EDICIONES COMPLUTENSE

Círculo de Lingüística Aplicada a la Comunicación
ISSN-e: 1988-2696

ARTÍCULOS

Do L1 Chinese speakers use melodic strategies to convey sadness and joy in L2 Spanish? A melodic analysis of speech of L2 acted emotional speech

Shaohua Sun
Universidad Nebrija, Spain
Cristina Herrero-Fernández
Universidad Nebrija, Spain

https://dx.doi.org/10.5209/clac.101431 Received: 30 July 2024 • Accepted: 15 November 2024

Abstract: Little research has been carried out on L2 acted emotional speech, either from the production or from the perceptual point of view (Pellegrino and Maffia, 2016), which may be due to the widespread acceptance of the theory that states that a second language is less emotional for the late learner than the L1 (Harris, 2004). Whether this emotional distance is due to the lack of emotion in the contexts where a second language is acquired (Ivaz et al., 2016) or not, the communicative competence of L2 speakers also depends on their ability to convey the emotions they intend to convey when communicating in L2. Several authors have recently studied the specific acoustic cues of L1 Spanish emotional speech and therefore underlined the vital role of prosody (Garrido Almiñana, 2011; Hidalgo, 2020; Padilla, 2020). At the same time, other researchers have suggested that L1 paralinguistic intonation patterns and cultures may influence how L2 emotional speech is produced and perceived (Chen, 2005; De Abreu and Mathon, 2005; De Marco, 2019). Also, it has been scientifically proven that poor production and perception of emotional speech can lead to misinterpretations and cause serious misunderstandings in intercultural communication (Holden and Hogan, 1993). However, there is a gap in the field of L2 Spanish research regarding the perception and production of emotional speech. The present study aims to fill this gap and investigate whether Chinese speakers of L2 Spanish living in Spain use any melodic strategy to try to convey sadness and joy. For this purpose, a corpus of 100 pairs of utterances produced by Chinese speakers of L2 Spanish living in Spain to convey sadness and joy was elicited and analyzed using the Melodic Analysis of Speech (Cantero and Font-Rotchés, 2020). The pairs of utterances were characterized by having the same lexical content and by only differing by the communicative intention of the speaker. The study's results shed light on whether Chinese L2 Spanish speakers use melodic strategies to convey different emotions (joy and sadness) in L2 or not.
Keywords: Emotional speech; L2 Spanish; Chinese; melodic strategies.

How to cite: Sun, S.; Herrero-Fernández, C. (2025). Do L1 Chinese speakers use melodic strategies to convey sadness and joy in L2 Spanish? A melodic analysis of speech of L2 acted emotional speech. *Círculo de Lingüística Aplicada a la Comunicación* 102 (2025), 29-42. https://dx.doi.org/10.5209/clac.101431

1. Introduction

Language serves not only to exchange information, but also to convey emotions, to achieve things (Austin, 1975) and/or to improve our relations with other humans. Being able to express our emotions and to perceive the emotions of others contributes to our own physical and mental well-being, to the harmonious development of society and to promoting the coexistence of citizens from different cultures living together in the same community (Fussell, 2002).

We all feel emotions such as joy and sadness regardless of the language we speak and the culture we live in, but we do not express them in the same way. Scholars point to the coexistence of universality and cultural specificity in the recognition of cross-cultural emotions (Elfenbein and Ambady, 2002a, 2002b). However, recent studies emphasize the clear differences between the expression of emotions in different languages. Therefore, many foreign language speakers without sufficient sociopragmatic competence are unable to communicate their emotions in a foreign language (Dewaele, 2016). Prosody, facial expressions,

and gestures are very important when trying to convey emotions in all languages. However, specific prosodic strategies vary considerably in different languages, making it difficult for foreign language speakers to interpret and express emotions in foreign languages (Lorette and Dewaele, 2022).

Studies have shown that several important acoustic features such as fundamental frequency (hereafter F0), duration, intensity (Hidalgo, 2020; Martínez and Rojas, 2011), or voice quality such as falsetto voice, broken voice, breathy voice (Padilla, 2020), as well as melodic contour (Carbajal-Carrera, 2020; Garrido, 2011; Garrido et al., 2012; Garrido and Chica, 2018; Hidalgo, 2020; Rodero, 2011) are associated with L1 Spanish emotional speech.

Rodero (2011) conducted a study with the hypothesis that emotion identification in L1 Spanish is more affected by melodic contour than by the F0 level. For this purpose, four Spanish male actors were recorded reading and simulating the emotion assigned to them. Each actor was assigned an emotion (joy, sadness, calm and anxiety) and, following the instructions of the researcher, they modified only the F0 level and the type of melodic contour. Later, a perception study was conducted with 100 students (46 males and 54 females). The study showed that, regarding the identification of emotions such as joy and sadness, the type of melodic contour proved to be a more significant parameter than the F0 level.

Garrido (2011) also concluded that the melodic contour was a relevant cue in the identification of emotions in L1 Spanish. A corpus of simulated emotional speech was analyzed for this study. 4,201 emotional and 1,658 neutral utterances produced by two professional native Spanish speakers (male and female) simulating emotions were recorded. Specifically, according to his results the use of the ascending descending circumflex toneme was more frequently observed in the expression of the emotion of happiness, while its presence was lower in the expression of sadness. A year later, Garrido et al. (2012) stated that descending melodic contours are associated with sadness.

To describe the specific melodic characteristics of emotional intonation in Spanish, Hidalgo Navarro (2020) analyzed three colloquial conversations to study how L1 Spanish speakers express happiness, sadness, anger, fear and surprise, and compared them with neutral utterances as a reference. For this purpose, three monolingual (Spanish) women of medium-high sociocultural level and ages between 25 and 45 years were selected. The results showed that the melodic contours of the expression of joy and sadness are very different. The melodic contours of joy were characterized by having the circumflex melodic curve with a circumflex or descending or suspended toneme, while melodic patterns of sadness presented a flat melodic curve with a suspended toneme.

The results of these studies suggest that the melodic contour is a key component in L1 Spanish when trying to convey the emotional attitude and mood of the speaker (Hidalgo Navarro, 2019). However, Mandarin Chinese is a tone language in which melody may not play as important a role as in Spanish when it comes to expressing emotions. In Mandarin Chinese, lexical tone is critical in communicating the meaning of words. When conveying emotions or attitudes, intonation is superimposed on lexical tone, and is achieved by extending or contracting the tonal range without altering the lexical meaning of the words (Cao, 1933; Cao, 2009; Wu, 1996). In other words, intonation in Mandarin Chinese is constrained by lexical tone (Wang and Lee, 2014) and the expression of joy and sadness is not merely presented through a rising, falling, or suspended final inflection.

According to Chen (2007), for example, the declarative intonation serves as the foundation for all other intonations. Based on the declarative intonation, a sentence can change from being declarative to being exclamatory by just increasing or decreasing the tonal range. Emotional intonation is characterized by Chen (2007) as having a high F0, a long duration, a fullness of pitch contour, a wide tonal range, and a low final inflection. Emotional intonation has been classified by Chen (2007) into the following categories: high F0 and wide tonal range for anger; high F0 and narrow tonal range for surprise or panic; narrow tonal range for disgust; low F0 and wide tonal range for envy; low F0 and narrow tonal range for anxiety, etc.

