by replacing the problematic item. Only 5 out of 23 self-repaired verbs (22%) are repaired via this Replace only strategy.

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9   In the past and present tenses, this implies postrecycling, since the subject morpheme consists of a suffix. In the future, the subject morpheme consists of both a prefix and a suffix.

5.3.3. Recycle & Replace Verb

Another 8 verbs (35% of all self-repaired verbs) are replaced using the Recycle & Replace strategy, most frequently (in 6 (75%) of these cases) recycling back to the preceding subject pronoun, as in example (23):

(23) ('Jeep')

1   *. . hem '**ovr***im*   *'im xevrot**
      *they '**ovr***im**-they*   *with companies**
       do they [garbled form of 'work'] with companies*

2   *hem '**ovd***im*   *'im xevrot*   koax 'adam?
      they **work-*they with companies*** power man?
       do they work with manpower companies?

The speaker made a phonological error (the phoneme /r/ instead of /d/) in articulating the verb, replaced it with the right form of the verb (*'ovrim* > *'ovdim*, 'work')[10] while recycling the obligatory subject morpheme of the verb *-im* ('they'). However, besides this obligatory recycling, we also find 'real' recycling of the subject pronoun *hem* ('they') preceding the verb, as well as post-recycling of the preposition *'im* ('with') and the adverbial argument *xevrot* ('companies') following it.

Very few lexical and grammatical errors occur in this corpus during the production of function words. It is not surprising that errors tend to occur in content, rather than in function words. The far greater array of content words, in comparison to function words, suggests that they are less available for recall during talk, making their verbalization therefore more susceptible to errors. The fact that few function words are involved in errors also suggests that the molds, or grammatical constructions, into which content words are set are cognitively accessible to speakers at a more basic level than are content words.

5.3.4. Recycle back to Verb

Hebrew verbs serve as the destination of recycling (with no accompanying replacement) in 10 cases in the database (43% of all verbs involved in self-repair). At first glance, this seems a major contradiction to the 'Content-Replace' pattern. Upon further investigation, however, it turns out that 7 of these 10 cases involve no overt subject. In the absence of an overt subject, the subject morpheme attached to the verb functions referentially (referring to the agent of the action described by the verb) rather than merely as an agreement morpheme. Recycling the verb in those cases includes recycling also the subject morpheme on the verb, as in example (24):

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[10]   The Hebrew verb *'ovrim* actually means 'they pass'. However, we have decided not to translate it here as such, because we believe the error is not semantic but rather phonological, in anticipation of the phoneme /r/ in the following adverbial argument *xevrot* ('companies'). Another argument supporting this choice in translation is semantic: the verb *'ovrim* ('they pass') is not likely to appear with the adverbial argument *'im xevrot* ('with companies').

(24) ('Intruding Privacy')

1   . . . . <u>ve'az</u> <u>'e--h</u>,
         and then u--h,

2   . . . ***<u>xazarti</u>--***,*
         returned-I
         I returned,

3   . . . ***<u>xazarti</u>***   <u>habayta</u>.
         returned-I home
         I returned home.

The speaker is relating a story about himself. The verb he employs is therefore in 1[st] person singular: *xazarti* ('I returned'). Pronouns referring to discourse partici-pants are typically[11] not overtly expressed in spoken Hebrew (Polak-Yitzhaki 2004). Since there is no overt subject here, the subject morpheme *-ti* attached to this verb functions referentially. Therefore, by recycling the verb, the speaker es-sentially recycles also the subject of this verb. Since there is no overt subject ex-pressed, such verbs often occur turn-initially; if the speaker must employ recy-cling for delaying purposes, he or she may have little choice but to recycle (back to) the verb. This property of Hebrew certainly distinguishes it from English – verbs are rarely turn-initial in English (except in imperatives), and are very rarely the destination of recycling. This pattern in Hebrew is a good example of our motto "if you don't have it, you can't recycle it". When no overt subject is present, then of course the speaker cannot recycle back to the subject.

In only 3 instances (13%) do verbs serve as the destination of recycling while following an *overt* subject in this corpus. All three cases involve a full NP (rather than a pronoun; Wouk 2005, for a similar finding in Indonesian). Thus, only 3 verbs violate the 'function – recycle' vs. 'content – replace' pattern. An example follows:

(25) ('Political Argument')

1   . . . <u>'ani bixlal lo batuax sheyar-</u>*
             I at all not sure that Jor-*
             I'm not at all sure that Jor-*

2   . . <u>sheyarden</u> ***rotsa****
             that Jordan wants*

3   . . . ***<u>rotsa</u>*** <u>bixlal 'et ze.</u>
             wants at all this
             wants this at all.

---

[11] This is the unmarked case. There are several marked environments in which pronouns referring to discourse participants are not dropped. See Polak-Yitzhaki (2004) and also Hacohen/Scheg-loff (2006).

This example exhibits two cases of self-repair. In the second one (lines 2-3), the speaker recycles back to the verb (*rotsa* 'wants'). Indeed, the subject of the clause is a full noun (*yarden* 'Jordan'). This is possibly related to cognitive disfluencies exhibited by the self-repair token in the immediately preceding intonation unit -- recycling back to the subordinator *she-* ('that') at the beginning of this object complement. Notice that Hebrew verbs are never the destination of recycling in the Recycle & Replace strategy.

5.3.5. Complement-Taking-Predicate Verbs-of-Saying

So far we have seen that self-repair patterns involving verbs constitute evidence for the strong bond between the subject and the verb as perceived by Hebrew speakers. Not only is there obligatory recycling of the bound subject morpheme whenever the verb is repaired; repair involving the verb very often entails recycling back to the subject pronoun. In other words, subject and verb are perceived as so closely related that speakers cannot repair one without also mentioning the other.

