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Intonation Patterns of Chinese EFL Learners and Their Correlation with Holistic Prosody Ratings

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Abstract: Chinese English as a Foreign Language (EFL) learners often face challenges when acquiring intonation skills. This study employed AM theory as the theoretical framework and utilized the Tone and Break Indices (ToBI) labeling system to analyze 29 recordings of first-year English major female students enrolled at a university in China. The aim is to examine the intonation patterns exhibited by these learners and explore their correlation with prosody ratings. The findings revealed that H*, L+H*, and L* were the most commonly observed pitch accent types among Chinese EFL learners. Furthermore, the L tone predominated in phrase accents and boundary tones, while the prevalent intonation pattern in intonation phrase boundaries was identified as the L-L% pattern. The study also identified negative correlations between the proportion of L* and the proportion of L-, as well as between prosody ratings and phrase accent density, and between prosody ratings and the proportion of L*. These findings contribute to the existing body of knowledge on intonation acquisition and hold significant implications for language pedagogy.

Keywords: intonation, EFL, ToBI

1. Introduction

Intonation is an important aspect of spoken language as it conveys linguistic meaning beyond the words themselves. In conversation, intonation plays a critical role in structuring thoughts, differentiating new ideas from old ones, drawing contrasts, and transitioning between topics [1]. For second language learners, mastering intonation is vital for expressing attitudes, emotions, and personal experiences accurately and naturally. However, Chinese EFL learners often encountered difficulties in acquiring intonation skills, particularly in pitch accent, phase accent, and boundary tone, which resulted in an overreliance on falling intonation and a limited range of pitch variation [2]. Despite the pivotal role of intonation in communication, a research gap exists concerning the specific intonation patterns exhibited by Chinese EFL learners and their relationship with holistic prosody ratings. Investigating the distinct intonation patterns of Chinese EFL learners and their association with the goodness of prosody not only contributes to the existing knowledge on intonation acquisition but also holds implications for language pedagogy. Understanding these patterns can inform the development of effective instructional materials and teaching strategies tailored to the specific needs of Chinese EFL learners, ultimately enhancing their overall communicative competence in spoken English. Consequently, this paper aims to provide valuable insights into the intonation patterns

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exhibited by Chinese EF learners by conducting a comprehensive analysis of the pitch accent, phrase accent, boundary tone, and their correlations with prosody ratings.

2. Literature Review

Over the years, numerous studies have examined the intonation patterns of Chinese EFL learners. A significant number of studies has employed the tonality, tonicity, tone (3T) approach, which was proposed by Halliday and Wells [3-4], to identify the specific intonation patterns of Chinese EFL learners. In Chen's study, the findings revealed that Chinese EFL learners, as opposed to native English speakers [5], tended to rely more on pauses rather than pitch reset when segmenting intonation phrases. Chen's study primarily focused on the segmentation of intonation phrases. In contrast, Bu examined multiple aspects including the number of intonation phrases [6], tonicity position, and tone patterns among Chinese EFL learners. Bu's investigation uncovered that Chinese EFL learners tended to produce a higher number of intonation phrases compared to recordings of native standard speakers. Furthermore, these learners often misjudged the position of tonicity, frequently utilizing descending tones. Notably, Chinese EFL learners assigned a Chinese character tone with a full Chinese accent to each syllable. In line with research on the number of intonation phrases and tonicity position, Xiao and Huang also found that Chinese learners exhibited an excessive use of intonation phrases and improper tonicity [7], leading to the inappropriate distribution or shifting of information and resulting in incoherent discourse when compared to American English native speakers. However, despite the valuable insights gained from these studies, they did not investigate the intonation patterns of Chinese English learners at different levels of oral proficiency, thus leaving an opportunity for further investigation in future research.

In addition to 3T approach, the autosegmental-metrical (AM) approach, as proposed by Pierrehumbert [8], Silverman et al. [9], and Ladd [10], has been employed in a few studies to investigate intonation patterns. In contrast to the 3T approach, where tone tails are considered as part of the tone nucleus or a continuation of it, the AM theory acknowledges the independent status and unique pragmatic and discourse functions of tone tails in intonation patterns [11]. Consequently, the AM approach offers a more precise analysis of intonational patterns when compared to the 3T approach. Using this approach, Ji and her colleagues conducted a comparative study utilizing the ToBI and Intonational Variation in English (IViE) labeling systems to examine the intonation patterns of yes-no questions [12]. The study involved seven American English speakers and twelve Chinese EFL learners, with a selected set of five sentences serving as the speech materials. The findings of this study demonstrated significant differences in the utilization of tones by Chinese EFL learners in nuclear accents and boundary tones when there was a variation in the position of the nuclear accent, as compared to the American speakers. Building upon this research, Ji and her colleagues conducted a related study with the same participants and labeling system [13], delving into the intonation patterns of six wh-questions. The outcomes of this investigation not only highlighted differences in tone production between the two groups, but also indicated the potential presence of post-nuclear accents on specific words among Chinese EFL learners. These two studies highlight the effectiveness of the ToBI and IViE labeling systems in capturing intonation characteristics, particularly in the context of yes-no and wh-questions. Furthermore, they shed light on the distinctive intonation patterns exhibited by Chinese EFL learners. However, it is important to acknowledge that the use of isolated sentences as speech materials in these studies may pose limitations in capturing the natural flow and rhythm of speech. As a result, the findings may not fully reflect the authentic representation of intonation patterns in connected discourse.

While previous research has provided insights into the specific intonation patterns exhibited by Chinese EFL learners in comparison to native English speakers, there remains a significant gap in understanding the relationship between these intonation patterns and different levels of proficiency.

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Existing studies have predominantly concentrated on investigating the relationship between intonation variations and factors such as gender or specific dialect regions within China, as evidenced by the works of Jiang and Shi [14], Jiang [15], Chen [16], and Zhou and Yang [17]. Although these studies have contributed to our understanding of intonation patterns, there is a need to expand the scope of research to include the relationship between intonation and proficiency levels. In this context, Kang and Ahn conducted a study that explored the impact of English proficiency levels on the production of intonational patterns by Korean EFL learners [18]. Their findings revealed distinct intonation patterns exhibited by Korean EFL learners with higher proficiency levels. These patterns were characterized by steeper declination tilt, wider F0 range, lower F0, and shorter duration at phrase-final boundaries, as well as faster speech rate and shorter pauses. These results indicated that English proficiency level significantly influenced the acquisition of second language intonation, thereby providing a basis for examining the intonation characteristics of Chinese EFL learners across different proficiency levels and their relationship with these levels. By addressing this research gap, a comprehensive understanding of the link between intonation and proficiency can be achieved, ultimately facilitating more effective language instruction for Chinese EFL learners. Considering the theoretical frameworks employed in the aforementioned studies, it can be inferred that the AM theory and its associated labeling system offer a more comprehensive and precise analysis of intonational patterns. Therefore, the present study adopted the theoretical framework of AM theory and the ToBI labeling system to explore the intonation patterns exhibited by Chinese EFL learners and their association with prosody ratings. This investigation aims to address the following research questions:

(1) What are the specific intonation patterns among Chinese EFL learners when reading aloud a given text?

(2) How do these intonation patterns relate to the holistic prosody ratings?

3. Method

3.1 Materials

In this study, a short text was employed as the speech material, comprising two interrogative sentences and six declarative sentences. The utilization of the short text, as opposed to isolated sentences, offered a more natural context for participants to engage in oral reading, thereby enhancing the ecological validity of the study. A total of 29 recordings, collected and scored by Dr. Ye, were included in the analysis. The recordings were captured using Sony headphones, with a sampling frequency of 22050 Hz, mono channels, and a resolution of 16 bits. The intonation rating employed a holistic rating approach, utilizing a subjective rating scale ranging from one to five, to assess the quality of prosody. A rating of one denoted poor prosody, while a rating of five denoted excellent prosody. The scoring criteria encompassed various factors, such as the accuracy of word stress, differentiation between heavy and weak pronunciation, diversity in intonation patterns, variation in intonation changes, pitch range, appropriate pausing between intonational phrases, alternation between heavy and weak syllables, and emphasis on content words rather than function words.

3.2 Speakers

The participants chosen for this experimental study comprised a sample of 29 Chinese first-year English major students enrolled at a Chinese university specializing in education. To minimize potential confounding variables related to gender differences, the study exclusively included female participants.