As we can see, studies on emotional expressions in Chinese focus on F0 pitch and tonal range (Chen, 2007; Wang et al., 2012; Wang and Lee, 2014; Wang et al., 2018) and not on melodic contour. Moreover, several authors emphasize that in Mandarin Chinese modal particles often convey the emotional information of the messages (Dai, 2006; Ding, 1985). This leads us to conclude that the melodic contour in Mandarin Chinese may not be as significant as it is in Spanish.

Cortés Moreno (2004) points out that the phenomenon of "avoidance of the use of emphatic intonation" or the inappropriate use of intonation by L1 Chinese speakers of L2 Spanish is the primary reason for ineffective communication with L1 Spanish speakers, which might lead to misinterpretations and even bias against them (p.106). On the other hand, Herrero (2021) in her studies on unintentional (im)politeness of L1 Chinese speakers of L2 Spanish indicates that, when trying to convey politeness, some may be interpreted by native speakers as impolite, due to the inappropriate use of melodic contours.

Since there is a great difference regarding the use of melodic contour between Mandarin Chinese and Spanish, we consider that it may be relevant to observe whether L1 Chinese speakers of L2 Spanish use melodic contour as a strategy to express joy and sadness in L2 Spanish. On the other hand, little research has been conducted on acted emotional speech in L2, either from a production or perceptual point of view (Pellegrino and Maffia, 2016), which may be due to the widespread acceptance of the theory that a second language is less emotional for the late learner than the L1 (Harris, 2004). Whether this emotional distance is due to the lack of emotions in the contexts in which a second language is acquired (Ivaz et al., 2016) or not, conducting this study will be useful for the teaching and acquisition of Spanish oral expression and of utmost importance to help L1 Chinese speakers of L2 Spanish to express their emotions accurately and confidently in Spanish L2. Since the effective expression of emotions is an essential part of communication, this will ultimately facilitate their full participation in the Spanish-speaking society.

2. The current study

The aim of the present study is to check whether Sino speakers living in Madrid use melodic contours as a strategy for the expression of joy and sadness in L2 Spanish. To achieve this objective, the following research question is formulated:

Do L1 Mandarin Chinese speakers use melodic strategies to convey sadness and joy in L2 Spanish?

3. Methodology and methods

3.1. Phases

The study was conducted in two phases:

- Phase I Emotional speech corpus compilation.
  - Data collection tool design.
  - Data collection tool piloting.
  - Selection of the participants.
  - Recording of the corpus.
- Phase II Analysis of the emotional speech corpus.
  - Extraction of the melodic patterns from the recordings.
  - Analytical processing of the extracted patterns.

3.2. Informants

Ten L1 Mandarin Chinese speakers of L2 Spanish were selected for the current study. They were all women living in Madrid (between 3 and 10 years of residence in Spain), from different cities of origin (6 from Northern China and 4 from Southern China). All of them use Mandarin Chinese as their language of communication and all of them have completed their university studies in Mandarin Chinese. All 10 informants had a B1 level of Spanish. Participants' ages ranged from 24 to 42 years (M = 33.2, SD = 6.98). All are Mandarin Chinese teachers currently working in different language schools in Madrid. Since the authors of the paper work in the field of teacher training, this is an accessible group for the researchers. On the other hand, by controlling for this variable we ensure that all the speakers' contact with Spanish is limited to the public and/or private sphere, but that in the professional sphere the informants have limited contact with the target language. Most of the participants (eight out of ten) use Mandarin Chinese as their main means of communication in both their professional and personal environments, which means that their exposure to and use of Spanish is quite limited.

3.3. Data collection

To collect our corpus of acted emotional speech, we created a PowerPoint Presentation. First, we selected 10 utterances (see Table 1). The longest length of each utterance is 9 syllables, the shortest is 4 syllables, and the average value is 6,50 (M = 6.50, SD = 1.65).

Table 1. Target utterances and their English translation

Number	Target sentence	English translation
1	"He sacado un 10"	"I got a 10"
2	"He ganado el concurso"	"I've won the competition"
3	"Me han dado el trabajo"	"I got the job"
4	"Ya estoy en casa"	"I'm home"
5	"Estoy divorciada"	"I'm divorced"
6	"La verdad es que no trabajo"	"Actually I do not have a job right now"
7	"Me voy a China"	"I'm going to China"
8	"Está lloviendo"	"It's raining"
9	"Tengo una fiesta"	"I have a party"
10	"Mi hija ya tiene novio"	"My daughter already has a boyfriend"

Note. The Table displays the Spanish sentences (target sentence) along with their English translations.

Next, in order to obtain the emotional speech samples (expression of sadness and joy), we chose to use the scenario approach (Wallbott and Scherer, 1986). That is, we designed two different contexts for each utterance, one to elicit the expression of happiness and the other to elicit the expression of sadness. Each utterance was then embedded into the dialogue expressing happiness and sadness respectively. In this way, we could observe whether the melodic contour of the same utterance changed according to the intended emotion. For example (see Figure 1), to elicit the phrase "He sacado un diez" ("I got a 10") with an emotion of joy, the informants were presented with a situation in which the score they obtained was a 10 out of 100 (sadness) and another in which the score they obtained was a 10 out of 10 (joy).