On the other hand, self-repair patterns of Hebrew speakers do not furnish evidence for a strong bond between the verb and its other arguments (objects or adverbial arguments). In the case of Recycle & Replace, verbs *never* serve as destinations of recycling. In other words, Hebrew speakers never return to the verb when there is a problem with one of the objects or adverbial arguments. In contrast, in those cases they often return all the way back to the beginning of the clause (as in example (21)). Hebrew self-repair patterns, then, cast doubt on the notion of verb phrase, suggesting that Hebrew speakers do not view the bond between the verb and its non-subject arguments as having the same strength as that between the verb and its subject (Fox/Jasperson 1995 for English).

There is one exception to this, and it involves a complement-taking predicate (CTP) (Thompson 2002; verb-of-saying, preceding constructed dialogue (Tannen 1989)). As seen in Table 3, none of these verbs are replaced in the corpus – they always serve as recycling destinations. Examine example (26):

(26) ('Mutuality')

1   <u>'az 'e--h</u>,
       so uh,
       so uh,

2   *<u>'amarti lo</u>*   **[she**--**]***
       said-I to him **[that]***
       I said to him **[that]***

3   *<u>'amarti lo</u>*,
       said-I to him,
       I said to him,

4   [[**<u>hitga'agati 'elexa</u>**]].
       [[**missed-I you**]].
       [[**I missed you**]].

The speaker recycles back to a 1st person verb (including the obligatory bound subject morpheme) in accordance with the pattern seen in example (24), as well as the indirect object pronoun (<u>lo</u>, 'to him') following the verb. She then replaces the subordinator *she-* ('that') with the utterance *hitga'agati 'elexa* ('I missed you'), turning what was about to become a case of indirect speech into constructed dialogue (Tannen 1989) -- a far more involving narrative strategy. Note, however, that the source of 'the problem' here is very different than in the preceding cases involving recycling. What is at issue here is a change in narrative strategies at mid-utterance, not merely a delay in production of the next-item-due.

There are 5 self-repaired CTP verbs in the corpus, all of them involving verbs of saying in either 1st or 2nd person, thus always referring to discourse participants which are typically not overtly expressed in spoken Hebrew (Polak-Yitzhaki 2004). This, then, is a sub-group of the cases involving no overt personal pronoun. Example (26), however, is the only case in the corpus in which a speaker recycles back to a verb and then *replaces* an object (the complement clause). Self-repair patterns of Hebrew speakers provide evidence, then, that the bond between a verb of saying and its object complement is of an entirely different nature − and a stronger one − than that between verbs and their non-subject arguments. Thompson (2002) questions the 'subordinate' status of English object complements, suggesting instead that they be viewed as epistemic/evidential/evaluative formulaic fragments expressing speaker stance toward the content of a clause. Our finding constitutes further evidence against viewing such complement clauses as equivalents of NP objects.

To sum up self-repair patterns involving Hebrew verbs, then:

- We find evidence for the strong connection between the subject and the verb as perceived by Hebrew speakers. It appears that speakers perceive the two as so closely related that they cannot repair one without also mentioning the other (either just as a bound morpheme or as a separate subject pronoun as well). This is reminiscent of the English self-repair pattern involving auxiliaries (see 4.1 above), according to which repairing auxiliaries always involves also repeating the subject pronoun. As in the case of the English cliticization of the copula (e.g., *I'm*, *you're*), the bond between the subject pronoun and the copula is perceived as so strong by speakers, such that they cannot repair one without also mentioning the other.

- On the other hand, no such strong connection is perceived by Hebrew speakers between the verb and its other arguments. Verbs having an overt subject are not recycled back to when the source of the problem is one of the objects or adverbial arguments (the category <u>Recycle</u> V & Replace in Table 4 shows zero instances). This supports the findings of Fox/Jasperson 1995 for English, according to which, when speakers are in a post-verbal element, they do not recycle back to the verb, preferring instead to recycle back to the subject pronoun. Hebrew self-repair patterns, then, cast further doubt on the notion of verb phrase also in a language of the Semitic group, suggesting that Hebrew speakers do not view the bond between the verb and its non-subject arguments as a very strong one.

- The one exception of recycling back to the verb and replacing an object, which involves a CTP verb of saying (example (26)), suggests that Hebrew

speakers perceive the bond between such verbs and their complements as of an entirely different (and stronger) nature than that between verbs and their non-subject arguments.

6. Repair patterns in German

As noted above, Recycle is much less frequent in German (41%) than it is in English (59%) and Hebrew (64%); and Replace (27%) and Recycle & Replace (27%) are more frequent in German than in Hebrew and English (cf. Table 1 above).

6.1 Content words vs. Function words and Repair Type

Looking at the syntactic categories which contribute to the three repair types in German, we saw the pattern we have already found in English and Hebrew: recycling strongly favours closed-class function words, and open-class content words are over-represented in repair strategies that involve replacements compared to those that involve recycling. In Table 2 we saw that German function words make up 83% of the destinations of recycling, while content words constitute only 17% of the destinations of recycling. And while content words make up 41% of the replaced items, function words make up 59% of the replaced items. Thus content words are overrepresented as replaced items, while function words are overrepresented as destinations of recycling (chi-square = 21.9; p=.0000).

Let us again examine the breakdown of each repair type into the various syntactic categories. From Table 5 we can see that all content word classes – verbs, nouns, adjectives and adverbs – make up a greater proportion of replaced items than of recycled items, but only adjectives and adverbs are the destination of recycling in Recycle repairs. On the other hand, most of the function words – pronouns, determiners, connectives and prepositions – make up a greater proportion of destinations of recycling than of replaced items; the only exception here is, as we saw above in the discussion of English, the group of copulas, modals and auxiliaries. Another interesting exception to the expected pattern is the function word category pronouns. In English we found a significant difference in the proportion of (subject) pronouns as destinations of recycling as opposed to replaced items, and in Hebrew we found a tendency in that direction. Although pronouns are still more frequently recycled than replaced in German, the difference is rather small and is clearly not statistically significant (chi square=0.682, p=.41).

In what follows, we elaborate on the particularities of German grammar resulting in these repair patterns.

GERMAN	Destination of Recycling			Replaced Item		Grand Total	
	Recycle	Recycle & Replace	Total	Replace	Recycle & Replace	Total	
Function words							
Pronoun	19 (17%)	17 (31%)	36 (59%) (22%)	8 (11%)	17 (23%)	25 (41%) (17%)	61
Determiner	20 (18%)	6 (11%)	26 (67%) (16%)	5 (7%)	8 (11%)	13 (33%) (7%)	39
Preposition	16 (14%)	10 (19%)	26 (81%) (16%)	4 (5%)	2 (3%)	6 (19%) (4%)	32
Connective	15 (13%)	8 (15%)	23 (96%) (14%)	0 (0%)	1 (1%)	1 (4%) (1%)	24
Question-word	4 (4%)	3 (6%)	7 (54%) (4%)	5 (7%)	1 (1%)	6 (46%) (4%)	13
Aux/Mod/Cop	4 (4%)	1 (2%)	5 (14%) (3%)	10 (13%)	22 (29%)	32 (86%) (21%)	37
Other	13 (12%)	2 (4%)	9 (64%) (5%)	3 (4%)	2 (3%)	5 (36%) (3%)	14
Subtotal			138 (61%)			88 (39%)	226
Content words							
Noun/NP	4 (4%)	0 (0%)	4 (17%) (2%)	11 (15%)	9 (12%)	20 (83%) (13%)	24
Verb	7 (6%)	0 (0%)	7 (27%) (4%)	15 (20%)	4 (5%)	19 (73%) (13%)	26
Adjective	8 (7%)	2 (4%)	10 (40%) (6%)	11 (15%)	4 (5%)	15 (60%) (10%)	25
Adverb	2 (2%)	5 (9%)	7 (47%) (4%)	3 (4%)	5 (7%)	8 (53%) (5%)	15
Subtotal			28 (31%)			62 (69%)	90
Total	112	54	166	75	75	150	316

Table 5: Syntactic category and repair type for German

6.2. Simple recycling and the destination of recycling in German

Looking at function words involved in recycling first, we see that personal pronouns, which were the most frequently recycled syntactic category in English, play a much less crucial role in German (Rieger 2003:58) and Hebrew. In English, nearly half of all destinations of simple recycling were subject pronouns (45%); in German, however, pronouns make up only 17% of simple recycling and 31% of destinations of recycling in Recycle & Replace. Although pronouns are the most common destination of recycling in German if we look at the two types of recycling combined (22%), the frequency of pronouns as the destination of recycling is still much lower in German than it is in English, and is roughly equivalent to the frequency in Hebrew.

A first step toward an answer to the question "Why is simple recycling less common in German?" might thus be to look at pronoun recycling in German.

6.2.1. Pronouns and other front-field constituents

It is generally assumed that each language has a basic constituent order: For English and Hebrew it is generally **SVO**; for German it is either **XVX** (main clause), **XXV** (subordinate clause) or **VXX** (*yes/no*-question). And although the four-term case system in contemporary spoken German is subject to attrition and although there is a lot of syncretism in the system, case marking still allows the identification of grammatical relations (like subject and object) independently of their position in the emerging turn. Thus we find not only variation in the position of the finite verb, but also relatively free constituent order [12]. This is especially true for the position of the so-called Vorfeld (front field, cf. FN 12), which can be filled by

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[12] Constituent order in German can be described by so-called 'topological fields' (cf. Drach 1937): Front Field (FF), Left Sentence Bracket (LSB), Middle Field (MF), Right Sentence Bracket (RSB). The position of the finite verb varies depending on whether the sentence is a main or a subordinate clause. In main clause order the finite verb fills the left sentence bracket and the front-field is filled. This type is called verb (finite)-second. In subordinate clause order the finite verb fills the right sentence bracket and the left sentence bracket is filled with a subordinate conjunction: This type is called verb (finite)-last.

Main Clause:			
FF	LSB	MF	RSB
Morgen wird		*er*	*kommen*
Tomorrow will		he	come

Subordinate Clause:			
FF	LSB	MF	RSB
Ø	*weil*	*er morgen*	*kommen wird*
	Because	he tomorrow	come will'

The front field (Vorfeld), which is filled only in verb-second sentences (XVX), precedes the left sentence bracket and can contain any "Satzglied" (cf. FN 14) of the sentence. The left sentence bracket can be filled by the finite verb in verb-first (VXX) and verb-second sentences (XVX) or by a subordinating conjunction (complementizer e.g. *dass*, *wenn, ob*) in verb-last sentences (XXV). The right sentence bracket can be filled by non-finite verbal elements in verb-first and verb-second sentences with analytic tenses or it takes the whole verbal complex in verb-last sentences. The middle field (Mittelfeld) is defined as the part between the right and the left sentence bracket.

almost every constituent. One option is of course a subject pronoun, as in example (27) below:

```
(27)        ich* ich hab glaub  ich nur (-) DREI
            I     I have believe I   only   three

            'I I have I guess only three'
```

In example (27), the speaker repeats the subject pronoun *ich* ('I'). The recycling of the subject pronoun in the front field is a less prominent strategy in German (as compared to English and Hebrew), and less than half (6) of these recyclings involve 'proper' personal pronouns; in the remaining cases (13) pronouns from a class of demonstrative pronouns[13] are used. Consider (28) below, where the speaker repeats the nominative demonstrative pronoun *das* ('that/it'):

```
(28)  das* (.) das paSSIERT nur am   SCHLUSS.
      it       it  happens only at.the end
      'it happens only at the end'
```

But due to the relative freedom of word order in German, the front field position is frequently filled with adverbs. As we saw in Table 5, adverbs serve as the destination of recycling in 5 instances. In all the instances in which the speaker prerecycles back to an adverb and then replaces another item, the adverb fills the position of the front field in a verb-second-sentence:[14]

(29)

```
JA da hat* (.) da erinner ich mich  im    nachhinein dran?
Yes there has  there recall I  myself in.the  event     at.it
'Yes I have I do recall this after the event'
```

In example (29), the speaker recycles back to the adverb *da*[15] and replaces the auxiliary *hat* (first person past tense form of *haben*) with *erinner* (phonologically reduced first person present tense form of *(sich) erinnern*, 'to remember').

This observation leads to a generalization that puts adverbs together with 'proper' personal pronouns and a subset of demonstrative pronouns. It seems to be the case that in German it is not the subject personal pronoun (as in English) but the front-field, which serves as a common locus for recycling independently of syntactic category or grammatical relation of the constituent that occurs there. But due to the significant variation in word order, there is not a high level of bonding between the front-field-constituent and the verb-second-position in German. This low level of bonding also shows itself in the phonological realization of pronouns and verbs/auxiliaries. In contrast to English, there is no cliticization of subject pronouns + auxiliary and copula forms: *du´st* (*you´ve*) is not a possible realization of *du hast* (*you have*), (Rieger 2003:64). There is another observation that leads to a similar conclusion: English shows a fair number of recyclings back to a

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[13] There are two types of demonstrative pronouns in German: *dieser, diese, dieses* and *der, die, das*. Both vary in gender and case and the last one is homophonous with the definite article.

[14] The fact that adverbs can be placed in the front-field is one of the main features that serves as a test that they are indeed a proper "Satzglied", because only constituents that can be topicalized (i.e. realized in the front field) do get that status.

[15] Note that the response particle *ja* ('yes') does not get recycled.

wh-word, while German shows very few such cases. Again we find cliticization with the *wh*-word as the host and auxiliaries and the copula in English (*who´s coming*) but not in German in case the wh-word is in front-field position *(*wer´s gekommen?*)*.[16]

So a first step towards an answer to the question "Why is there less recycling in German?" could be connected to the typological difference in word order between the two Germanic sister languages. German has a much more flexible word order as compared to English and possibly due to that variability neither subject pronouns nor *wh*-words have become hosts for auxiliary clitics as in English, and this early part of the turn has not become such a deeply entrenched grammaticized unit (Bybee 2006) that would be rapidly available to speakers. German speakers wishing to delay production of an item early in the turn might therefore choose other options than recycling; for example, Rieger (2003) suggests that German speakers make greater use of so-called filled pauses than do speakers of English. Future cross-linguistic research exploring all the options available to speakers for delaying next item due could shed light on this possibility.

6.2.2 Prepositions and Determiners

After pronouns, the next most common destinations of recycling are determiners and prepositions: As Table 5 shows, these syntactic categories each make up 16% of all recyclings (including Prerecycling & Replace). But if we look at these total numbers only, we miss an interesting difference between English and German: in German, determiners (possessive determiners and numerals) and prepositions also occur as destinations of recycling in Recycle & Replace (11% and 19%), while this almost never occurs in English (only one determiner serves as the destination of recycling in Recycle & Replace repairs in English, and there are no instances of prepositions serving in this role). In the case of prepositions, this scope of recycling is inevitable in German when the preposition serves as the host for the clitic form of an article as in (30):

```
(30)   der (--) typ vom*   von der neuen WUTh bei uns,
       this   guy by.the by the Proper Name with us
                'this guy by the  by the neue WuTh with us'
```

Vom is the fused form of *von dem* (def. art. sing. dative masc. or neuter), but the proper name *neue Wu(ppertaler)Theatergruppe (new theater group of Wuppertal)* has feminine gender so the correct dative form is not *dem* but *der*. Cliticization of prepositions with phonologically reduced articles is – in contrast to English – a highly frequent feature of colloquial informal registers of spoken German.[17] But speakers also choose prepositions as the destination for recycling in examples like (31) below, in which the preposition does not host a clitic article:

---

[16] There is of course ample cliticization in German with the finite verb in verb-second sentences (or the complementizer in verb-last-sentences) as the host and pronouns at the beginning of the middle field (in the so called Wackernagel-position). Cf. example (33) *dann* hasse* *dann* kannsten (dann hast du/then have you; dann kannst du ihn/ then can you him).

[17] For phonological details cf. Wiese (1996:248ff.) and Uhmann (2001:392ff.) for the analysis of self-repair in PPs.

(31)

```
01  S: irgendwie in der (.) R[AThaus*] eh quatsch nee
       'somehow in the   city hall uh nonsense nope'
02  L:
                                  [((whisper))]
03  S:        in den CITYarkA[den.
              in the city.arcades
04  L:                      [((whisper))
```

In excerpt (31), one problem for speaker S is that the names of the two shopping malls in her town differ in number (rather than gender, since both are feminine): one is called *Rathausgalerie* (*city hall gallery*) and the other *Cityarkaden* (*city arcades*). But there is another problem for S in repairing her turn, which arises from the fact that in German (in contrast to English) all prepositions assign case and agreement is obligatory within the whole PP.[18] The locative preposition *in* requires dative case, so the definite article *der* (sg.) has to be replaced by *den* (pl). Even though prerecycling is not morpho-phonologically inevitable (as it is in example 30), the speaker recycles back to the preposition *in* before replacing the article. We have found no instances of self-repair in German where a speaker simply replaces the article, if the noun phrase follows a preposition.[19] On the basis of these differences in grammatical features and the frequent cliticization in spoken German between prepositions and articles, we can say that prerecycling reveals a much stronger bond between prepositions and their noun phrases in German than in English.

Leaving the class of function words and moving to an examination of content words, we notice that nouns, verbs, adjectives and adverbs do get recycled. But even when combined with instances of Recycle & Replace, all of the four syntactic categories together make up only 16% of the destinations of recycling (remember that determiners and prepositions each reached 16%). Nouns are rarely recycled (4 instances only). Not a single instance was found in the German data where a noun was chosen as the destination of multi-word recycling, nor were they found as the destination of prerecycling in instances of Prerecycle & Replace. Verbs are, like nouns, never the destination of recycling in Prerecycle & Replace. This picture is similar to the distribution in English. We now turn to consider patterns of replacement in German.

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[18] The only exception in English is the preposition *to*.

[19] It was already claimed in Uhmann (1997; 2001:392ff.) that prepositions are the preferred destination of recycling in German PPs (in contrast to Levelt's (1983:84) "Well-Formedness-Rule of Repairs" that makes no distinction between the determiner and the preposition in a PP), but the corpus was so limited that invented examples had to stand in for what was found in this bigger corpus.

6.3. Replacement strategies

As we saw above, the content-replace and function-recycle correlation is strongest in Hebrew. As in English, content words in German are over-represented in replacement repairs. But again the breakdown of each repair type into the various syntactic categories (cf. Table 5) reveals both similarities and differences between the three languages. Differences are found in correlation patterns between repair type and syntactic category as well as in frequency. First, unlike English, there are two classes of function words that show a remarkably high rate of replacement in German: auxiliaries, modals and copulas (86%) on the one hand and pronouns (41%) on the other. The difference in the replacement of nouns (83%: 63%) is weak and is not significant (chi square = 2.2, p=0.14).

6.3.1. Replacement of function words: auxiliaries, modals and copulas

Although auxiliaries, modals and copulas are function words, they are far more likely to be replaced than to be the destination of recycling. The reason for the high rate of auxiliary replacement in German is probably the same as for English: speakers may find themselves having produced the auxiliary for one tense-aspect and then find that tense-aspect to be problematic. But speakers also replace modals with auxiliaries and vice versa. Consider examples (32) and (33) below:

```
(32) und ich wollte* ich hab mir          gedacht
     and I   wanted I   have to.myself     thought
       'and I wanted I meant'
(33) dann hasse*    dann kannsten   drauf FESTNAGELN.
     Then have.you then can.you.him then to.it nail.down
       'then you have then you can nail him down to it'
```

Despite this functional explanation for a high rate of replacement, which might be shared by German and English speakers, the comparison between Table 3 and Table 5 shows that the replacement of auxiliaries, modals and copulas is far more frequent than recycling those items in the German data but not in the English (86% and 43%, respectively). As there is no obvious difference in the grammar of modals, auxiliaries and copulas between English and German, we must look at discourse patterns to explain our findings.

But if we shift our attention and examine the scope of recycling involved in these replacements more closely, we find similarities as well as suggestive differences between English and German. Let's start with similarities. In examples (32) and (33) the speakers not only replace an auxiliary or a modal, but also recycle the pronoun *ich* ('I') (as in example 32) or the adverb *dann* ('then') (as in example 33) in the front-field.[20] This pattern occurs 15 times in the data (10 recycled pronouns and 5 recycled adverbs). This pattern is identical with examples in the English data (cf. example 15). But German also shows another pattern for replacing auxiliaries, modals and copulas as in (34) and (35) below:

---

[20]   Note that the coordinative conjunction *und* ('and'), which fills the K-position does not get recycled.

```
(34) ich hab* war  in dem moment so !BAFF!,
     I   have was  at that moment so flabbergasted
        'At that moment I was so flabbergasted'
```

```
(35) und dann hab ich musst ich
     and then  have I  must   I
        'And then I must…'
```

In examples (34) and (35), the speakers engage in replacement without prerecycling of the front field constituent. This pattern occurs 13 times in the data, 10 times in the repair category Replace and another 3 times in the repair category Recycle & Replace because of post-recycling.[21] It is thus almost as frequent as the pattern described immediately above, where the front field element is recycled. The pattern in which the front-field element is not recycled, while attested in the data, seems to be somewhat less frequent in English. As we have already mentioned, there is an especially tight bond between the subject pronoun and the auxiliary in English and this unit tends to not be broken in the syntax of self-repair. Although the front-field is a destination for recycling in German, the bond between the constituent in the front-field and the finite verb (auxiliary or modal) seems to be much weaker, so that speakers frequently engage in self-repair patterns as in (34) and (35) in German.

6.3.2 Replacement of function words: pronouns and determiners

Pronouns are the second most commonly replaced part of speech. They are replaced far more often in German than in English and Hebrew: pronoun replacement reaches only 12% in English and 17% in Hebrew but 41% in German (the difference between English and German is significant (chi square=17.7, p=.0000) as is the difference between Hebrew and German (chi square = 7.8, p=.005)). There are two reasons for the high replacement rate of pronouns in German: gender and/or case marking and flexible word order (especially in the front field position).

   In (36) below, H replaces an ambiguous demonstrative pronoun (either fem. sing. nom *die/she* or - more likely in this context - the homophonous plural of all three genders *die/they*) by an unambiguous pronoun (masc. sing. nom *der/he*):

```
(36)   aber die*   (.) der WILL dem* dem DIESES geschäft
       but she/they     he wants him  him this   deal
       'but she/they he wants to pitch this deal


       mit DIESEM (.) ding da  schmackhaft machen,
       with this      thing there tasty      make
       with this object to him'
```

And in example (37) below, the speaker replaces the demonstrative pronoun *die* (feminine gender) with the demonstrative pronoun *das* (neuter gender):

---

21 At this point of our research we have not yet determined the factors that influence the use of prerecycling with replacement like (32) and (33) as opposed to simple replacement like (34) and (35) in German.

(37) ma= MUSS **died'** **das**   ANders: AN[gehn.
      you must DemPro.d DemPro different approach
         'you have to approach this differently'

Example (38) below shows an instance of pronoun replacement in the position of the front field:

(38) NEE (.) **man*** (.) **das** darf man wohl irgendwie nich;
      no   you   that must you PART sort.of not
         'no you sort of must not (do) that'

The speaker rearranges the word order in the emerging turn by replacing the indefinite subject pronoun term *man* ('you') by the demonstrative pronoun *das* ('that'), and repeats the subject term in the middle field.

Determiners (articles, possessives, and demonstratives) get replaced in German for various reasons (demonstrative determiners are replaced by definite articles, definite articles are replaced by indefinite ones or singular forms are replaced by plural forms), but in the majority of instances the need for self-repair arises again due to the gender classification of German nouns, which is reflected in determiners. And as determiners precede their nouns, the gender-marked determiners create the need for repair and they are regularly replaced, if the noun - that is eventually produced - does not match the gender marking on the determiner that has already been produced. Consider example (39) below, in which the speaker starts with a masculine article which is first recycled and then replaced by the feminine article, which is (retrospectively) the correct one for the noun *Batterie* ('battery'):

(39) =***der*** **der*** **die** batterie die versorgt
      Art.masc. Art.masc. Art.fem. battery it powers

      nur im NOTfAll   dann;
      only in case.of.need then

         'the the the battery it powers only in case of need'

The following examples further illustrate the challenges faced by German speakers in selecting the appropriate determiner for an NP in the emerging turn. The challenge arises due to the gender marking of nominal compounds, which can be rather complex in German. And it is only the gender of the final noun (the grammatical head of the compound) that determines the gender of the entire compound:

In extract (40) the compound *Waffeditor* ('wav editor') is thus masculine because *Editor* is masculine:

(40) **dieses***   ehm **dieser** WAFF.E.DI.TOR,
      Dem.Neut. Dem.Masc. Waff-editor
         'this uhm this wav editor'

The speaker, who has already produced a determiner marked for neuter gender (*dieses*), replaces it with the same determiner marked for masculine gender (*dieser*).

Despite the gender and case marking of determiners in German, determiners in German are replaced at the same rate as determiners in English (33% and 32%,

respectively). However, when we look at replacement of noun phrases, we will see that determiners are often replaced when a noun is replaced; this fact raises the rate of determiner replacement beyond that for English.

6.3.3. Replacement of content words: nouns and NPs

Nouns are the most frequently replaced content words in German (83%), and the rate of replacement is higher in German than in English (63%) and Hebrew (60%), although these differences are not statistically significant because of the small numbers. Speakers replace nouns because of errors in articulation (alveolar nasal instead of bilabial nasal) as in example (41) below:

```
(41) die (.)   schlägt aber  jEde con* compUterzeichnung  eignlich
     Art.fem.sing beats PART. every con*computer.drawing    PART.
        'But it beats all computer drawings'
```

But frequently, nouns that are already produced in an emerging turn as in example (41) can´t be simply replaced:

```
(42)   na  bist du der   GAST* die   GASTKATZE?
       Prt. Are you Art.masc. guest Art.fem. guest cat
       'Are you the guest the guest cat?'
```

In (42) the noun *Gast* ('the guest') has the correct article (*der*), because *Gast* is masculine, but although this turn is grammatically correct, the speaker initiates repair and the entire NP gets replaced by *die Gastkatze* ('the guest cat') in the course of the ongoing turn. In doing this kind of self-repair the speaker has to replace both the noun *Gast* by the compound *Gastkatze* and the masculine determiner (*der*) with the female one (*die*), because the final part of the compound, *Katze* ('cat'), is feminine.

In the next example the speaker replaces the determiner after the initiation of repair, but nevertheless ends up having produced a grammatically inappropriate article:

(43)

```
wenn ich die    geSAMtvolUmen den    geSAMT(.)AUFtragsvoLUMen
if I Art.neut.pl total.volume Art.masc.sg. total.contract.volume

   kennen würde,
  know   would
```

```
'if I knew the total volume the total contract volume'
```

H is engaged in producing a direct object. So in this instance the determiner is not only marked for gender but also for case (accusative). H comes up first with the term *die gesamtvolumen*, which shows a grammatically correct article, if *Volumen* is meant to be the plural (neuter, plural *die*). But obviously this is not the term he is aiming at and he next produces the compound *Gesamtauftragsvolumen*. This compound consists of three constituents and the last one is neuter (singular or plural): $[_{N, neut.}$ $[_{Adj.}$gesamt] $[_{N, masc.}$ auftrag] $[_{N, neut.}$ volumen]]. The correct article (accusative) would thus be either *die* (plural) or *das* (singular). The chosen article *den* only agrees with the masculine gender (accusative, singular) of *Auftrag* ('con-

tract'), which is not the final noun and thus not the grammatical head of the compound. In this instance, then, the speaker starts off with what turns out to be the correct article and then repairs it with an incorrect article.

Thus, self-repair involving nouns is regularly achieved through the replacement of the entire NP in German, since as determiners precede their nouns and agree in gender and case, they have to be replaced, too. In our statistics, instances like (42) and (43) were counted only once as 'replace NP'. If they were counted as well in the category 'replace determiner', the score would be higher in German than in English, which would reflect the differences in gender and case marking.

As was shown in Table 1, the German data contains a higher rate of Replace and Recycle & Replace repairs than do the other two languages. The breakdown of each repair type into the various syntactic categories (cf. Table 5) reveals that it is both the higher frequency of replacement strategies involving auxiliaries/modals/copulas and nouns, and the high rate of pronoun replacement that contributes to this finding.

6.4. Summary of German self-repair patterns

First, we noticed that German speakers recycle less frequently and replace more frequently than do speakers of English and Hebrew. Second, we found that German speakers follow the tendency we saw in English and Hebrew to recycle function words more often than content words, and to replace content words at a higher rate than they are recycled. However, function words do get replaced (auxiliaries/modals/copulas and pronouns), and they are replaced at a markedly higher rate in German. Third, we noticed differences in the scope of recycling. Several factors may play a role in this outcome, and we address those further in section 7 below. Suffice it here to recall the major findings:

- *Free word order*: Recycling the beginning of a clause might be less frequent in German, because – due to its relatively free word order – the front-field and the finite verb in verb-second position are not a rapidly available, highly entrenched grammaticized unit (e.g. there is no cliticization between front-field pronouns or *wh*-words as hosts and auxiliaries/finite verbs in German). The scope of recycling in replacement strategies might also be connected to flexible word order. The front-field serves as a destination for recycling, but when German speakers replace a finite verb in verb-second position they *either* pre-recycle the front-field constituent *or* they immediately start the repair with the replacement of the verb. The latter pattern, which shows a weak bond between the front-field and the finite verb, seems to be more frequent in German than in English. Flexible word order might (besides gender marking) also be responsible for the high rate of pronoun replacement in German, because frequently the replacement takes place in the position of the front field, where pronouns are replaced by another constituent.

- *Bonding of prepositions and determiners:* In contrast to the weak bond between the front-field and the verb, there is a strong bond between prepositions and articles in German (frequent cliticization), thus prepositions are frequently the destination of prerecycling in replacement strategies in German.

- *Rich inflectional morphology:* Recycling functional items, which are morphologically inflected (e.g. articles for case and gender), can be an unsuitable device for delaying a content word in the emerging turn for German speakers, because the grammatical properties of the chosen content word differ from the one that might have been originally projected (e.g. due to a difference in gender). With morphologically inflected function words, there may also be a greater need to replace forms, because a change in the projected noun may involve replacing a preceding determiner.

- *Rate of overlap:* As we mentioned earlier (cf. 5.2.2), there is a low rate of overlap in the German data. Only 10% of the recycled instances occur in the environment of overlap. Thus if overlap at least in some cases leads to recycling, German should show less recycling than Hebrew and English.

Thus language specific typological and grammatical features may 'conspire' with interactional properties to shape the frequencies of different repair types and account for the replacement of function words and the scope of recycling in German.

7. Comparing English, Hebrew and German

We are now in a position to discuss the central difference noted among the three languages, namely the much higher rate of simple recycling in English and Hebrew as compared to German. We would like to suggest that there are several factors that together may create this outcome: first, there is significantly less overlap in the German data than in the Hebrew or English data (10% of the recycled instances in German occur in the environment of overlap, compared to 22% in Hebrew and 38% in English), and overlap does on many occasions (though certainly not all) lead to recycling; second, the need in German to replace problematic morphology on determiners and adjectives creates a greater demand for replacement repairs than we would find for a language in which modifiers do not depend on their (lexical) heads for morphological categories. Third, we argued that there is a weak bond between the front field and the finite verb in verb-second position in German, such that German speakers are less likely than English and Hebrew speakers to recycle back to the beginning of a TCU. This fact may lead German speakers to prefer so-called filled pauses as a delay device, rather than recycling (Rieger 2003).

The next major difference we noted among the languages was the prominence of subject pronoun as a destination of recycling. In English, subject pronoun is an extremely common destination of recycling, making up 44% of all destinations of recycling; in German and Hebrew, however, the rate is much lower (roughly 22% in each language). We believe the reason for this difference is the very high rate of clause-initial overt subject pronouns in English – nearly every clause in English has an overt, clause-initial subject pronoun. German and Hebrew, on the other hand, show much greater variability in the placement of subject pronouns and, especially for Hebrew, in whether subject pronouns are overtly expressed or not. In German the more important category of destination of recycling is front field, which may be occupied by a subject pronoun, but may also be occupied by other parts of speech, such as adverbs, non-finite verbs, non-subject NPs, and so on. In

addition, in German there is only a morphological bond (agreement) and no pho-nological bond between subject pronouns in front field and their verbs – there is no cliticization of verbs to their subjects, as there is in English. Thus subject pro-noun is not a heavily entrenched clause-initial locus in German. While Hebrew speakers do tend to recycle back to subject pronouns, the common practice of leaving subjects unexpressed often produces utterances in which the verb is initial, and thus verbs are a more suitable destination of recycling in Hebrew than in English.

The third difference we noted was the pattern of recycling regarding preposi-tions. In German and Hebrew, prepositions are a common destination of recycling (20% of all destinations of recycling in Hebrew and 16% in German), while in English they are not a particularly common destination of recycling (making up only 6% of all destinations of recycling). This pattern may be a result of the much stronger bond between prepositions and their determiners and nouns in German and Hebrew than in English. In German the preposition determines the case that the determiner and noun will occur in (for example, *von* ('from, by, of') requires the following noun and its determiner and modifiers to be in the dative case), and in some cases the preposition and determiner have become fused into a single morpheme (for example, *von dem* ('from the' (masculine/neuter singular) is over-whelmingly produced as *vom*). In Hebrew, prepositions often occur as proclitics on their nouns in which case they, too, often fuse with the following definite ar-ticle (as in example 20). In English, on the other hand, there is no special mor-phological or phonological bond between prepositions and their nouns (or the modifiers associated with those nouns). Perhaps that is why English speakers tend not to recycle back to prepositions when they initiate repair in the noun or deter-miner immediately following the preposition (speakers recycle back to preposi-tions in these circumstances only 38% of the time). And there are only 7 instances in the English database of speakers recycling just a preposition.

Although there are striking differences across the three languages, there are also striking similarities. All three languages show a strong preference for func-tion words as destinations of recycling in recycling repairs, and all three lan-guages show an overrepresentation of content words in replacements (although this overrepresentation is much stronger in Hebrew than in English or German). This pattern makes sense given the fact that all three languages tend to have func-tion words that precede content words: prepositions, determiners, pronouns, and auxiliaries and modals all[22] tend to precede the content words they serve as satel-lites in these languages (although Hebrew does not have auxiliaries or modals in the same sense as in English and German). We have seen that function words can

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[22] Word order of Hebrew NP's is actually more complex. Whereas prepositions and the definite article precede the noun; demonstratives, possessives, and adjectives (along with the definite articles preceding them in an NP) follow the noun, e.g.:

babayit   hagadol haze   sheli
in the house   the big the this my
'in this big house of mine'

However, these noun satellites which follow the noun are very seldom repaired in our data. In addition, word order in German VPs is more complex. Auxiliaries and modals precede their full verbs only in verb-second and verb-first sentences with an empty middle field. In verb-last position they follow their verbs.

be recycled to delay next content-word-due, and thus are likely to be used as the destinations of recycling. In contrast, content words can be inapposite and thus need to be replaced, leading to a higher rate of replacement among content words than recycling.

Of course in English and Hebrew function words do sometimes pose troubles for speakers (e.g. an inapposite preposition, or an interactional pressure to switch from *I* to *we* to include the recipient – see Lerner/Kitzinger 2007), and thus may be replaced; in German the need for agreement in gender, case and number between determiners and nouns may lead speakers to replace determiners if the projected noun due is changed.

The importance of word order in our findings cannot be overstated. In fact, if we look at a language with different word order characteristics, the strong association between function words and recycling appears not to hold. Consider, for example, Korean. Korean is a classic example of a language in which modifiers follow their heads; for example adpositions are actually suffixes on their nouns. While Korean has demonstrative determiners, they are much less frequently used than are articles in English, German and Hebrew. Subjects are only infrequently expressed overtly, and pronouns in general are not common. Thus Korean has few function words that could serve to delay the next item due (Fox/Hayashi/Jasperson 1996, for this point regarding Japanese). We would thus expect that function words would not show a special association with recycling in Korean. And indeed that's what we find. In a cursory exploration of 159 instances of self-repair in Korean, collected by Hyun Jung Yang, we found that only 25% of simple recyclings had as their destination of recycling a function word, compared to 85% for English, 83% for Hebrew, and 81% for German (see Table 2).

The associations between part of speech and type of repair that we found in Hebrew, English and German languages thus reflect the typological characteristics of those three languages and is not to be taken as a universal fact about languages (Fox/Wouk et al. to appear).

8. Conclusions

This study has explored the recycling and replacement patterns in three languages, two of which are sister languages. This study supports the findings of prior work on self-repair (Gomez de Garcia 1994; Fox/Hayashi/Jasperson 1996; Fincke 1999; Uhmann 2001; Rieger 2003; Wouk 2005) which suggest that typological characteristics of a language, such as major constituent order, presence or absence of determiners which precede or follow their nouns, presence or absence of overt arguments (especially subjects), presence or absence of highly entrenched – even cliticized – relationships between certain function and content words, and presence or absence of complex morphology on function and/or content words, all shape the self-repair practices of that language.

This relationship between typological characteristics and repair practices further suggests that even genetically close languages may exhibit quite different repair practices if their structures have diverged substantially. This is clearly the case for English and German, which, though sister languages, show distinctly different repair practices. One of the most remarkable manifestations of this difference is the treatment of subject pronouns in recycling in the two languages: al-

though both languages show a strong preference for overt subject arguments (a typologically rare feature), the greater flexibility in word order in German leads away from the entrenchment of subject as the beginning of a clause, and especially leads away from the entrenchment of the linear subject-verb bond. In English the deep entrenchment of the subject-verb bond can be seen in the cliticization of certain high-frequency verbs (auxiliaries and the copula *be*) on subjects. No such cliticization exists in German.

In a similar vein, languages which are not genetically close but which share certain typological features may exhibit similar repair practices. German and Hebrew, for example, though not genetically related, both exhibit a much greater tendency to recycle back to prepositions than does English. We have argued that this pattern arises from the very close morphological and phonological relationships between prepositions and the determiners and nouns that follow them in German and Hebrew: both languages show an extremely close phonological relationship between some prepositions and the following nouns or determiners; in Hebrew some prepositions fuse with the immediately following definite article and procliticize to their nouns, and in German some prepositions have fused with certain determiners to make a single word. Moreover, in German prepositions require their noun phrases to be in specific morphological cases, so there is also a close morphological relationship in German between prepositions and their noun phrases. No such phonological or morphological relationships exist in English between prepositions and their noun phrases.

In addition to correlating self-repair strategies with language typology, through the study of self-repair, we gain an understanding of the way the speakers of a language themselves interpret the structure of their language. Self-repair patterns reveal the degree of connection that speakers create among particular syntactic categories. For instance, self-repair patterns involving frequent recycling back to a clitic or to a clitic host, such as to a preposition procliticized to a Hebrew noun or to a pronoun to which the copula or auxiliary is encliticized in English, reveal speakers' understanding of morphemes and the connections among them in their languages. Such a window proves to be important for our understanding of language organization, as the recent interest in the concept of 'word', and in particular in the ambivalent nature of clitics with regard to 'words', suggests (Dixon/ Aikhenvald 2002).

Furthermore, it seems that clitics shape self-repair practices in crucial ways in our three languages. For example, the fact that a variety of verbal elements (the copula, auxiliaries, some modals) cliticize to subject pronouns (and to full NP subjects as well) in English helps to create the importance of the subject as a destination of recycling. And in turn the importance of the subject as a destination of recycling helps to create turn-beginning in English as a critical destination of recycling (not true of all languages; Fox/Hayashi/Jasperson 1996). In Hebrew the fact that many prepositions are procliticized to their nouns leads to a high rate of recycling of prepositions, and in German the fact that the copula, auxiliaries and modals are not cliticized to subjects may be part of the reason that subjects are not a common destination of recycling in German.

In addition to these differences among the three languages, there is a strong similarity, namely that all three languages have function words which precede the content words they serve as adjuncts to. As we saw above, this similarity mani-

fests in the tendency in all three languages for speakers to recycle back to function words rather than content words. Our prediction, on the basis of the data presented here, is that all languages with function words that precede their respective content words (which will tend to be verb-initial and verb-medial languages) will show a preference for recycling back to function words rather than content words, while languages without such function words will not show this preference (Fox/Wouk et al. to appear). Further research on languages of various typological profiles will be needed to determine if this prediction is accurate.

9. Acknowledgements

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Prof. Barbara A. Fox (Corresponding author)
Department of Linguistics
295 UCB
University of Colorado, Boulder
Boulder, Colorado 80309
barbara.fox@colorado.edu

Dr. Yael Maschler
Department of Communication
University of Haifa
Mount Carmel, 31905, Haifa, Israel
maschler@research.haifa.ac.il

Prof. Susanne Uhmann
University of Wuppertal
Geistes- und Kulturwissenschaften
42119 Wuppertal
uhmann@uni-wuppertal.de