

Final Report:

Communicative Reality and Articulation in Digital Communication

(On the Intonation of Rising Declaratives)

Studienziel:

Study Objective: This experiment measured intonation, in particular the final pitch contour of rising declaratives (RDs, for example: "Peter is hungry?!"). As is often the case in experimental linguistics, this study objective had to be kept secret until the end of the experiment, as participants who know the purpose of the experiment pay attention to their pitch contours during testing and no longer intonate naturally, but consciously, which can significantly impair the quality of the results.

In RDs, sentence structure and intonation are combined in an unusual way. Typically, pitch falls toward the end of a declarative sentence utterance (e.g., "Peter is hungry."). In the case of RDs, however, it rises. This makes the intonation of RDs similar to that of yes/no questions (e.g., "Is Peter hungry?"). RDs are functionally flexible. Mostly, RDs are used to ask biased questions. However, RDs can also be used to state a fact. For English, it has been shown that fine differences in the pitch contour of RDs are perceived by speakers and influence whether an RD is interpreted as a statement or as a question (Jeong, 2018): it was shown that RDs with a shallow rise—that is, a shallow final pitch slope—are more frequently interpreted as statements than RDs with a steep rise. Furthermore, a theoretical study on English suggests that even finer functional distinctions between different RDs influence intonation (Goodhue 2025). The present study aims to provide empirical evidence for this for German.

Hypotheses:

A number of hypotheses can be tested on the results of this study, which ultimately extend far beyond the subject of RDs itself. For example:

Hypothesis 1: Concerns RDs in their question function: The final rise depends on how surprised speakers would be if the content of the question were true. (The more surprised, the steeper the slope.)

Hypothesis 2: The pitch contour of RDs differs significantly across four conversational functions (sarcastic, assertive, incredulous, confirmative). This hypothesis combines detailed sub-hypotheses regarding the expected intonation of each respective function individually.

Study Material and Participants

The study participants were native German-speaking students at the University of Graz.

The study material consisted of 8 test sentences across the 4 functions "sarcastic, assertive, incredulous, confirmative". These test sentences were processed into 32 test stimuli, which consisted of three components:

1. Context: To clearly present the communicative function of the RD, a context consisting of several conversational turns preceded the target sentence. The conversation was presented as a chat in a messenger app.
2. Target sentence: A Rising Declarative in one of the four functions. These functions are shown in Figure 1 using the example sentence "Nina is studying biology...?!".
3. Two follow-up questions regarding the naturalness of the entire conversation and the target sentence, to be answered on a five-point Likert scale.

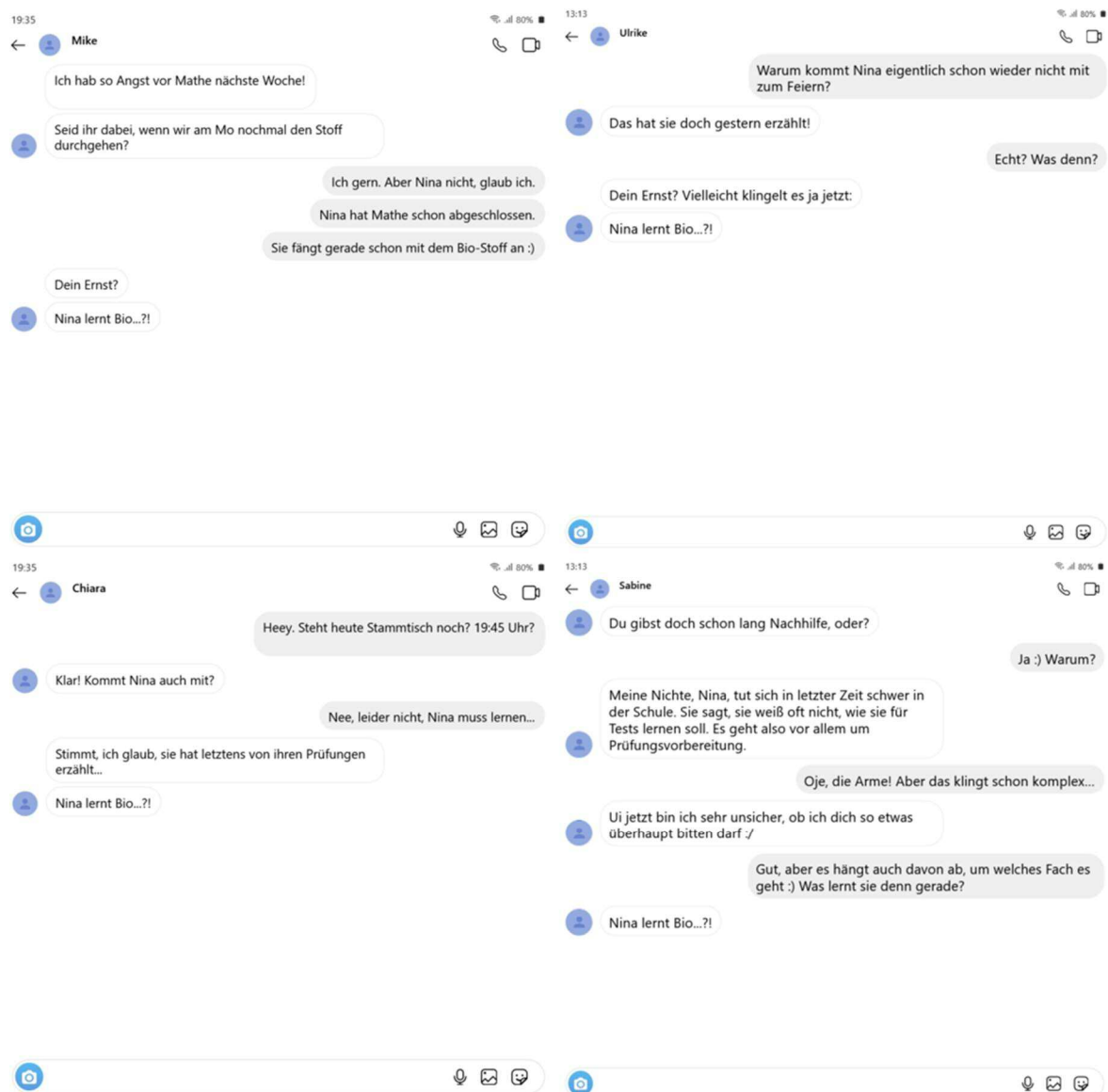
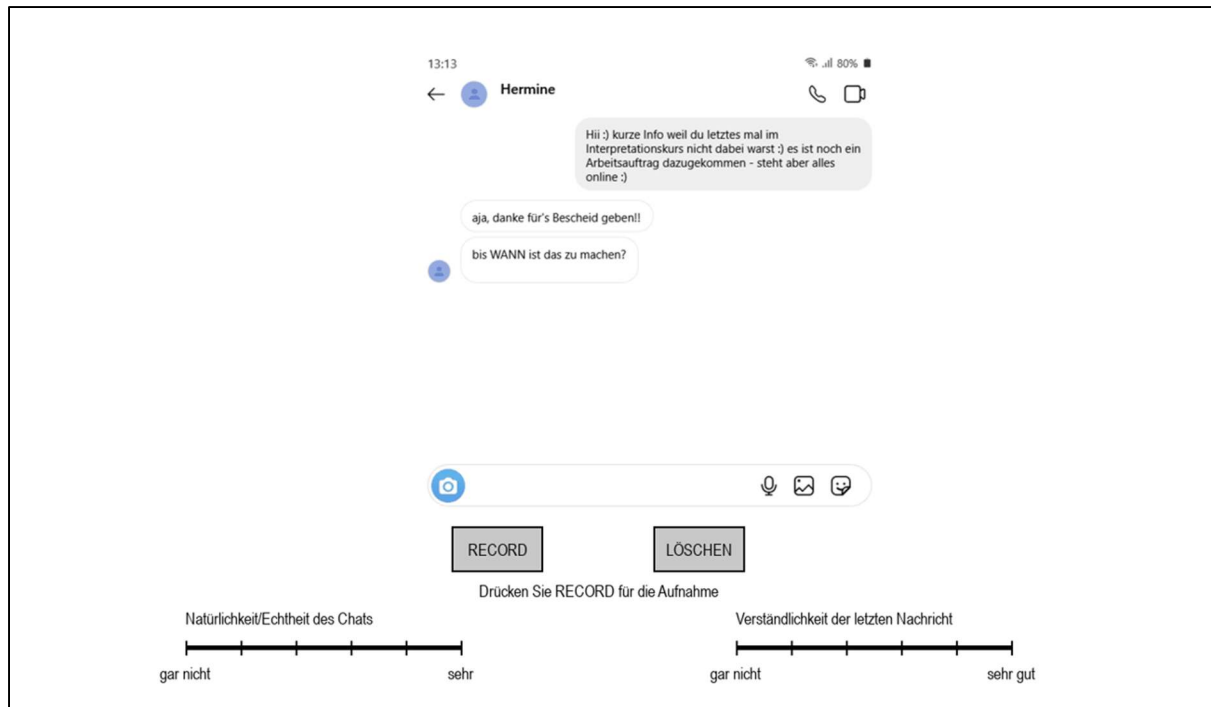


Figure 1: Four contexts for four functions of the RD "Nina is studying biology". Top left: incredulous. Top right: sarcastic. Bottom left: confirmative. Bottom right: assertive.

The sequence of the stimuli was randomized with constraints. The constraints ensured that the same target sentence in different communicative functions could only appear with at least two other test stimuli in between. The real test stimuli were additionally shown alternating with distractor conversations during the experiment. This was intended to ensure that the participants' attention was diverted from the goal of the study.

Figure 2 shows the complete user interface used.



Grafik 2: User Interface

Procedure:

The production experiment took place in the speech laboratory of the Department of German Studies (Mozartgasse 8, 2nd floor). Participants were recorded with a microphone while reading the target sentences aloud.

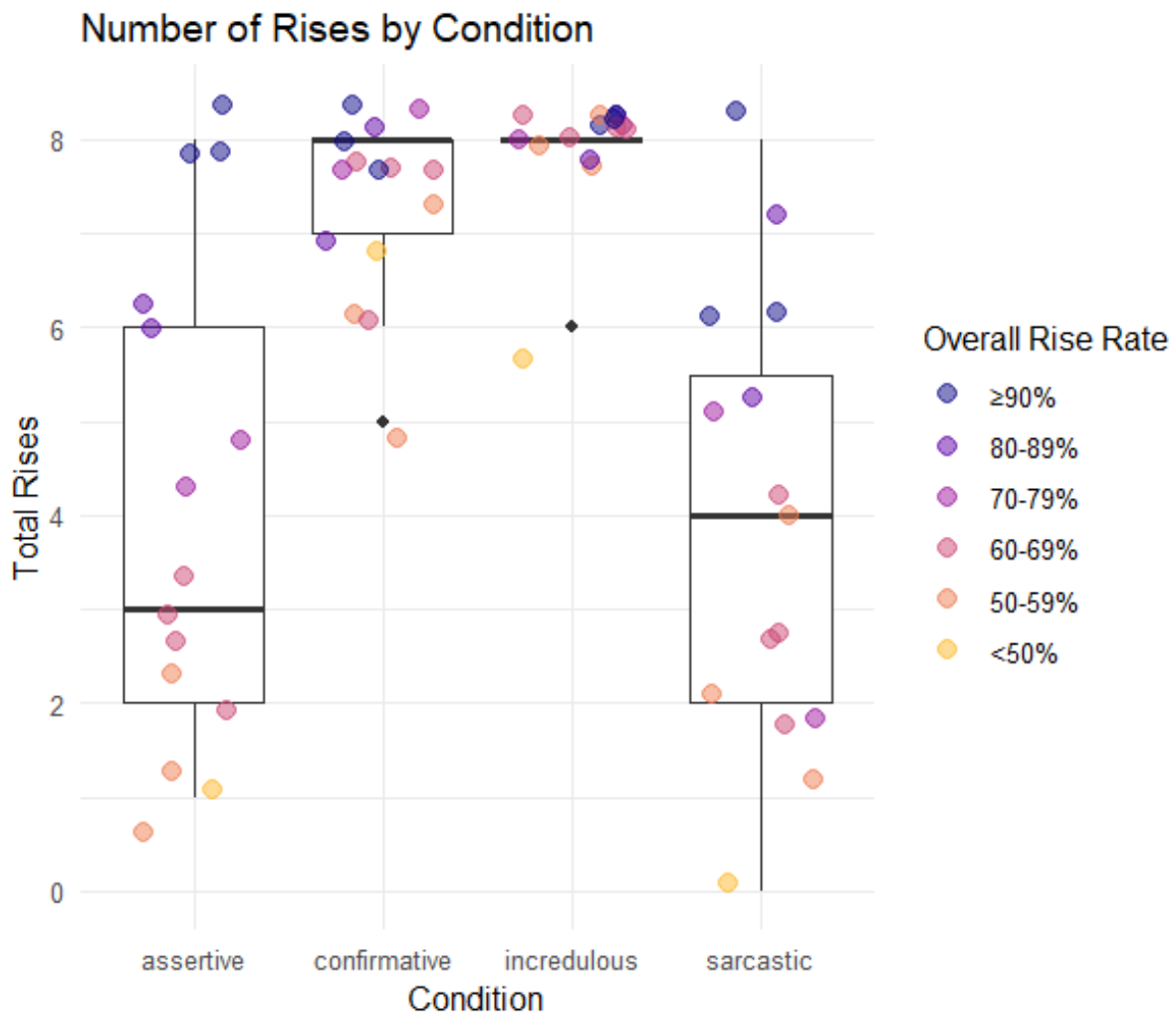
At the beginning of the study, participants were offered coffee, water, and sweets. Afterwards, an informed-consent form was signed. This was followed by brief instructions on what to do in the experiment and two practice conversations. The participants were tasked with reading the conversation turns marked in white (on the left in the figure) out loud. The experimenter present read the conversation turns marked in gray (on the right). Before the last message (target sentence), participants activated the microphone themselves via the "RECORD" button, recorded the message and deactivated the microphone again. Unsuccessful recordings could be deleted, in which case the entire conversation was re-spoken. This option was used in only few cases. Before proceeding to the next chat, participants had to answer the two questions about the conversation and the target sentence. At the end of the experiment, participants could ask about the study's goal and received a €13 allowance for participation.

Preliminary Results:

The current examination of the data is currently limited to the frequency of realization of all clause targets as RDs. For this purpose, each recording was acoustically evaluated as to whether it contained a final rise. From these data, conclusions can be drawn about which communicative functions RDs are used in with particular frequency. Figure 3 shows the frequency of RDs for each communicative function.

The graph clearly shows that the four different test conditions differ significantly in their frequency of being realized as an RD. The frequency is given in absolute numbers (y-axis). Each participant saw each test condition a total of 8 times, thus having 8 opportunities to realize an RD. Each colored dot represents one participant; the respective color indicates how many

rises that participant produced in total (out of $8 \times 4 = 32$). The farther down on the y-axis, the fewer rises that participant produced in the given condition. For better visibility and to avoid overlap, individual dots are slightly scattered across the plot area.

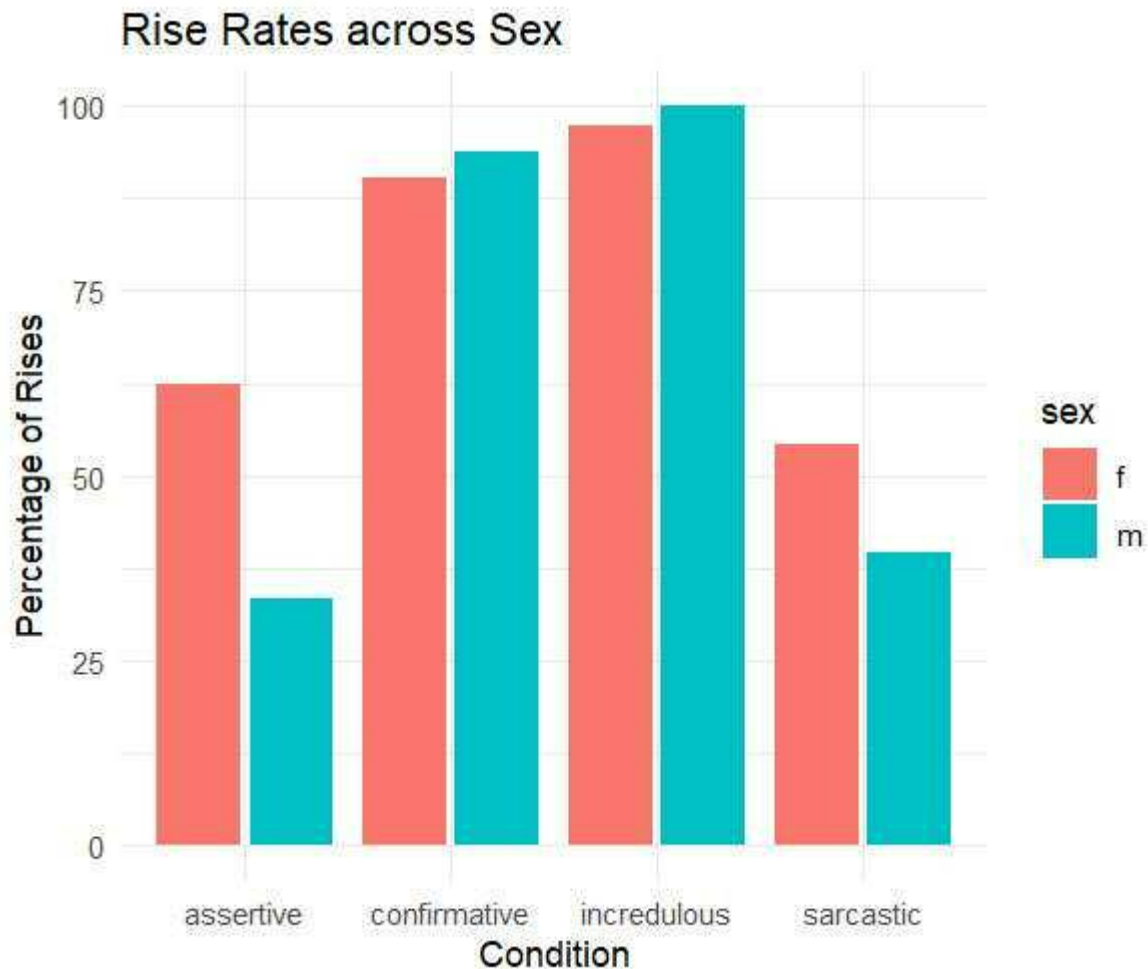


Grafik 3: Statistische Häufigkeit der RDs

In the incredulous condition, a rise was produced most frequently – at-ceiling performance is observed everywhere except for a single participant. The condition with the second highest RD frequency is confirmative. Here, too, well over half of the participants perform at ceiling. The two assertive conditions have significantly lower rise frequencies. In terms of overall frequency, these two conditions hardly differ. However, an interesting gender difference emerges in the assertive conditions, as seen in Figure 4. Particularly in the neutrally assertive condition (assertive), but also in the ironically assertive condition (sarcastic), it can be seen that women produced the test sentence as an RD more frequently. For now, the reasons for this tendency can only be speculated about.

Summary

The core evaluation of the data is currently still pending. However, even from the minimal data shown here, it is clear that there is still much to discover about Rising Declaratives.



Grafik 4: Gender differences in Rise-Productions.

Relevante Literatur

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