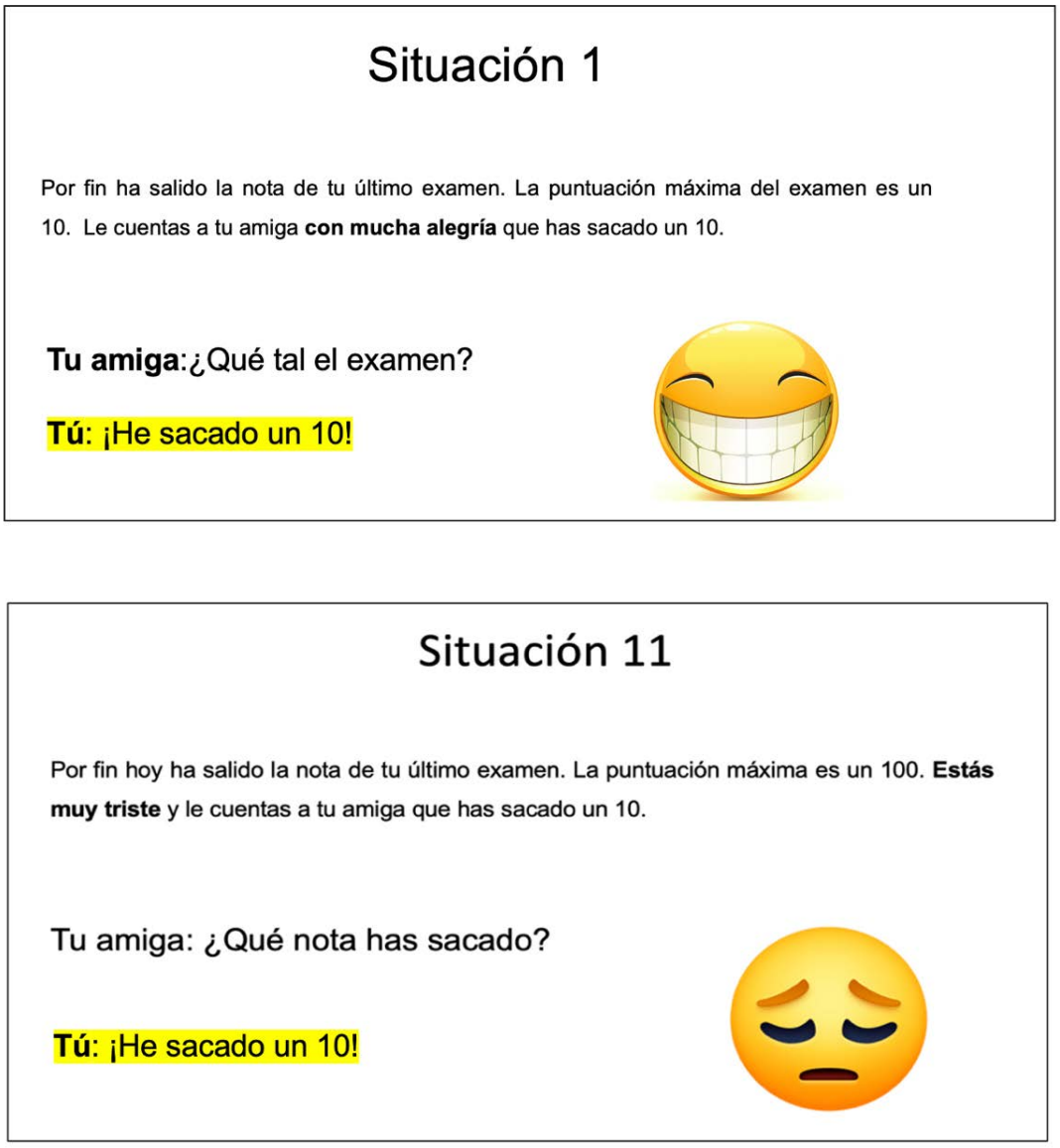


Figure 1. Examples of contextual situations to elicit sadness and joy

Before recording, the purpose of the study was explained to the speakers and a written consent was signed by each participant. Next, the data collection process was explained in Mandarin Chinese. Then, they were asked to read aloud the ten sentences as many times as necessary to familiarize themselves with the words and to identify any difficulties in understanding them. Afterwards, participants were presented with the context of each conversation in Chinese and Spanish so that they could better understand the context of the conversations. Each participant was assigned the role of one of the two characters interacting in each conversation and was instructed to read aloud the text in yellow while expressing joy or sadness. Before starting the official recording, two tests were conducted to make the participants feel more comfortable and familiar with the procedure.

3.4. Data analysis

A corpus of 100 happy and 100 sad utterances was collected and analyzed using Praat software (Paul Boersma and David Weenink, version 6.2.23.). Melodic analysis was then conducted following the protocol of the Melodic Speech Analysis method (Cantero 2002; Cantero and Font-Rotchés, 2009).

To carry out the analysis, first the relevant acoustic data of each tonal segment were extracted, that is, the relevant F0 values of the vowels, discarding the irrelevant values. During this process, the following considerations were taken into account: if there was an ascending or descending inflection with a difference of more than 10% between the beginning and the end of a vowel, this vowel was considered as two values and the second value was marked with an asterisk; and if the circumflex inflection consisted of a vowel, it was considered as three values (Zhao, 2019, p.23). After standardizing the values in percentages, we obtained the melodic curve of the utterance with the standard values (see Figure 2).

Subsequently, we manually identified the melodic features of each utterance such as the anacrusis, the first peak, the body, the nucleus and the final inflection (see Figure 3), to observe and compare the melodic contours produced by the participants in the study.

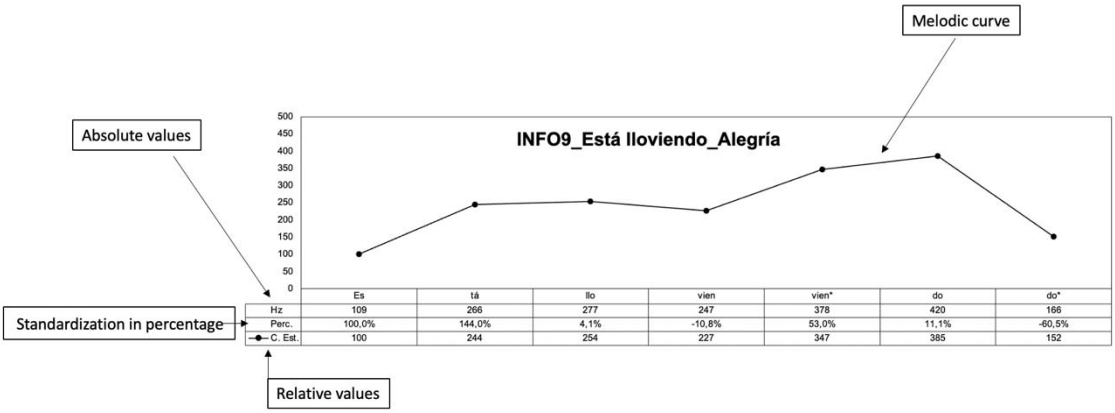


Figure 2. Example of melodic curve with standard values

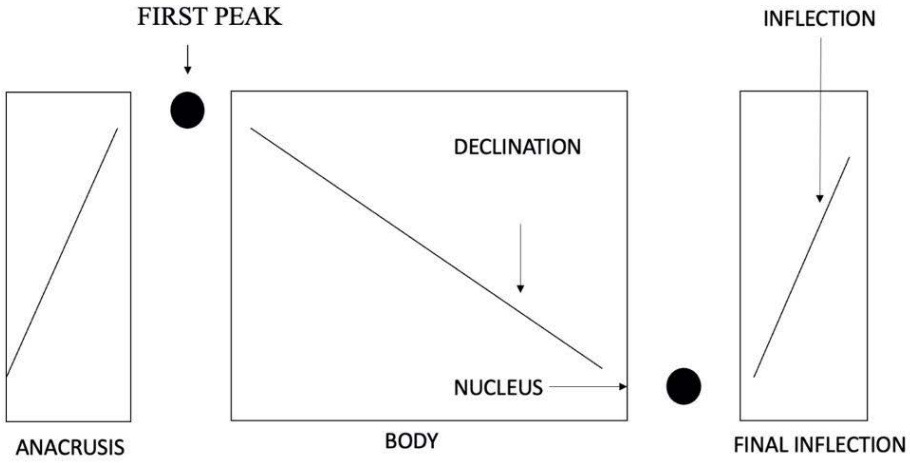
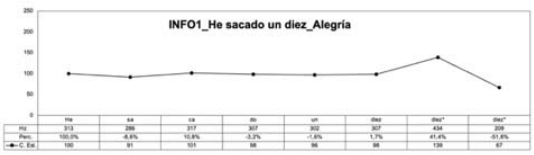
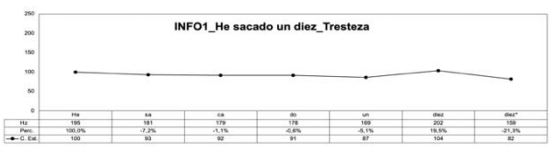
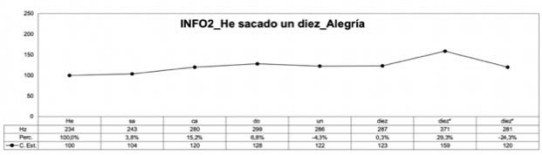
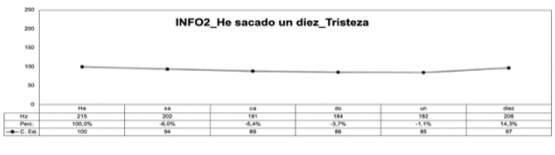


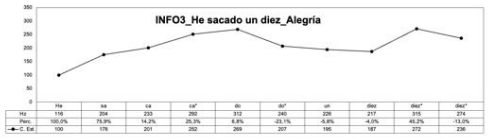
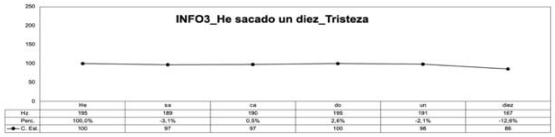
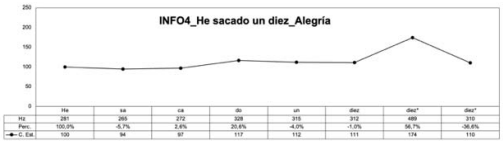
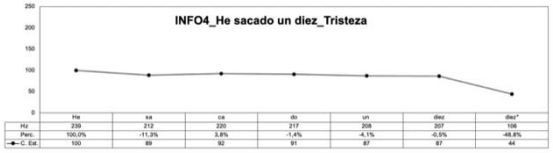
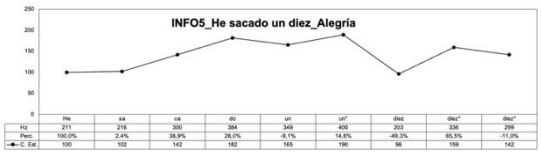
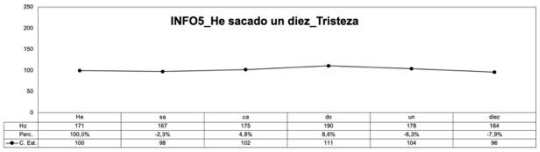
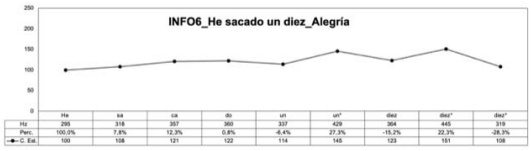
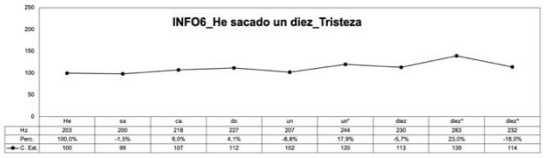
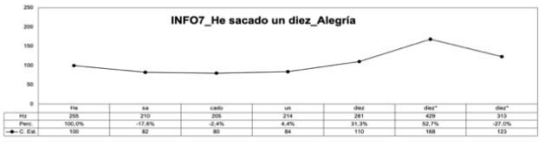
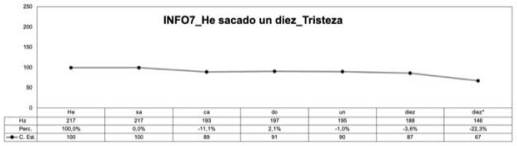
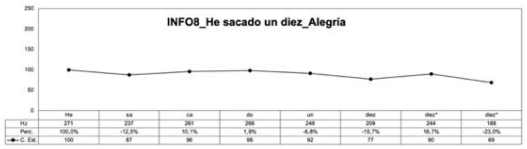
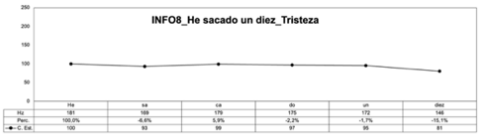
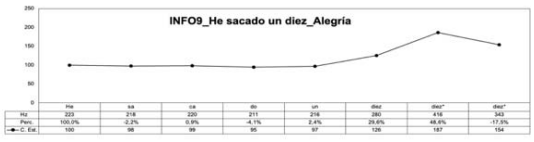
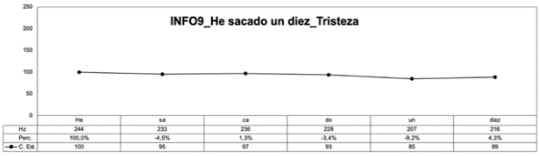
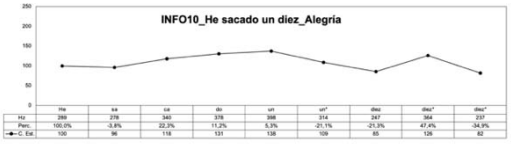
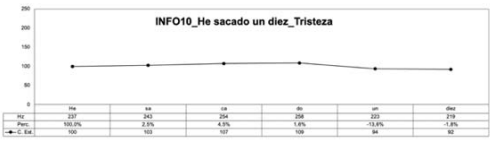
Figure 3. Melodic contour structure
Source: Cantero (2002, p. 161)

4. Results

To answer our research question, we analyzed and then compared the melodic contours present in the 100 pairs of joy and sadness utterances. In 94 of the 100 pairs of utterances analyzed, different melodic contours were found to have been used to express joy and sadness in identical utterances at the lexical-grammatical level, and only in six pairs of utterances the same melodic contour was used to express joy and sadness. Table 2 illustrates an example of the different melodic contours of joy and sadness in utterance 1 “He sacado un diez” (“I got a 10”) produced by the 10 informants in the study.

Table 2. Example of the melodic contour of expression of joy and sadness in L2 Spanish: “He sacado un diez”

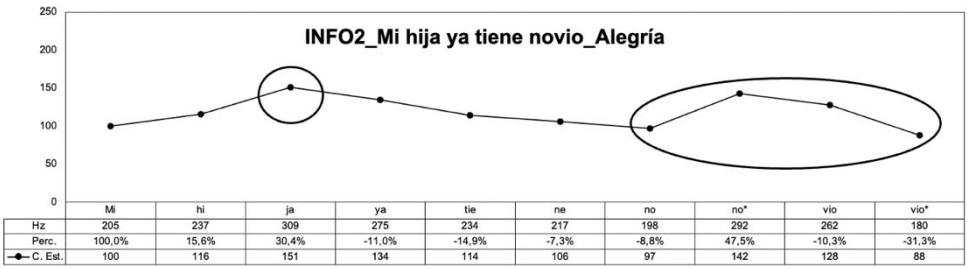
Informant	Joy	Sadness
1		
2		

Informant	Joy	Sadness
3		
4		
5		
6		
7		
8		
9		
10		

Note. This Table presents the representation of the melodic contours associated with feelings of joy and sadness, as expressed by 10 informants when saying the phrase “He sacado un diez”.

As we can see in Table 2, sad speech patterns tend to be flat compared to joy speech patterns that show more melodic movements, specially at the end of the melodic contour. After observing the differences, we analyzed in detail the characteristics of each melodic contour, taking into account the different parts of the melodic contour described by Cantero (2002): anacrusis, first peak, body and final inflection.

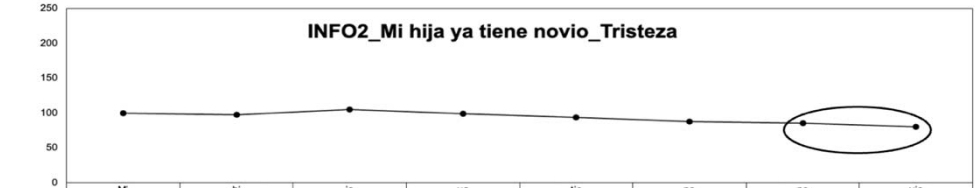
Figures 4 and 5 illustrate an example of two melodic patterns of the same sentence produced by the same speakers with two different communicative intentions: to convey happiness (Figure 4) and to convey sadness (Figure 5).



	Mi	hi	ja	ya	tie	ne	no	no*	vio	vio*
Hz	205	237	309	275	234	217	198	292	262	180
Perc.	100,0%	15,6%	30,4%	-11,0%	-14,9%	-7,3%	-8,8%	47,5%	-10,3%	-31,3%
C. Est.	100	116	151	134	114	106	97	142	128	88

Anacrusis	Ascent to the first peak of 46.0%.
The first peak	Shifted to the next unstressed syllable.
Body	Steady descent.
Final inflection	Circumflex: Ascending (47.5%)-descending (-41.6%).

Figure 4. Example of melodic contour of joy speech: "Mi hija ya tiene novio"



	Mi	hi	ja	ya	tie	ne	no	vio
Hz	232	227	243	229	217	204	199	187
Perc.	100,0%	-2,2%	7,0%	-5,8%	-5,2%	-6,0%	-2,5%	-6,0%
C. Est.	100	98	105	99	94	88	86	81

Anacrusis	Absence of anacrusis.
The first peak	Absence of first peak.
Body	Flat body.
Final inflection	Flat

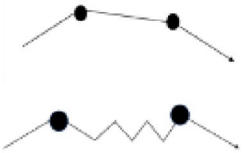
Figure 5. Example of melodic contour of sad speech: "Mi hija ya tiene novio"

The detailed analysis of the contour shows us that the difference in this case can be located in every part of the melodic contour. In the joy speech melodic contour, we can find an ascent to the first peak in the anacrusis, while in the sad speech melodic contour we can find no anacrusis or first peak. The body is equally different, being the joy speech pattern characterized by a descending body and the sad speech pattern by a flat body. But probably the most remarkable difference can be found in the final inflection, since we can observe a circumflex final inflection in the joy speech utterance, while the final inflection is suspended and flat in the sad version of the sentence.

In order to compare the characteristics of the patterns obtained in a more systematic way, according to the results of the Melodic Analysis of all utterances, a classification of patterns was built. In Table 3 we can observe the characteristics of each melodic pattern, the graph that represents the tonal movements, as well as the frequency of appearance of each melodic contour in our corpus of joy speech. PA stands for Patrón de Alegría (Joy Speech Pattern) and the numbers in the names of the patterns (I/II/III...) have been assigned according to the frequency of appearance of the pattern in our corpus.

Table 3. Patterns of joy speech in L2 Spanish

PATTERN NAME	FREQUENCY OF OCCURRENCE	PATTERN SHAPE
PA-I: Circumflex body + circumflex FI	48%	
PA-II: Flat body + ascending descending circumflex FI	38%	

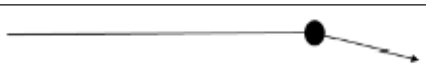
PATTERN NAME	FREQUENCY OF OCCURRENCE	PATTERN SHAPE
PA-III: Variable body + descending FI	12%	
PA-IV: Flat body + flat FI	1%	
PA-V: Flat body + ascending FI	1%	

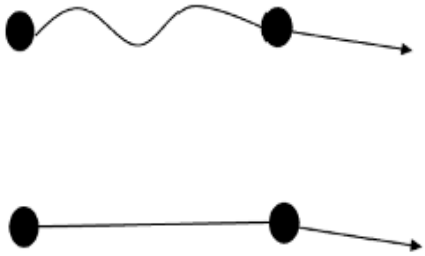
Note. Table 3 illustrates the prevalent melodic profiles in the corpus, along with their representation and frequency of appearance in the context of joy speech in L2 Spanish spoken by Chinese speakers.

As we can see, PA-I, the most frequent melodic pattern, is characterized by a circumflex body and a circumflex final inflection, and the second most frequent one is also characterized by a circumflex final inflection.

As for sad speech patterns, after conducting the melodic analysis of the utterances we found eight melodic patterns. As we can see in table 4, 45% of sadness utterances present a flat body followed by a descending FI, 10% present a flat body and a flat FI, 12% present a flat body and an ascending descending circumflex FI, 7% present anacrusis, a 1st peak, a descending body and a descending FI, 10% present anacrusis, 1st peak, descending body and a circumplex FI, in 4% the first peak coincides with the final inflection, 7% have a 1st peak, different types of bodies and a descending FI and finally 5% have flat body and an ascending FI. In Table 4 the name of each pattern is presented. PT stands for Patrón de Tristeza, which means sad speech pattern in Spanish.

Table 4. Patterns of sad speech in L2 Spanish

PATTERN NAME	FREQUENCY OF OCCURRENCE	PATTERN SHAPE
PT-I: Flat body + descending FI	45%	
PT-II: Flat body + flat FI	10%	
PT-III: Flat body + ascending descending circumflex FI	12%	
PT-IV: Anacrusis + 1st peak + descending body + descending FI	7%	
PT-V: Anacrusis + 1st peak + descending body + circumflex FI	10%	
PT-VI: 1st peak = FI	4%	

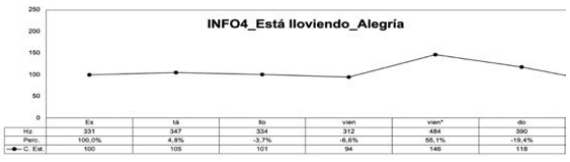
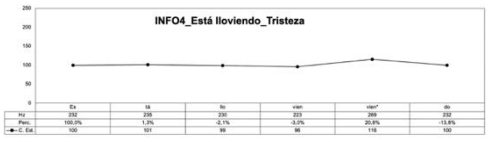
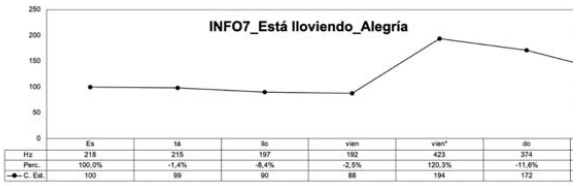
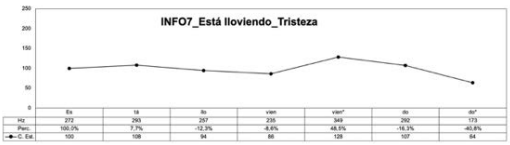
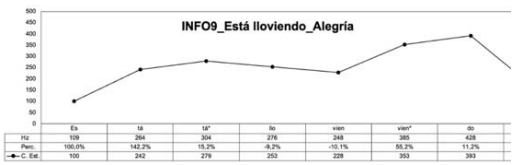
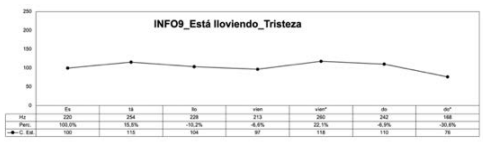
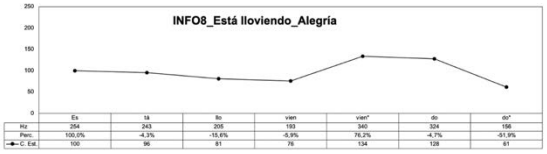
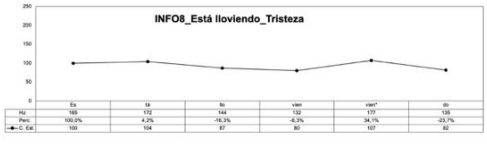
PATTERN NAME	FREQUENCY OF OCCURRENCE	PATTERN SHAPE
PT-VII: 1st peak + variable body + descending FI	7%	
PT-VIII: Flat body + ascending FI	5%	

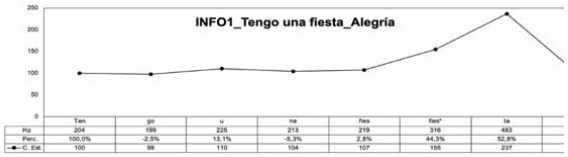
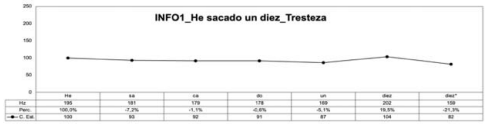
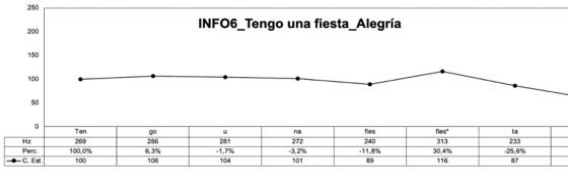
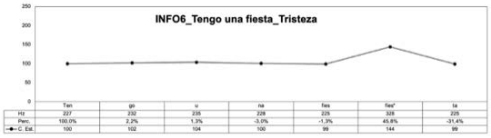
Note. Table 4 illustrates the prevalent melodic profiles in the corpus, along with their representation and frequency of appearance in the context of sad speech in L2 Spanish spoken by Chinese speakers.

As we can see, most sad speech utterances present a very flat body and a final downward inflection. This pattern is very different from the patterns presented for joy speech, which corroborates the idea that L1 Chinese speakers of L2 Spanish use different melodic patterns when trying to convey joy and sadness. However, sometimes speakers have used the same melodic pattern to express joy and sadness in Spanish.

Only six sentences presented the same melodic contour type when different emotions were expressed. Table 5 illustrates the six cases that show no difference in melodic contour when expressing joy and sadness.

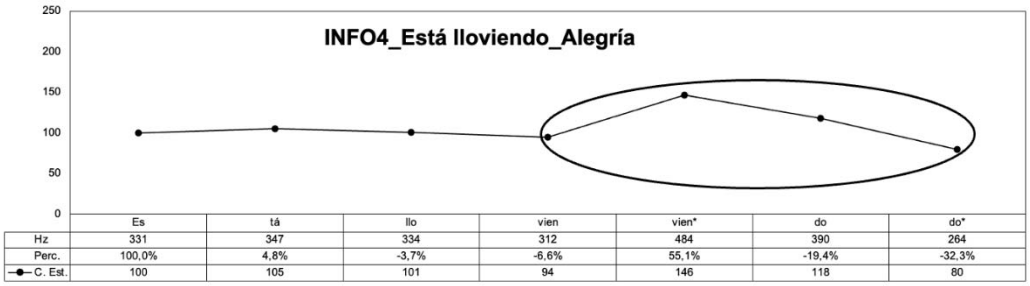
Table 5. Pairs of utterances lacking melodic contour differences in the expression of joy and sadness

Informant	Joy	Sadness
4		
7		
9		
8		

1		
6		

Note. Table 5 presents pairs of utterances that lack melodic contour differences in the expression of both joy and sadness.

As an example, in the utterance "Está lloviendo" ("it´s raining"), both the happy-intended and the sad-intended utterances are characterized by a melodic contour with a flat body, descending ascending circumflex final inflection (see Figure 6 and Figure 7).



	Es	tá	llo	vien	vien*	do	do*
Hz	331	347	334	312	484	390	264
Perc.	100,0%	4,8%	-3,7%	-6,6%	55,1%	-19,4%	-32,3%
C. Est.	100	105	101	94	146	118	80

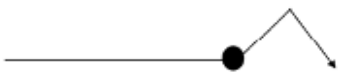
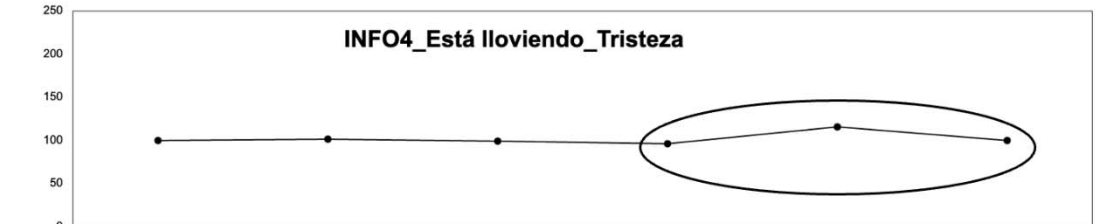
Anacrusis	Absence of anacrusis.
The first peak	Absence of first peak.
Body	Flat.
Final inflection	Circumflex: ascending (55,1%)-descending (-51,7%).
Graphic	

Figure 6. Example of melodic contour of joy speech: "Está lloviendo"



	Es	tá	llo	vien	vien*	do
Hz	232	235	230	223	269	232
Perc.	100,0%	1,3%	-2,1%	-3,0%	20,6%	-13,8%
C. Est.	100	101	99	96	116	100

Anacrusis	Absence of anacrusis.
1° pico	Absence of first peak.
Body	Flat.
Final inflection	Circumflex: ascending (20,6%)-descending (-13,8%).
Graphic	

Figure 7. Example of melodic contour of sad speech: "Está lloviendo"

In the example, as we can see, the percentage of rise and fall is, as expected, higher in the utterance pronounced with the intention of communicating joy than in the one produced with the intention of conveying sadness. However, the melodic movements in both cases are the same.

5. Discussion

The aim of the current study was to test whether L1 Chinese speakers of L2 Spanish, who are living in Madrid, use melodic contours as a strategy for the expression of joy and sadness in L2 Spanish. For this purpose, we recorded and analyzed 100 pairs of joy and sadness speech utterances (10 utterances x 2 emotions x 10 informants).

As we have indicated in the results section, 94% of the utterance pairs have shown different melodic contours to express joy and sadness in identical utterances at the lexical-grammatical level. As an example, we can observe that in Figure 5 and Figure 6, i.e., the same utterance "Mi hija ya tiene novio"("My daughter already has a boyfriend"), to express joy, the informant has used a melodic contour characterized by the presence of anacrusis with a 46% ascent to the first peak, descending body and descending ascending circumflex final inflection; however, to express sadness using the same utterance, the informant has opted for a melodic contour with flat body and a flat final inflection.

These results are in line with those presented by Hidalgo (2020) for L1 Spanish, who states that "the melodic contours of joy and sadness in L1 Spanish are divergent" (Hidalgo, 2020, p. 50). Specifically, the emotional expression of joy in L1 Spanish is characterized by greater tonal range, while the expression of sadness is characterized by flat melodic patterns.

After analyzing in detail each melodic pattern, we observed which patterns were frequently used by the speakers in order to express happiness. We found that the most frequently used pattern (PA-I) coincides with the joy pattern described by Hidalgo (2020). Interestingly, this pattern is the most used one also in L1 Spanish (27% of utterances trying to convey happiness in Spanish L1). Therefore, further studies are needed to check whether this pattern is perceived according to the communicative intention of the speakers when trying to convey happiness, but it could be hypothesized that, at least in this case, when speakers want to express joy they are perceived according to their communicative intention. Different is the case of sadness expression, since the melodic pattern most present in our corpus of sadness expression has not been mentioned by any of the authors who have focused on describing the melodic patterns of sadness expression in L1 Spanish.

On the other hand, out of the 100 utterances studied, we only found six pairs with the same melodic contour when trying to convey both joy and sadness in identical utterances at the lexical-grammatical level.

However, although six utterances share the same melodic contour when expressing joy and sadness, the percentage of tonal ascent of anacrusis, ascent and tonal descent of the final inflection is higher in joy speech than in sad speech, which is also in line with the results obtained by Garrido (2011), who considers that the tonal height of the expression of sadness in L1 Spanish is lower than that of happiness, since sadness has "a rather low degree of activation" (Garrido, 2011, pp. 253).

These results also allow us to speculate on the possible influence of their L1, Mandarin Chinese. Chao (1932, cited in Cao, 2013) uses the elastic effect ("elastic" effect in-depth), a metaphor, to describe Chinese emotional intonation. That is, the extension or contraction of the tonal range plays a key role in expressing emotions or attitudes in the Chinese language.

According to the results obtained, we can conclude that the productions of joy and sadness of the L1 Chinese L2 Spanish speakers residing in Madrid show differences at the melodic level, from which we deduce that melody can indeed be one of the strategies used by them when expressing emotions in L2 Spanish. To further explore this topic, in the future it would be advisable to carry out perceptual studies to evaluate whether the utterances produced by L1 Mandarin Chinese speakers of L2 Spanish with happy and sad emotional intention are perceived by native speakers of Spanish according to their communicative intention. Similarly, it would be interesting to conduct a similar study with L1 Spanish speakers to compare results and determine whether there are significant differences between the two groups of speakers.

The current study has some limitations, such as the small number of participants, the lack of gender diversity and the small number of happy and sad utterances analyzed. Therefore, future research recommends increasing the sample size to obtain more robust and generalizable results, as well as including a wider variety of emotional utterances and comparing individual variables such as Chinese variety or language proficiency level.

6. Conclusion

Expression of emotions is the most basic need in human communication. Accurate recognition of emotions and proper expression of emotions help immigrants integrate into the daily life of migrant countries and promote social stability and solidarity. It also contributes to the physical and mental health of the individual. There is little research on emotional expressions in L2 Spanish spoken by L1 Chinese speakers of L2 Spanish. Although recently (Carbajal-Carrera et al., 2020) an interest on the part of researchers and teachers has begun, there is still a need to carry out more studies to delve deeper into this topic and obtain a more complete understanding of it.

In the present study, we observed that L1 Chinese speakers who speak Spanish do seem to use melody to try to express joy or sadness in Spanish. However, in some cases the informants have used the same pattern to express joy and sadness. When analyzing the expression of joy, we have observed that the most frequent patterns are similar to those presented by previous literature in Spanish. In the case of sadness, it seems that the patterns differ quite a bit from those used by L1 Spanish speakers. It is therefore necessary in the

future to conduct perceptual studies in order to test whether Chinese speakers have problems when trying to communicate sadness to L1 Spanish speakers and, if so, whether the melody could be responsible for such a communicative error.

The findings of this study have important pedagogical implications for the teaching of Spanish as a foreign language. Although perceptual studies need to be carried out to reach conclusive results, the results of the current study suggest that it is important to teach melodic patterns of emotion expression in L2 Spanish. As we know, the teaching of pronunciation and the teaching of intonation are not always present in the Spanish as a foreign language classroom. This can lead to serious communicative misunderstandings, since when expressing an emotion, we all want that emotion to be perceived. Doing so in a foreign language can be challenging, so it is necessary to incorporate this content in the foreign language classroom. To this end, specific activities focused on these aspects could be developed. Such activities could focus on recognizing the melodic patterns of the expression of emotions in Spanish L2 and on trying to reflect on the melodic features of their own productions. Of course, this work should not be carried out in isolation, but should be integrated throughout the language teaching process.

More studies in the field will allow teachers of Spanish as L2 to develop specific didactic activities that address the difficulties encountered in emotional expression in Spanish L2 by Chinese speakers. In this way, it will be possible to design more effective teaching materials and strategies adapted to the needs of Chinese speakers of L2 Spanish. This will undoubtedly make it easier for them to integrate into the host society and allow them to participate fully in the Spanish-speaking community.

In short, it is of vital importance to observe which are the linguistic features that prevent foreign language speakers and, in particular, the Chinese-speaking community based in Madrid, from communicating their emotions and feelings, so that we can finally contribute to building a more just, equitable, harmonious and truly multicultural society.

Acknowledgements

This study was conducted within the framework of the project “Emotion in Learning Spanish as an Additional Language and in Bilingual Communication in Migration Contexts (EMILIA2)” [PID2022-138973OB-C22], funded by the State Program for Research, Development, and Innovation Projects for Knowledge Generation 2022 of the Ministry of Science, Innovation, and Universities. We are grateful for the financial support provided by this program, which has made this research possible.

CRediT Author Statement

Both authors have contributed equally to the development of this work, as detailed below:

Cristina Herrero Fernández contributed to the conceptualization, methodological design, investigation, formal analysis, content organization, and manuscript writing.

Shaohua Sun contributed to the conceptualization, methodological design, investigation, formal analysis, and manuscript writing.

References

Austin, John Langshaw (1975). *How to do things with words.* Oxford: Oxford University press.

Banse, Rainer, & Scherer, Klaus R. (1996). Acoustic profiles in vocal emotion expression. *Journal of Personality and Social Psychology, 70*(3), 614-636. https://doi.org/10.1037/0022-3514.70.3.614

Cantero Serena, Francisco José (2002). *Teoría y análisis de la entonación.* Editions of University of Barcelona.

Cantero Serena, Francisco José, & Font-Rotches, Dolors (2009). Protocolo para el análisis melódico del habla. *Estudio de fonética experimental*, *18*,18-32. https://raco.cat/index.php/EFE/article/view/140087

Cantero Serena, Francisco José, & Font-Rotchés, Dolors (2020). Melodic analysis of speech (mas). Phonetics of intonation. *Contributions on education*, 20-47.

Cao, Jian Fen (2009). 吴宗济先生的学术思想与理论体系 [Academic idea and theoretic system of professor Wu ZongJi]. 暨南学报 [Journal of Jinan University (Philosophy and Social Sciences)], 31(6), 148-211.

Cao, Jian Fen (2013). 赵元任语调思想微探 [Exploration on the pith of Y-R Chao´s intonation theory]. 中国语音学报[Chinese Journal of Phonetics], 4. https://xueshu.baidu.com/usercenter/paper/show?paperid=1m4v00806e2b04b0735q08h0kn745115

Carbajal-Carrera, Beatriz, Hernández, Diana Martínez, & Martín, Dania Ramos (2020). El aprendizaje de los rasgos fonopragmáticos del enfado en español como lengua extranjera. *Logos: Revista de Lingüística, Filosofía y Literatura*, *30*(2), 394-411. https://doi.org/10.15443/RL3029

Chao, Yuen Ren (1933). Tone and intonation in Chinese. *Bulletin of the Institute of History and Philology*, *4*(2), 121-134.

Chen, Aoju, Gussenhoven, Carlos, & Rietveld, Toni (2004). Language-specificity in the perception of paralinguistic intonational meaning. Language and Speech, *47*(4), 311-349. https://doi.org/10.1177/00238309040470040101

Chen, Hu (2007). 基于语音库的汉语感叹句与感叹语调研究 [A Study of Chinese Exclamatory Sentence and Intonation Based on Sound Corpus]. 汉语学习Chinese Language Learning, 5, 45-54.https://global.cnki.net/kcms/detail/detail.aspx?filename=HYXX200705007&dbcode=CJFQ&dbname=CJFD2007&v=).

Cortés Moreno, Maximiano (2004). Análisis acústico de la producción de la entonación española por parte de sinohablantes. *Estudios de fonética experimental*, *13*, 80-110. https://raco.cat/index.php/EFE/article/view/140013

De Abreu, Sophie, & Mathon, Catherine (2005). Can you hear I'm angry? Perception of anger in a spontaneous French corpus by Portuguese learners of French as a foreign language. *In Proceedings of the Phonetics Teaching and Learning Conference* (PTLC), 27-30. file:///Users/shaohuasun/Downloads/Can_you_hear_Im_angry.pdf

De Marco, Anna (2019). Teaching the Prosody of Emotive Communication in a Second Language. *In Second Language Acquisition-Pedagogies, Practices and Perspectives*, 165-180. IntechOpen. https://doi.org/10.5772/intechopen.87210

Dewaele, Jean-Marc (2016). Thirty shades of offensiveness: L1 and L2 English users' understanding, perception and self-reported use of negative emotion-laden words. *Journal of Pragmatics*, *94*, 112–127. https://doi.org/10.1016/j.pragma.2016.01.009

Ekman, Paul (1992). An argument for basic emotions. *Cognition and Emotion*, 6(3-4), 169-200. https://doi.org/10.1080/02699939208411068

Elfenbein, Hillary Anger & Ambady, Nalini (2002a). Is there an in-group advantage in emotion recognition? *Psychological Bulletin*, *128*(2),243-249. https://doi.org/10.1037/0033-2909.128.2.243

Elfenbein, Hillary Anger & Ambady, Nalini (2002b). On the universality and cultural specificity of emotion recognition: A meta-analysis. *Psychological Bulletin*, *128*(2), 203-235. https://doi.org/10.1037/0033-2909.128.2.203

Fussell, Susana Runyon (2002). The verbal communication of emotion: Introduction and overview. In Susana Runyon Fussell (Ed.). *The Verbal Communication of Emotions: I*nterdisciplinary Perspectives. Mahwah, 1-22. NJ: Lawrence Erlbaum Associaties.https://www.ffri.hr/~ibrdar/komunikacija/seminari/Fussell,%202002%20-%20Verbal%20Communication%20of%20Emotion%20-%20ch%201.pdf

Garrido Almiñana, Juan-María (2011). Análisis de las curvas melódicas del español en habla emotiva simulada. *Estudios de Fonética Experimental*, *20*, 205-255. https://raco.cat/index.php/EFE/article/view/252416

Garrido Almiñana, Juan-María, Laplaza, Yeskia & Marquina, Monserrat (2012). On the use of melodic patterns as prosodic correlates of emotion in Spanish. *6th International Conference on Speech Prosody*, 645-648, Shanghai, China. https://www.researchgate.net/publication/257818648_On_the_use_of_melodic_patterns_as_prosodic_correlates_of_emotion_in_Spanish

Garrido Almiñana, Juan-María & Chica Sabariego, Juan Antonio (2018). Pitch range and identification of emotions in spanish speech: a perceptual study. *Estudios de Fonética Experimental*, *27*, 13-36. https://raco.cat/index.php/EFE/article/view/343493/434648

Harris, Catherine L. (2004). Bilingual speakers in the lab: Psychophysiological measures of emotional reactivity. Journal of Multilingual and Multicultural Development, *25*, 223–247. https://doi.org/10.1080/01434630408666530

Herrero Fernández, Cristina (2021). *Rasgos melódicos de (des)cortesía en el español hablado por inmigrantes sinohablantes en la Comunidad de Madrid: percepción y producción de (des)cortesía (in)voluntaria* [Doctoral thesis, University of Antonio Nebrija, Spain].

Hidalgo Navarro, Antonio (2019). *Sistema y uso de la entonación en español hablado.* Alberto Hurtado University, Santiago, Chile.

Hidalgo Navarro, Antonio (2020). