Say it again, Sam! The prosodic profiles of emphatic reduplication in German

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Abstract

Our paper presents an initial investigation into the acoustic form and function of emphatic reduplication in German. We found that emphatic reduplications are used to attract attention in order to prepare listeners for important information. Read-speech data elicited on this basis showed that the emphatic reduplications of grade particles and verbal imperatives both start with a prosodic 'ritardando', but differ subsequently in the overall intonation patterns and their association with either decreasing or increasing stress and accent levels.

Index Terms: emphasis, reduplication, prosody, German.

1. Introduction

German shows many lexical iterations like *"sehr, sehr"*, *"viel, viel"*, *"bitte, bitte"* and *"warte, warte"*. German grammars marginalize these lexical iterations, even though they became increasingly productive in the 20th century and are nowadays entrenched in all social classes and age groups, cf. [3,4,5]. The aim of this paper is to shed initial light on the functions and acoustic forms of lexical iterations in German. For reasons that will be explained in the discussion section, we will henceforth refer to *"sehr, sehr"*, *"viel, viel"*, *"bitte, bitte"*, *"warte, warte"* etc. not merely as lexical iterations, but as instances of reduplication – a phenomenon which is primarily associated with languages of the South Pacific, cf. [1,2,4]. Moreover, to our knowledge our study is the first acoustic-phonetic approach to reduplication, which has been analyzed so far only in phonological and morphosyntactic terms. Therefore we were also interested in determining to what extent the literal meaning of the technical term 'reduplication' is reflected in acoustic-phonetic detail. In fact, it is frequently claimed in the literature that the reduplicated element is an exact copy of the original element, cf. [5].

In languages like Saramakka, Lampung, Hebrew, French and Italian particularly adjectives, but also nouns are reduplicated in order to intensify word meanings. For example, by reduplicating *"piccola"* (little) in *"Una stanza piccola"*, a little room becomes a tiny little room in Italian. A Saramakka speaker saying *"de kua kua fisi"* expresses that the fish s/he offers is not just fresh, but very fresh. Likewise *"balak balak"* and *"gever gever"* refer to a very large item in Lampung or to a manly man in Hebrew, cf. [4,5]. In order to find lexical reduplications in German, we systematically searched large corpora of spoken and written sentences (e.g., DGD and IDS). The search yielded several hundred instances like the following: *"Es wird sehr, sehr schwierig, die nächste Runde der Champions League zu erreichen"* (It will get very very difficult to reach the next round in the Champions League), *"Ich glaube, die Kompromisse liegen viel, viel früher"* (I believe that the compromises should have been made much much earlier), *"Das wird richtig, richtig spannend; vielleicht haben wir am Ende die Nase vorn"* (It's getting really really exciting; maybe we win by a nose in the end), *"Warte, warte, nur einen Augenblick noch, dann bin ich so weit"* (Wait wait, I'm ready in just a moment), *"Das ist für sehr, sehr viele Bürger nur ganz, ganz schwer nachzuvollziegen"* (This is very very hard to understand for many many German citizens).

The German instances of reduplication differ from those of Italian, Saramakka, Lampung and Hebrew above in that they do not primarily concern nouns and adjectives, but verbs (imperatives) and adverbs (grade particles) that modify subsequent adjectives. (Reduplication involves also other word classes in German, but the overall proportion of these cases is negligible, cf. [7]). Moreover, unlike in the examples of Italian, Saramakka, Lampung and Hebrew, the German reduplication does not create an (implicit) contrast that then intensifies the meaning of the reduplicated word. For example, *"Warte, warte"* cannot be paraphrased as 'wait longer', *"viel, viel früher"* does not refer to a point in time before *"viel früher"*, and the number of addressed citizens does not increase from *"sehr viele Bürger"* to *"sehr, sehr viele Bürger"*.

Thus, summarizing our functional analysis, we think that subsuming German reduplications like *"sehr, sehr"*, *"warte, warte"* etc. under 'intensification', as was done by [4,6,7], is at least over-simplified, if not misleading. It was shown in the production study of [8] that intensifying word meanings is done in German by increasing the articulatory and phonatory effort of the corresponding word, or, more specifically, of its lexically stressed syllable (cf. [9,10,11] for English and French). It is certainly true that the German reduplications exemplified above fit under the more general term of 'emphasis' and may hence be called emphatic reduplications (as opposed to reduplications with grammatical functions, cf. [1,2]). The emphasis originates from an iconicity that relates a 'more' of phonetic form to a 'more' of function [5,12]. However, based on more than 100 selected single-case analyses of written and spoken examples, we have reached the conclusion that the emphasis is not directed towards the meaning of the corresponding word or phrase (like in the case of intensification). Rather, the emphasis of *"sehr, sehr"*, *"warte, warte"* etc. is directed towards the communication line between speaker and hearer. That is, the emphatic reduplication creates a syntactic and prosodic break in the speech signal, which resets the communication line and indicates 'I want your attention, because what I am saying is important'. This paraphrased function is similar to that sketched by [6] and may be labeled 'emphasis for attention', supplementing the established categories 'emphasis for intensity' and 'emphasis for contrast', cf. [8,9]. We found emphasis for attention in those contexts, among others, in which a speaker revisits a previously introduced and hence given theme and adds a new aspect to it. The notion of emphasis for attention is also compatible with the fact that we observed a tendency for emphatic reduplications to occur particularly often when parents and children speak to each other.

The fact that German emphatic reduplications are likely to occur in discussions between parents and children was taken into account in the production experiment that we present in this paper. That is, in order to create a genuine context for the production of emphatic reduplications, they were integrated in fairy tales that nursery school teachers read to their children.

The target words that we elicited with emphatic reduplication were selected on an empirical basis. We selected those 6 grade particles and those 6 verbal imperatives that occurred most frequently with emphatic reduplication in the analyzed corpora of spoken and written German. Each of the two target-word groups included four monosyllabic and two disyllabic items (in all disyllabic items the lexical stress was on the initial syllable). We added a third target-word group that consists of the two reduplicated grade particles *"weit, weit"* and *"lang, lang"*. These reduplications were analyzed separately, as they are not productively used anymore, but occur restricted to a few phrases like *"weit, weit weg"* (far far away) and *"lang, lang ist's her"* (it's a long long time ago). Apart from the empirically oriented selection of target words, the method of our production study was not based on specific hypotheses as there has never been an acoustic-phonetic analysis of (emphatic) reduplication before. Thus the choice concerning the analyzed acoustic parameters was guided by previous findings of [8] for types of intensifying emphasis in German. All further aspects of the method are sketched below.

2. Method

In addition to the above mentioned „*weit, weit*" and „*lang, lang*" that occurred in the fixed phrases *"weit, weit weg"* and *"lang, lang ist's her"* the following 2x6 emphatic reduplications were analyzed:

		Grade particles	Verbal imperatives
Monosyllables		*"ganz, ganz"* (very, very)	*"halt, halt"* (stop, stop)
		"sehr, sehr" (very, very)	*"hört, hört"* (listen, listen)
		"so, so" (so, so)	*"los, los"* (go, go)
		"viel, viel" (much, much)	*"schnell, schnell"* (hurry, hurry)
Disyllables		*"richtig, richtig"* (really, really)	*"bitte, bitte"* (please, please)
		"super, super" (super, super)	*"warte, warte"* (wait, wait)

Table 1: *The 12 elicited reduplications, plus "weit, weit" (far, far) and "lang, lang" (long, long).*

Each monosyllabic and disyllabic reduplication was embedded in two different fairy tales, the traditional text 'Die Bienenkönigin' (Queen bee, Brothers Grimm, [13]) and the more modern short story 'Oh, wie schön ist Panama' (The Trip to Panama, Janosch, [14]). The fairy tales were read to children by 10 female nursery school teachers, who were all between 25-40 years old, experienced readers and native speakers of Northern Standard German.

The recordings took place in different kindergartens around Kiel. In each recording session the nursery school teacher sat with 2-3 children (3-5 years old) together on a sofa in a separate, silent room. The nursery school teacher was instructed to read the two fairy tales one after the other fluently in a typical child-directed manner that maintains the attention of the children. Sentences that were interrupted by loud interjections of children or by slips of the tongue were to be repeated. The nursery school teachers were given about 15 min time to practise the texts and to ask questions prior to recording. Apart from that, the nursery school teachers were informed neither about the aim of the recording nor about the

target words in the texts; and, in fact, informal interviews after each recording session showed that none of the nursery school teachers guessed the actual aim of the recording. Almost all speakers assumed that the aim was to analyze child-directed speech or differences between direct speech and narrative text.

The recordings were made digitally (96 kHz, 24-bit) with an Olympus LS10 handheld voice recorder, which was placed on a table in front of the sofa, about 50 cm away from the mouth of the nursery school teacher. Reading each fairy tale took between 5-7 min. The order in which the two fairy tales were read was balanced across the 10 speakers. Including instructions, reading practice and concluding interview, an entire recording session took about 45 min.

Since 10 speakers produced 2x6+2=14 reduplications in each of the two fairy tales, the elicitation procedure yielded a total of 280 tokens for the acoustic analysis. The two elements (E1, E2) of each token (e.g., *"ganz*[E1], *ganz*[E2]*"*) were analyzed separately by means of PRAAT (http://www.fon.hum.uva.nl/praat/, version 5.3) with regard to the following parameters:

- F1-F2 distances (Hz) in the centre of the vowel,
- Overall duration of the element (ms),
- Duration of stressed, element-initial consonant(s) (ms),
- Duration of stressed, element-initial vowel (ms),
- Duration of intensity increase from the onset of the element to the intensity peak in the element (ms),
- Level of the intensity peak (dB),
- Slope of the intensity increase from the onset of the element to the intensity peak in the element (dB/sec),
- Overall duration of the rising-falling F0 peak (ms),
- Slope of the F0 rise from the onset of the element to the F0 peak in the element (st/sec),
- Maximum range of the F0 peak (rise or fall) (st).

All measurements were made using the default settings. Those measurements that concerned the segment and element durations were derived from a segmental annotation that was done beforehand in PRAAT using SAMPA. The acoustic measurements were complemented by a close auditory analysis that included a prosodic annotation on the basis of the PROLAB inventory [15]. The recorded and segmentally as well as prosodically annotated speech material was integrated into our KIESEL corpus (KIEler Sammlung Expressiver Lesesprache, http://www.stimmeundemotion.uni-kiel.de/Ressourcen.htm).

The acoustic measurements were statistically analyzed by means of series of paired-samples t tests (two-tailed) that compared the two elements E1 and E2 of the 14 different reduplications with respect to each of the 10 acoustic parameters. Due to the large number of tests, only results with $p<0.01$ were judged to be significant. The results are summarized in the following.

3. Results

Additional auditory analysis showed that all emphatic reduplications of Table 1 were produced by the 10 speakers with clear lexical stresses and rising-falling pitch-accent F0 peaks on both elements, E1 and E2. However, there were parallel changes in the stress and accent *levels* from E1 to E2, and the direction of these change differed between the groups of target-word pairs. In the 6 grade particles, stress and accent were stronger on E1 than on E2. The opposite was true for the

6 verbal imperatives. Their emphatic reduplications yielded higher stress and accent levels on E2 than on E1. This auditory finding is supported by the results of our acoustic measurements.

In particular, the level of the intensity peak as well as the duration and range of the F0 peak decreased significantly from E1 to E2 in the grade particles (int.peak: $3.502_{viel} \leq t[19] \leq 7.349_{super}$, p<0.01; peak.dur: $3.362_{viel} \leq t[19] \leq 9.026_{richtig}$, p<0.001; peak.range $4.703_{richtig} \leq t[19] \leq 6.254_{super}$, p<0.001), but increased significantly from E1 to E2 in the verbal imperatives (int.peak: $3.044_{hopp} \leq t[19] \leq 8.939_{warte}$, p<0.01; peak.dur: $2.897_{bitte} \leq t[19] \leq 7.869_{warte}$, p<0.01; peak.range $3.222_{halt} \leq t[19] \leq 6.864_{hört}$, p<0.01). The levels of the intensity peaks differed by about 3-5 dB. The mean changes in the durations and ranges of the F0 peaks amounted to about 40-80 ms or 2-3 st. Due to the semitone difference the reduplicated imperatives were almost exclusively characterized by upsteps from the first to second pitch accent, whereas no upsteps were found in the reduplicated grade particles. Moreover, that element with the greater intensity and F0 dynamics – i.e. E1 of the grade particles and E2 of the verbal imperatives – was also realized with more carefully pronounced vowel qualities. That is, the F1-F2 distances in the centre of the vowel became larger for front vowels and smaller for open and back rounded vowels (on average about 200-400Hz in each direction; F1-F2: $3.032_{ganz} \leq t[19] \leq 8.695_{super}$, p<0.01). It is interesting to note that this more careful vowel pronunciation applied to the entire element. So in the disyllabic target words, it concerned not only the vowel of the initial lexically stressed and pitch-accent syllable, but also the vowel of the following, word-final syllable (F1-F2: $2.804_{super} \leq t[19] \leq 3.191_{richtig}$, p<0.01). The more careful vowel pronunciation was linked with a significant increase in vowel duration of about 30-50 % or 25-55 ms (voc.dur: $3.729_{so} \leq t[19] \leq 11.042_{sehr}$, p<0.001).

In addition to the differences between E1 and E2, which are related to changes in the stress and accent levels, the reduplicated grade particles and verbal imperatives both showed specific global prosodies. Firstly, we observed that the verbal imperatives were produced overall faster, with a higher intensity level and with larger intensity and F0 changes than the grade particles. Secondly, we deduced from the measured element durations (in accord with our auditory analysis) that the speaking rate of the reduplicated grade particles was not just higher, but further accelerated by about 20 % (50-80 ms), whereas the speaking rate slowed down across the reduplicated imperatives (ele.dur.grade: $4.039_{viel} \leq t[19] \leq 8.647_{so}$, p<0.001; ele.dur.imp: $2.870_{bitte} \leq t[19] \leq 5.266_{warte}$, p<0.01). Thirdly, the prosodic annotation revealed melodic differences. The typical intonation pattern of the reduplicated grade particles consisted of 'late' and 'medial' pitch accents (L*+H, H* or L*+H, L*+H) that were clearly separated by a strong indentation. In the case of the reduplicated verbal imperatives, the by far most frequent intonation pattern was a sequence of 'early' and 'medial' pitch accents, concatenated by a moderate indentation (H+L*, H*).

In contrast to the clear differences between the stress, accent, rate and intonation patterns of the grade particles and verbal imperatives, both groups of reduplicated target-word pairs were introduced by a prosodic pattern that may be impressionistically described as 'ritardando'. In terms of acoustic measurements, this 'ritardando' is reflected in a significant lengthening of the onset consonant of the initial element E1 by about 40-60 % or 40-60 ms relative to the onset consonant of

E2 (ini.cons: $2.973_{hört} \leq t[19] \leq 8.877_{viel}$, p<0.01). This initial lengthening was continued in the subsequent accented vowel in terms of significant delays of about 50% (20-80 ms) of the intensity and F0 peaks, in this way creating less steep slopes for the intensity increase and the pitch-accent rise relative to those of E2 (int.dur: $2.888_{warte} \leq t[19] \leq 7.570_{halt}$, p<0.01; int.slope: $2.850_{super} \leq t[19] \leq 4.485_{halt}$, p<0.01; rise.slope: $2.882_{schnell} \leq t[19] \leq 9.026_{viel}$, p<0.001). Two examples of reduplication by different speakers are illustrated in Figure 1.
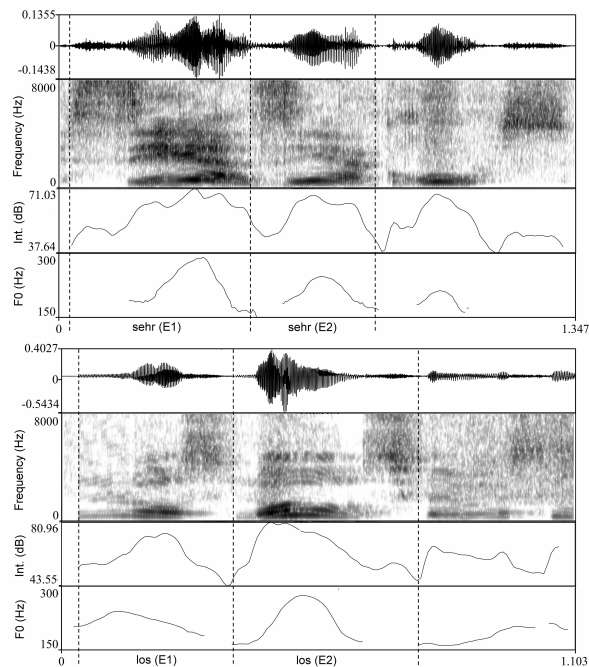

Figure 1. *Emphatic reduplications in "sehr, sehr groß" (very, very big; grade particle, spkr. 5, top) and "los, los, wir müssen" (go, go, we have to; verbal imperative, spkr.7, bottom).*

The prosodic pattern described as 'ritardando' similarly characterized the productions of the grade particles *"weit, weit"* and *"lang, lang"*, whose occurrences are nowadays restricted to the a few highly conventionalized phrases like *"weit, weit weg"* and *"lang, lang ist's her"* (ini.cons: $3.003_{weit} \leq t[19] \leq 4.181_{lang}$, p<0.01; int.dur: $3.632_{lang} \leq t[19] \leq 5.298_{weit}$, p<0.01; int.slope: $4.490_{lang} \leq t[19] \leq 7.793_{weit}$, p<0.01; rise.slope: $3.615_{weit} \leq t[19] \leq 4.382_{lang}$, p<0.01). However, while the other grade particles and verbal imperatives additionally showed multidimensional stress, accent, rate and intonation differences between the first and the second element of the reduplication, the two elements of *"weit, weit"* and *"lang, lang"* came closest to reduplication in the literal (i.e. phonetic) sense. That is, significant differences between E1 and E2 of *"weit, weit"* and *"lang, lang"* were found neither for the prosodic annotation nor for any of those acoustic parameters that embodied the stress/accent-level and speaking-rate effects in the other 2x6 reduplications in Table 1. Thus, for example, *"weit, weit"* and *"lang, lang"* were produced with sequences of two 'medial' pitch accents (H* H*) whose F0 peaks showed on average the same range and duration characteristics. The vowels of E1 and E2 were equally (hyper-)articulated in terms of their mean F1-F2 distances and produced with similarly high intensity peaks. The speaking rate did not change from E1 to E2 and was overall more similar to the relatively low rate of the verbal imperatives. Figure 2 provides an example.
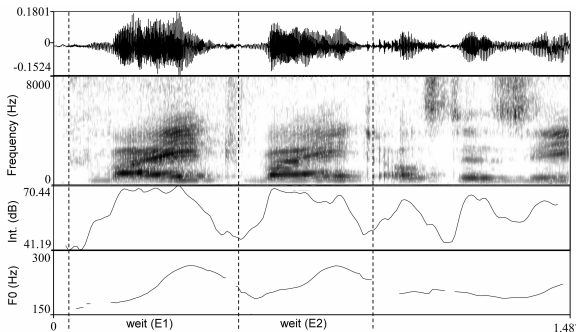
Figure 2. *Emphatic reduplication in the utterance "weit, weit weg auf der See" (far, far away on the sea, spkr.4).*

4. Discussion and Conclusion

The results of the acoustic analysis yielded differences and similarities between the pairs of grade particles and verbal imperatives that are listed in Table 1. On the one hand, the verbal imperatives were produced overall faster, with a higher intensity level and with larger intensity and F0 changes than the grade particles. On the other hand, both grade particles and verbal imperatives were introduced by an articulatory and phonatory deceleration. This prosodic 'ritardando' enhanced the disfluency created by the word pairs themselves. It was similarly found by [8] for types of intensifying emphasis in German that concern the accented syllable of a word and that serve to negatively color or to reinforce the truth value of that word. We also found that the two elements of the target-word pairs in Table 1 were consistently accented, irrespective of whether the individual target words were monosyllabic or disyllabic. Thus accent agglomerations and even accent clashes, which are otherwise avoided in speech production, are a part of the prosodic profile emphatic reduplication.

Moreover, our analysis unveiled clear differences between the elements of the target-word pairs in Table 1. Regarding the phonetic exponents of stress and accent levels, the second grade particle E2 is subordinated to the first grade particle E1. In the case of the verbal imperatives, it is the first element E1 that is subordinated to the second element E2. In other words, grade particles and verbal imperatives formed diametrically opposed (i.e. decreasing or increasing) *prosodic hierarchies*. In addition to these hierarchies our corpus analysis showed that the function of the target-word pairs cannot be described with reference to their linear syntactic order. Crucially, E1 does not modify E2 (or the syntactic phrase starting with E2) in the same way as *"very"* modifies *"nice girl"* in the utterance *"a very nice girl"*. Rather, E1 and E2 together form *a new word-like unit* in functional and syntactic terms. In view of these facts, we classified the investigated type of 'emphasis for attention' not merely as a lexical iteration. The structural and functional characteristics of *"sehr, sehr", "warte, warte"* etc. meet the criteria of *reduplication*. With regard to the prosodic hierarchies, the grade particles form right-branching reduplications, whereas the pairs of verbal imperatives represent instances of left-branching reduplications.

It was also clearly demonstrated in this study that reduplication is not simply the exact reproduction of a particular sound pattern. Even from a phonological point of view, repeating a phonemic pattern need not entail repeating the associated intonational categories and stress and accent levels. However, the productions of *"weit, weit"* and *"lang, lang"* showed that reduplication can in principle yield amazingly close phonetic copies. In fact, for some instances of *"weit, weit"* and *"lang, lang"* it is difficult to distinguish between original and copied (prosodically subordinated) element. But, where this distinction was possible, *"weit, weit"* and *"lang, lang"* were right-branching reduplications like the other grade particles. We assume that the consistently close copying in *"weit, weit"* and *"lang, lang"* is due to their restricted use in a few highly conventionalized phrases. It is reasonable that, along with the wordings of such phrases, their prosodic profiles become conventionalized, which includes that the emphatic function of the reduplication fades.

In contrast, a recent study by [2] on the grammatical reduplication in Teop verbs suggested that adding emphasis to these reduplications does not prevent, but provokes close copying, yielding pairs of elements that can be perceptually distinguished neither by native nor by non-native listeners. This example illustrates, how worthwhile and relevant follow-up experiments and cross-linguistic comparisons on the phonetics of reduplication will be. As for German, subsequent studies must address additional target words and registers, following the observation of [3:599] that *"there are clues to emphatic reduplication as an increasingly productive process in the German language. (This is associated with the creative conception of new adjective and grade particles, especially in youth language. Beside old particles […] there exist new ones such as super, mega and hammer). This development might be a reaction to the escalating usage of superlatives and product placement in the omnipresent advertising"*.

5. References

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