The High-fall Contour in North American English: A Case Study in Imperatives

Emma Gibson, Francisco Torreira, Michael Wagner

Department of Linguistics, McGill University, Canada

emma.gibson@mail.mcgill.ca, francisco.torreira@mcgill.ca, chael@mcgill.ca

Abstract

Imperatives are often uttered with a standard declarative falling contour. However, there are several claims that they can be pronounced with different tunes, leading to different illocutionary as well as attitudinal import. In this paper, we investigate one such tune, which we categorize as the "high-fall contour" and can be described as a nuclear high accent that is often scaled higher (or 'upstepped') compared to earlier accents. We show that it is used in the context of "weak" (suggestion-like) and "repeated" or "redundant" imperatives. The "weak" usage of the high-fall seems contradictory in pragmatic flavour to its use in repetitions, which usually sound like definite commands and not suggestions. We test for whether these uses may be distinguishable based on prenuclear patterns, as has been suggested in prior literature, and ultimately do not find evidence to suggest the tunes are distinct. We also observe that, surprisingly, imperative repetition leads to a lengthening of duration.

Index Terms: intonation, pragmatics, paralinguistic meaning, imperatives

1. Introduction

Imperatives, though mostly associated with orders, can take on many illocutionary functions, from granting permission to wishing others well [1], just as they can take on a variety of tunes [2]. It is relatively uncontested that the use of a tune is more dependent on the context in which it is uttered than the syntax of the utterance [2, 3]. Nevertheless, it has been claimed that an imperative is most conducive to an overall "falling" tune when used in most contexts (e.g. when used to order) [2, 4]. But there is a second intonational pattern which we characterize as a high fall, which appears to have a different pragmatic import. In this paper, we investigate the use of this alternative intonational pattern, in particular its use in imperatives that convey suggestions and that are repeated.

1.1. Weak Imperatives

[5] notes an intonational distinction between imperatives with different degrees of directive strength, or "strong" and "weak" imperatives. "Strong" imperatives often appear as commands and are said to indicate that the speaker prioritizes the imperative's contents. This is compatible with an overall "falling" intonation pattern (indicated by ⇓) [5]. "Weak" imperatives are used to "propose the addressee's commitment to treating the imperative's content as a priority" [5 pp. 15] and can function as an invitation or suggestion, as the imperative is uttered for the interest of the addressee. This type of imperative is labeled as "rising" and indicated with a ⇑ [5]. An example of this distinction would be as follows [5 pp. 15]:

(1) **Weak**: "Have a seat" ⇑ [you'll be more comfortable]

(2) **Strong**: "Sit down" ⇓ [don't get up until I tell you to]

[6] empirically confirms the same distinction, specifically attributing both to tunes which end in a final fall. [7] makes a similar observation, claiming that the "High-drop" tune, when used with a command, "[suggests] a course of action, rather than [giving] an order" [7 pp. 56] and is characterized by a high-falling nucleus and high head [7].

1.2. Repeated and Exasperated Imperatives

A contour marked by a high-falling nuclear contour that marks repeated declaratives or imperatives is described in [8].

(3) "Hand me the phone book!" ("raising each pitch from hand to phone") (from [8], p. 51)

A tune is observed in [7] that is termed the "long jump" and, when used with commands, "expresses surprise, and some criticism, that such an obvious course has not occurred to the listener before." The long jump consists of a "rising head" from a relatively low pitch on the first accented word and ends with a high-falling nucleus. The "Surprise-Redundancy (S-R) contour" also consists of a rise from an initial low pitch target to a high-falling nuclear contour [9, 10] (transcribed by [11] as L*H* L-L%) and expresses a certain degree of exasperation:

(4) Go open the door! (I shouldn't even have to tell you…) [7 pp. 492]

The meanings of repetition, redundancy, and exasperation, at least within imperatives, seem to be closely intertwined and, despite similarities in tune, seem to act in direct contrast to the "weak" imperative described in [5]. Repeated imperatives that are used in a "strong" pragmatic context are inherently *stronger* than their non-repeated counterpart (the "strong" context discussed above), indicating that the speaker highly values its contents being carried out. Thus, even in the case of a repeated weak imperative, the imperative serves to indicate the speaker's investment in a particular action being carried out.
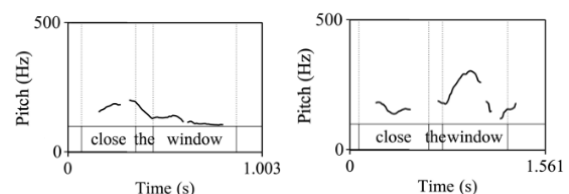
1.3. The "High-fall" Nuclear Contour

Figure 1: *low-fall (left) and high-fall contours (right).*

Weak, repeated and exasperated imperatives, despite their apparently contradictory meanings, appear to be compatible with a contour that differs from the common falling contour (typical of declaratives) in that the final pitch accent is scaled

highest. In cases where another accent precedes the nuclear accent, one can often see that final accent is scaled lower than earlier pitch accents. This type of high-falling nuclear configuration has been called "high-fall" in the past. For example, [7] discusses a high-falling nuclear contour that occurs in both the high-drop and long-jump (see above). We will adopt their term, "high-fall", in this paper and call the regular declarative contour a "low-fall" to refer to its "falling" counterpart.

According to [7], the only distinction between the two uses of the high-fall lies in the prenuclear material, with redundant and repeated imperatives featuring a low-rising head, while "suggestion" imperatives feature an optional rising head [7]. Using ToBI labeling conventions, we label the "high-fall" as ^H* L-L%, to highlight the high scaling of the nucleus in comparison to the head. This serves as an umbrella term for what we could consider an 'upstepped' tune (H* ^H* L-L%), the S-R contour (L* H* L-L%), and simply nuclear accent and boundary tone (H* L-L%). We thus seek to determine whether:

1. high-falling nuclei are indeed used to achieve these pragmatic reasons

2. these communicative intentions are intonationally distinguished (perhaps by a low rising prenuclear pattern to encode repetition, as claimed for the S-R contour)

2. Production Experiment 1: Weak, Strong and Repeated Imperatives

2.1. Methodology

In order to determine the shape of the tunes associated with weak and repeated imperatives, we conducted a production experiment consisted of eight distinct item sets with identical target sentences within item sets (Table 1). The context was manipulated along two dimensions: whether it would elicit a strong or weak imperative and whether or not the imperative is repeated. In determining what constitutes a "strong" and "weak" context, we took into consideration the various factors posited in [5] and [6], which included:

1. Speaker (S) priority (strong) v. addressee (A) priority (weak): S or A would be expected to prioritize the contents of the imperative

2. One course of action (strong; S values one possible outcome) versus multiple potential courses of action (weak; S presents one of a series of possible outcomes)

3. The wording "you *tell*" (strong) v. "you *suggest*" (weak) to lead into the target sentence

Table 1: *Example item set, experiment 1.* Target Sentence presented: **Close the window**

Condition		Context
Round Strong	1	You and your friend are studying for finals in a common room. Your friend, who is sitting close to a window, opens it even though it's below freezing outside. You find the room gets uncomfortably cold. You tell him:
Round Strong	2	Ten minutes later, your friend still hasn't closed the window, claiming it's too hot inside with the window closed. But everyone else, including you, is freezing. Again, you say:
Round Weak	1	You and your friend are studying for finals in a common room. Your friend, who is sitting right below an open window, starts complaining that it's too cold. You think he should change seats, put his sweater on or do something else to get warmer. You suggest to him:
Round Weak	2	You have gone to the washroom and come back to see your roommate is still shivering under a wide-open window. Again, you say:

Participants were presented with either the strong or weak context followed by the target imperative, which they read "as naturally as possible given the situation, as if in a real conversation with a friend". The order of contexts and manipulation was randomized for each participant. Following each context, the participants were presented with another context from the same item and are asked to read off the same target sentence again, with the understanding that they had already recently uttered it, which serves as the repetition condition. The experiment followed a within-subjects design, thus participants ended up seeing all 32 contexts. We found no clear difference between the first and second half of the data for each participant, meaning participants responses were not affected by seeing all contexts. The data was collected from 25 participants, all native speakers of North American English. To analyze the data, we created two perceptual annotations, force-aligned the data using the Montreal Forced Aligner and extracted relevant acoustics using a Praat script, which were then analyzed in R.

Based on prior literature [5, 8], we hypothesize that weak and repeated imperatives will exhibit a much higher proportion of high-falling contours than strong non-repeated imperatives (new information for the addressee). Similarly, based on the description of differences between the long-jump and high-fall [7], we expect a higher proportion of low accents word-initially in high-fall contours that occur in repeated imperatives, compared to their weak counterparts, which we predict has an overall higher utterance initial pitch accent. This distinction has not, to our knowledge, been empirically confirmed

2.2. High-fall or Low-fall?

The first annotation we conducted was a perceptual annotation made using a Praat script in which one of the authors (a native speaker of North American English) labeled each individual sound file as either:

1. "High-Fall": final accented word contained a high-falling nuclear accent, scaled higher than any earlier accents in the utterance.

2. "Low-Fall": final accented word contained a nuclear accent that was scaled lower than preceding pitch accents.

3. "Other": tune was neither low nor high-falling (e.g. ended in a final rise H-H%).

2.2.1. Data and Results

As predicted, first-round imperatives showed the highest proportion of low-falling tunes (79%), however a small proportion of the high-falling contour was present in the data (8%). Weak, first-round imperatives exhibited a jump to 22%. When repeated, there was an increase in use of the high-fall

contour from 17% (round 1) to 28% (round 2) across both imperative types.

We fitted a mixed-model regression with Strong vs Weak and First vs Second occurrence and their interaction as fixed effects. The model also included random effects for item and participant effect, with full random slopes for the predictors and their interaction, but we excluded the correlations between these random effects to avoid overfitting. There was indeed a significant difference between Weak vs. Strong ($\beta = 1.2338$, $z = 3.679$, $p < .001$) imperatives, as well as first vs. repeated imperatives ($\beta = 1.3014$, $z = 3.231$, $p < 0.001$). There was also a significant interaction ($\beta = -1.2389$, $z = -2.286$, $p < 0.03$), indicating that the difference between strong vs. weak was significantly smaller in the repeated cases, as is also shown by the Fig. 2. Despite the general increase in high-fall contours in contexts eliciting a weak or redundant response, the low fall was still the favoured tune in all conditions.

To determine if there is a difference between round 1 weak and round 2 (repeated) imperatives, we plotted the relative pitch (max of last – max of first word) (fig. 3) against the context. Fig. 3 demonstrates that there is no clear difference in relative pitch of the high-fall contour across contexts, further suggesting that weak and repeated imperatives may not elicit distinct tunes.
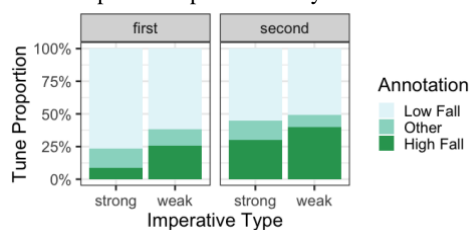

Figure 2: *Proportion of High-fall contours compared to "low-falling" (or regular fall) contour by imperative type.*
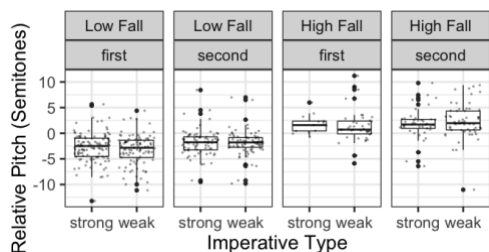

Figure 3: *Relative Pitch (max pitch of last – first word) in tunes annotated as low-fall vs high-fall*

2.3. Intended Pragmatic Contribution

To test whether the high-fall contour was perceptually different across contexts, we conducted a second perceptual annotation which consisted of trying to retrieve the original context. Again, using a Praat script, the first author annotated the original sound files, blind to the original experimental condition, as either "strong" or "weak" (command or suggestion) and either "first" or "second" round (whether it seemed to be repeated).

2.3.1. Data and Results

We plotted the annotator's perception, comparing perceived context in low and high-falling tunes (fig. 4). There is a clear difference in annotation associated with each tune. "First [round] Strong" was annotated around 50% of the time with the low-falling tunes, regardless of condition, whereas none of the high-falls were labeled as such. The most common annotation with high-falling tunes was the "first weak" annotation, which

was, by comparison, uncommon with low-falling tunes. "Second [round] strong" was correctly annotated more than 50% of the time, as was "first weak". The repeated weak condition was incorrectly annotated as non-repeated a majority (61%) of the time. The first weak condition was the most reliably annotated of the high-fall tunes (80% correct). For more precise results, a perception experiment with naïve participants may be necessary.
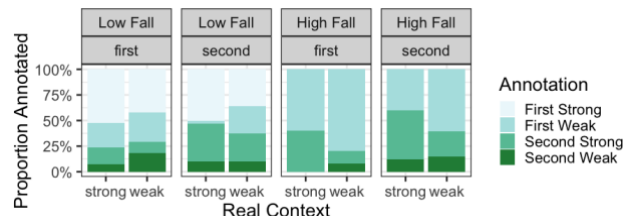

Figure 4: *Real Context vs. Annotator Perception (subset of tunes labeled as "high-fall" vs "low-fall")*
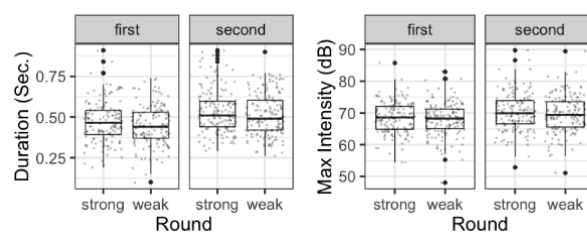

Figure 5: *Duration (right) and Max Intensity (left) of final word, first vs. second rounds (new vs. repeated)*

To determine which cues were used to determine the context of the tune, we examined the acoustics of a subset of tunes that were correctly labeled. We found that second-round data (regardless of imperative type or contour used) exhibited increased duration and intensity in the final word compared to its first-round counterpart (fig. 5). These cues were also the best predictor of correctly identifying repetition in our perceptual annotation of the original communicative intent. An increase in duration and intensity under repetition goes contrary to many earlier findings, as it is generally the case that repeated utterances are phonetically reduced [12].

We hypothesize that these acoustic differences are due to a paralinguistic encoding of annoyance by means of the Effort Code [13] perhaps conventionalized from strategies used by the speaker when repeating something that the addressee initially had trouble hearing. Mixed model linear regressions with full random slopes indicate that there are significant main effects of repetition on both duration ($t(23.43) = 7.002$, $p < 0.001$, computed with Satterthwaite approximation using lmerTest) and intensity ($t(15.02) = 3.416$, $p < 0.001$), but no effect of strong vs. weak and no interaction. This is expected if these are acoustic reflexes of insistence when repeating something. But could it be that an increase in duration and intensity is generally used to convey exasperation in non-repetitions as well?

3. Experiment 2: Exasperation and Repetition

3.1. Methodology

In this experiment, we used a methodology similar to Experiment 1 to compare imperatives read in response to a

context that was meant to elicit an "exasperated" response to a "control" condition. The control condition was equivalent to the "strong" context in experiment 1. The "exasperated" condition was created by adapting the control condition to make it clear that the participant is meant to be annoyed with the addressee (Table 2). Like experiment 1, there was also a repeated condition. The purpose of this experiment was to tease apart the differences between repetition and exasperation effects. These contexts are mutually compatible in the context of imperatives and could thus equally contribute to the increased use of the high-fall contour, as well as the duration and intensity effects observed. 16 participants were recorded.

Table 2: *Example item set, experiment 2.* Target sentence: **"Close the window"**

Condition		Context
Round Control	1	You and your friend are studying for finals in a common room. Your friend, who is sitting close to a window, opens it even though it's below freezing outside. You find the room gets uncomfortably cold. You tell him:
Round Control	2	Ten minutes later, your friend still hasn't closed the window, claiming it's too hot inside with the window closed. But everyone else, including you, is freezing. Again, you say:
Round Exasperated	1	You and your friend are studying for finals in a common room. Your friend, who is sitting close to a window, opens it even though it's below freezing outside. You find the room gets uncomfortably cold. Annoyed with his lack of consideration for others, you tell him:
Round Exasperated	2	Ten minutes later, your friend still hasn't closed the window, claiming it's too hot inside with the window closed. But everyone else, including you, is freezing. Again, you say:

3.2. Data and Results

Similar to experiment 1, sound files were annotated for whether the utterance exhibited the (i) high-fall or (ii) low-fall contour or (iii) another tune. The results (fig. 6) mirrored that of experiment 1: the highest proportion of high-fall contours occurred in the repeated conditions (with no difference between exasperated and control) however at an even higher proportion than experiment 1. The ME logistic regression model shows a significant effect of repetition ($\beta = 1.6932$, $z = 4.633$, $p < 0.001$), but no effect of exasperation and no interaction. We can thus conclude, based on the annotation alone, that exasperation does not correlate to an increase in the high-fall contour, whereas the repetition effect from experiment 1 was replicated.
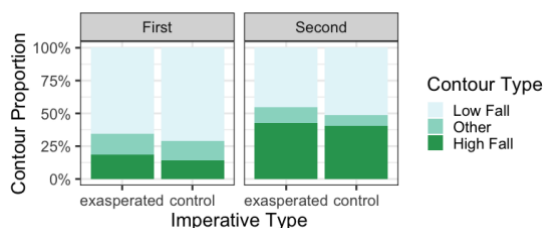

Figure 6: *Proportion of High-falling compared to "low-falling" contour by imperative type*

In examining the acoustics, "exasperation" had little to no effect on the duration and intensity of the final word (fig. 7). Repetition did have an effect, with an overall higher duration and intensity in the repeated condition, as was observed in experiment 1 (fig. 5). Similar effects were observed in the first word of interest as well, though of a lower magnitude. This replicates the effect observed in experiment 1 that utterance repetition leads to lengthening and intensifying of the final word. This is contrary to what is generally observed with repeated utterances, which are generally phonetically reduced [12]. The lack of such quantitative effects in the exasperation conditions suggests that these effects are specifically used to signal insistence in repetitions. ME linear regression models showed again that the difference in duration and intensity depending on rebut it is petition was significant (p < 0.001 for each).
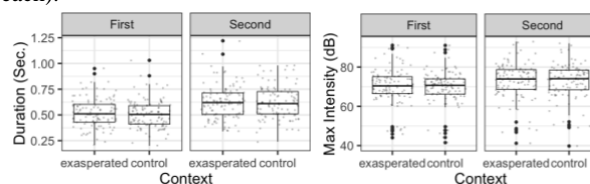

Figure 7: *Duration (left) and Max Intensity (right) of final word; first vs. second rounds (new vs. repeated)*

4. Discussion & Conclusion

In this paper we present evidence that indicates that contexts in which the imperative is "weak" or undergoes a full repetition are more conducive to the use of the High-Fall contour (^H* L-L%) compared to the stereotypical "strong" imperative. Based on prior literature, we also examined the prenuclear material for a difference between high-fall contours used in weak and repeated contexts. Based on our perceptual annotation and acoustic data, however, there seems to be no apparent difference between the two uses. To further confirm these findings, it would be interesting to examine the distinction used with utterances of varying lengths and accented material to see if the tune will vary across contexts. More broadly, the only clear acoustic distinction between the two contexts was an increase in the duration and intensity of the final word, a phenomenon which occurred across tune types and therefore does not lend evidence to the existence of two different context-specific contours.

These findings demonstrate that the high-fall contour can be realized variably in weak and repeated contexts, and is perceptually indistinguishable without the context, except for the duration and intensity effects. The heightened duration and intensity in the repeated condition, rather than indicating exasperation, as was predicted, could simply be a method of further emphasizing the imperative to push the addressee to execute its contents, as per the effort code [13]. The speaker repeats the utterance as if the speaker didn't hear the utterance the first time to indicate that they don't wish to be ignored. The initial low pitch that was observed in contexts of repetition (but was not replicated here) could be an effect of the effort code, in which – to further highlight the repeated utterance – pitch range is expanded, though it is not a necessary component of the tune based on our results. It is thus possible that there is a broader overarching usage for the high-fall contour that has not yet been captured by the literature and is compatible with both contexts. However, a broader examination of the tune will be necessary to properly explore this possibility.

5. References

[1] S. Schmerling, "How Imperatives are Special, and How They Aren't." in R. Schnieder, K. Tuite, and R. Chametzky (Eds.), *Papers from the Parassession on Non-declaratives,* Chicago: Chicago Linguistics Society.

[2] D. Bolinger, *Intonation and its uses: Melody in grammar and discourse.* London: Edward Arnold, 1989.

[3] A. Cutler 1977, "The context-dependence of 'intonational meanings.'" in W. Beach, S. Fox, & S. Philosoph (Eds.), *Papers from the Thirteenth Regional Meeting, Chicago Linguistic Society* (pp. 104-115), Chicago: CLS.

[4] S. Jeong and C. Condoravdi. "Imperatives and Intonation: The Case for the Down-Stepped Level Terminal Contour," *Proceedings of the 35th West Coast Conference on Formal Linguistics.* ed. Wm. G. Bennett et al., pp. 214-223. Somerville, MA, 2018.

[5] Portner, P. "Commitment to Priorities." In Daniel Harris, Matt Moss, and Daniel Fogal, eds., *New Work in Speech Acts.* Oxford: Oxford University Press, 2018.

[6] M. Keough, E. McCay, M. Babel, and L. Matthewson, "Intonational qualities of strong and weak imperatives." Poster presented at LabPhon15, 2016.

[7] J. D. O'Connor and G. F. Arnold, *Intonation of Colloquial English and Practical Handbook*. London: Longman, 1973.

[8] D. Bolinger, "Intonation in American English," in D. Hirst and A. Di Cristo (Eds.) *Intonaton Systems: A Survey of Twenty Languages*, pp. 45–55. Cambridge: Cambridge University Press, 1998.

[9] I. Sag and M. Liberman, "The Intonational Disambiguation of Indirect Speech Acts." In *CLS-75*, pp. 487–498. Chicago: University of Chicago. 1975.

[10] M. Liberman, *The Intonational System of English.* (PhD Thesis) Cambridge, MA: Massachusetts Institute of Technology, 1975.

[11] M. Beckman and E. Ayers. "Guidelines for ToBI labelling, v.3. The Ohio State University Research Foundation, Ohio State University, 1997.

[12] T. Lam and D. Watson, "Repetition is easy: Why repeated referents have reduced prominence." in *Mem Cognit.* pp. 1137-1146. December, 2010. doi: 10.3758/MC.38.8.1137.

[13] C. Gussenhoven, "Foundations of Intonational Meaning: Anatomical and Physiological Factors". *Top Cogn Sci*, 8. pp. 425-434. 2016. doi:10.1111/tops.12197.