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3.3 Annotation and Data Extraction

The sound files utilized in this study underwent a rigorous annotation procedure. All "wav" files were manually annotated in Praat, with a primary focus on identifying key intonation patterns, such as pitch accents, phrase accents, and boundary tones. The annotation process followed the ToBI labeling system, which ensured a systematic and standardized approach to intonation labeling, thereby improving the accuracy and reliability of intonational analysis across different studies and researchers. The specific ToBI labeling rules employed in this study are available in the appendix for reference. After the initial annotation phase by the first annotator, a second annotator participated in a calibration process, adhering to the same annotation guidelines, to identify any potential discrepancies. Subsequently, the first annotator conducted a comprehensive review of the annotations and made necessary revisions to ensure the utmost precision and consistency within the annotated dataset. The frequency and distribution of pitch accents, phrase accents, and boundary tones were then collected and subjected to analysis using Excel and MATLAB.

4. Results and Analysis

By conducting data analysis, the frequencies and proportions of each tone type in pitch accent, phrase accent, and boundary tone were examined. The results are presented in the table below.

Tabel 1: The distribution of pitch accent, phrase accent and boundary tone.

Tone Types	Pitch Accent					Phrase Accent		Boundary Tone	
	H*	L*	L+H*	L*+H	H+!H*	L-	H-	L%	H%
Frequency	628	353	363	8	2	621	84	408	50
Proportion	46.38 %	26.07 %	26.81 %	0.59 %	0.15%	88.09 %	11.91 %	89.08 %	10.92 %

Table 1 presents the distribution of pitch accent, phrase accent, and boundary tone types. The most prevalent pitch accent type observed in the study was H*, accounting for 46.38% of the instances. Following closely behind were L+H* at 26.81% and L* at 26.07%. Collectively, these three pitch accent types represented the majority, comprising 99.26% of the occurrences. On the other hand, the utilization of pitch accent types L*+H and H+!H* was relatively rare, constituting only 0.59% and 0.15% of the instances, respectively. In terms of phrase accents and boundary tones, the L tone demonstrated dominance, encompassing 88.09% and 89.08% of the occurrences, respectively.

Furthermore, the results of the Pearson correlation analysis revealed a significant relationship between the different tone types, as depicted in the subsequent table.

Table 2: Pearson correlation between the tone types of pitch accent, phrase accent and boundary tone.

Correlation Coefficient	H* Pct.	L* Pct.	L+H* Pct.	L*+H Pct.	H+!H* Pct.
L- Pct.	0.080	-0.612**	0.289	-0.168	0.111
H- Pct.	-0.080	0.612**	-0.289	0.168	-0.111
L% Pct.	0.157	-0.009	-0.131	0.057	-0.069
H% Pct.	-0.157	0.009	0.131	-0.057	0.069

Note: * $p<0.05$ ** $p<0.01$

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Table 2 exhibits a significant correlation between pitch accent types and phrase accent types. The proportion of L* in pitch accents was found to have a negative correlation (correlation coefficient = -0.612, $p < 0.01$) with the proportion of L- in phrase accents, suggesting that an increase in the proportion of L* coincided with a decrease in the proportion of L-. Conversely, a positive correlation (correlation coefficient = 0.612, $p < 0.01$) was observed between the proportion of L* and the proportion of H- in phrase accents, indicating that an increase in the proportion of L* corresponded to an increase in the proportion of H-.

Given that an intonation phrase consists of one or more intermediate phrases along with a boundary tone, full intonation phrase boundaries are associated with two final tones. These combinations encompass four possibilities: L-L%, L-H%, H-H%, and H-L% [19]. The distribution of these tone combinations is presented in the following table:

Table 3: The distribution of tone combinations within intonation phrase boundaries.

Tone Combination	Frequency	Proportion
L-L%	418	88.00%
L-H%	44	9.26%
H-H%	6	1.26%
H-L%	7	1.47%

The analysis of Table 3 revealed that the L-L% tone type exhibited the highest frequency, while the H-H% tone type appeared to be the least frequent. These findings suggested a prevalent use of falling tones, particularly the L-L% pattern, within the given short text.

So far, a comprehensive examination was conducted to explore the intonation patterns encompassing pitch accent, phrase accent, and boundary tone among the participants. Nevertheless, it is crucial to uncover the potential relationship between these intonation patterns and prosody ratings. In order to assess the strength of these relationships, Pearson correlation coefficients were employed as a statistical measure. The variables of interest, namely “pitch accent density”, “phrase accent density”, and “boundary tone density”, were used to quantify the proportions of pitch accents, phrase accents, and boundary tones, respectively, relative to the total number of words within the corpus. The findings revealed a significant negative correlation (correlation coefficient = -0.376, $p < 0.05$) between prosody ratings and phrase accent density, indicating that an increase in prosody ratings was associated with a decrease in the density of phrase accents.

Do the prosody ratings exhibit any relationship with the tone types in pitch accent, phrase accent, and boundary tone? To investigate this matter, Pearson correlation coefficients were employed as a statistical measure. The findings of the investigation revealed a noteworthy association between the tone types in pitch accent and the prosody ratings. The detailed outcomes are presented in the subsequent table.

Table 4: Pearson correlation between prosody ratings and the tone types of pitch accent.

Correlation Coefficient	H* Pct.	L* Pct.	L+H* Pct.	L*+H Pct.	H+!H* Pct.
Prosody Ratings	0.077	-0.458*	0.211	-0.283	0.198

Note: * $p<0.05$ ** $p<0.01$

The analysis of Table 4 revealed a statistically significant negative correlation (correlation coefficient = -0.458, $p < 0.05$) between the prosody ratings and the proportion of L* in the dataset. This finding indicated that an increase in prosody scores was associated with a concomitant decrease

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in the proportion of L*. Furthermore, based on the finding presented in Table 1, the participants primarily employed pitch accent types H*, L*, and L+H*. Therefore, these two findings indicated that higher prosody ratings were associated with reduced proportions of L* in pitch accents and a higher occurrence of the H tone.

5. Discussion

The findings indicated that H*, L+H*, and L* were the most frequently observed pitch accent types among Chinese EFL learners. The L tone was found to be predominant in phrase accents and boundary tones. Furthermore, the prevalent intonation pattern in intonation phrase boundaries was identified as the L-L% pattern. The study also revealed negative correlations between the proportion of L* and the proportion of L-, as well as between prosody ratings and phrase accent density, and between prosody ratings and the proportion of L*.

The finding that the L-L% pattern was the most prevalent in intonation phrase boundaries is consistent with the finding of Meng and Wang [20]. Their study observed that Chinese EFL learners frequently utilized the double-declined H*LL% as the boundary tone in declarative and special interrogative sentences, with frequencies of 78.9% and 52.6% respectively. This conclusion aligns with the current study, as the corpus used in the current study consists of declarative and special interrogative sentences. The shared prevalence of the L-L% pattern suggested that Chinese EFL learners commonly employed this pattern as a strategy to indicate boundary tones in these specific sentence types.

The finding that higher prosody ratings were associated with a decrease in the density of phrase accents aligns with Miao's [21] study. Following the ToBI labeling rules, the number of phrase accents can be indicative of the number of pauses. Therefore, this finding suggested that when prosody ratings were higher, there were fewer pauses. This corresponds to the findings of Miao (2009), which indicated that as language proficiency improved, the frequency of pauses among Chinese EFL learners decreased.

However, it is imperative to acknowledge several limitations in this study. Firstly, a notable limitation was associated with the utilization of an artificial read aloud test task, which deviated from natural reading conditions. The nature of the task allowed students to allocate time for sufficient preparation concerning the provided reading material. As a result, the intonation patterns captured during the read aloud task predominantly reflected pre-planning rather than spontaneous, online production. This factor potentially influenced the accuracy and consistency of the data collected. Secondly, the selection of a specific group of participants, specifically first-year female students majoring in English from a Chinese university specializing in education, raised concerns about the generalizability of the findings to a broader population of Chinese EFL learners from diverse cultural and educational backgrounds. Although the sample size of 29 participants ensured a satisfactory representation of the target population, it is crucial to acknowledge the limitations associated with generalizability.

To address these limitations, future studies could consider alternative data collection methods that go beyond read-aloud tasks. Exploring other approaches, such as spontaneous speech or naturalistic conversations, would provide a more authentic representation of participant' intonation patterns. Moreover, to enhance the comprehensiveness and applicability of findings, future research could explore the intonation patterns of Chinese EFL learners across diverse educational contexts and with varying language learning experiences. Investigating how factors such as different educational settings or instructional approaches impact intonation acquisition would provide valuable insights into the specific variables that influence language learning. Despite these limitations, this study contributes to the understanding of the intonation patterns of Chinese EFL learners and their relationship with prosody ratings. These findings hold significance for language instruction and

curriculum development, as they provide valuable guidance for effectively teaching intonation to Chinese EFL learners.

6. Conclusion

The present study investigated the intonation patterns exhibited by Chinese EFL learners, identifying predominant tone types in their intonation patterns. Furthermore, it established correlations between prosody ratings and different intonation features. The findings not only provide further support for previous research conclusions but also shed light on the variability in intonation patterns, particularly in relation to prosody ratings. These findings hold substantial implications for the field of language pedagogy, suggesting that educators could effectively offer explicit instruction on intonation patterns, thereby guiding students in comprehending the various components of intonation and their pivotal role in facilitating effective communication.

References

[1] *Beckman, M. E., & Hirschberg, J. (1994). The ToBI annotation conventions. Ohio State University.*
[2] *Bu, Y. (2016). Chinese EFL learners' problems in their English intonation. Foreign Language Teaching and Research, 48(4), 569-582+641.*
[3] *Chen, H. (2009). On English Intonational Studies in the 20th Century. Journal of PLA University of Foreign Languages, 32(3), 13–20.*
[4] *Chen, W. (2017). Research on the Intonation of English Learners in the Zhejiang Dialect Area. Education Modernization, 4(30), 193–194. https://doi.org/10.16541/j.cnki.2095-8420.2017.30.085*
[5] *Chen, Y. (2006). Tonality in Chinese EFL learners' read speech. Foreign Language Teaching and Research, 5, 272-278+319-320.*
[6] *Halliday, M. A. K. (1967). Intonation and grammar in British English: DE GRUYTER. https://doi.org/10.1515/9783111357447*
[7] *Ji, X., Xia, W., & Aijun, L. (2009). Intonation Patterns of Yes-No Questions for Chinese EFL learners. Oriental Cocosda 2009 - International Conference on Speech Database and Assessments, 88-+. https://doi.org/10.1109/ICSDA.2009.5278369*
[8] *Ji, X., Xia, W., Yuan, J., & Aijun, L. (2012). Intonation Patterns of Wh-questions from Chinese EFL learners. In Q. Ma, H. Ding, & D. Hirst (Eds.), Proceedings of the 6th International Conference on Speech Prosody, Vols I and Ii (pp. 741–744). Tongji Univ Press. https://www.webofscience.com/wos/alldb/summary/9285f6d4-a620-41a9-8400-f0a1820953ca-86baf4da/relevance/1*
[9] *Jiang, H. (2012). Research on Gender Differences in English Intonation and the Awakening of Female Subjectivity. Journal of Southwest University for Nationalities(Humanities and Social Science), 33(1), 189–194.*
[10] *Jiang, H., & Shi, J. (2009). A Statistical Analysis of the Gender Differentiation in English Intonation. Application of Statistics and Management, 28(6), 1059–1066. https://doi.org/10.13860/j.cnki.sltj.2009.06.009*
[11] *Kang, S., & Ahn, H. (2014). Intonational Variations in Korean Learners' English. The SNU Journal of Education Research. https://www.webofscience.com/wos/alldb/full-record/KJD:ART001950862*
[12] *Ladd, D. R. (2009). Intonational Phonology (2nd edition). Cambridge University Press.*
[13] *Meng, X., & Wang, H. (2009). Boundary tone patterns in Chinese English learners' read speech. Foreign Language Teaching and Research, 41(6), 447-451+481.*
[14] *Miao, H. (2009). . Pauses in L2 Non-fluent Oral Production. Journal of PLA University of Foreign Languages, 32(4), 56–60.*
[15] *Pierrehumbert, J. B. (1980). The phonology and phonetics of English intonation [PhD Thesis]. Massachusetts Institute of Technology.*
[16] *Silverman, K. E., Beckman, M. E., Pitrelli, J. F., Ostendorf, M., Wightman, C. W., Price, P., Pierrehumbert, J. B., & Hirschberg, J. (1992). ToBI: A standard for labeling English prosody. ICSLP, 2, 867–870.*
[17] *Wells, J. C. (2007). English intonation: An introduction (3. print). Cambridge Univ. Press. http://catdir.loc.gov/catdir/enhancements/fy0619/2006299992-d.html*
[18] *Wennerstrom, A. (2017). Intonation and language learning. In The Routledge handbook of contemporary English pronunciation (pp. 154–168). Routledge.*
[19] *Xiao, J., & Huang, G. (2019). A Systemic Functional Linguistics Analysis of the Intonation Choices in Chinese English Learners' Read-Aloud Speech. Technology Enhanced Foreign Language Education, 3, 36–42.*

DOI: 10.54254/2753-7064/11/20231424

[20] Xu, J., Liu, Z., & Ren, W. (2013). English prosodic acquisition by second language learner. Foreign Language World, 3, 31–38.
[21] Zhou, X., & Yang, D. (2021). Intonation Patterns of Tag Questions of Chinese Northeastern EFL Learners. Contemporary Foreign Language Education, 2, 72–80.

Appendix

The labeling rules employed in this paper draw heavily from the work of Beckman and Hirschberg and follow the guidelines of the ToBI transcription system. This system encompasses four parallel tiers used for the annotation of an utterance. These tiers consist of an orthographic tier, a tone tier, a break-index tier, and a miscellaneous tier.

The orthographic tier serves the purpose of transcribing the utterance into orthographic words. The break indices, on the other hand, are denoted at the right edges of the words transcribed in the orthographic tier. These break indices provide an assessment of the perceived juncture degree between each pair of words as well as between the final word and the ensuing silence at the conclusion of the utterance. It is of utmost importance that explicit break index values be assigned to all junctures. The set of available break index values includes the following categories:

- 0 indicates non-boundaries between words of clitic groups, such as the medial affricate in contractions of ‘did you’.
- 1 indicates boundaries between words, demarcating the separation between individual lexical units.
- 2 signifies uncertainties or apparent mismatches, denoting instances where the juncture is less clear or ambiguous.
- 3 signifies boundaries between intermediate phrases, typically associated with a phrase accent (H- or L-), suggesting a lesser sense of disjuncture.
- 4 indicates boundaries between intonational phrases, typically associated with a boundary tone (H% or L%), indicating a complete sense of disjuncture.

The tone tier encompasses two fundamental types of tones: pitch events associated with intonational boundaries, referred to as phrasal tones, and pitch events associated with accented syllables, known as pitch accents. In terms of pitch level, the basic distinction involves high (H) tones within the local pitch range and low (L) tones within the local pitch range.

The assignment of phrasal tones occurs at each intermediate or intonation phrase boundary. Specifically, the following markers are employed:

- L- or H- denotes the presence of a phrase accent, which manifests at an intermediate phrase boundary (as described in level 3 above).
- L% or H% represents a boundary tone, which materializes at every full intonation phrase boundary (as discussed in level 4 above).

Given that an intonation phrase consists of one or more intermediate phrases along with a boundary tone, full intonation phrase boundaries are associated with two final tones. These final tone combinations include L- L%, L- H%, H- H%, and H- L%. Typically, the L- L% contour is employed as the standard ‘declarative’ pattern, L- H% as a ‘continuation rise’, H- H% as the canonical ‘yes-no question’ contour, and H- L% as a ‘plateau’ pattern.

Pitch accent tones transcription system are annotated at each accented syllable. The system allows for the representation of five distinct types of pitch accents, each serving to mark specific tonal patterns.

- H* (!H*) represents a ‘peak accent’. It indicates a perceived tonal target on the accented syllable, typically located in the upper range of the speaker’s pitch for the phrase. This inludes tones in the middle of the pitch range.
- L*, corresponds to a ‘low accent’. It signifies a tonal target on the accented syllable positioned

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in the lowest range of the speaker's pitch.

- L*+H (L*+!H), is known as a 'scooped accent'. It patterns a low tonal target on the accented syllable, immediately followed by a relatively sharp rise to a peak in the upper part of the speaker's pitch range.
- L+H* (L+!H*), is termed a 'rising peak accent'. It denotes a high peak target on the accented syllable, preceded by a relatively sharp rise from the lower part of the speaker's pitch range.
- H+!H* denotes a clear step down onto the accented syllable from a high pitch. This type is used when the preceding material is clearly high-pitched and unaccented, and cannot be accounted for by a preceding H phrasal tone or a preceding H pitch accent within the same phrase.

Among these pitch accent types, the !H* marker specifically indicates downstepping, which refers to the gradual lowering of pitch observed within a sequence of consecutive stressed syllables. It represents a tonal phenomenon that is not counted as a separate tone type for statistical convenience.

The miscellaneous tier within the ToBI system is utilized for additional comments or markings as desired by specific transcription groups. This may include indications of silence, audible breaths, laughter, disfluencies, and other relevant annotations.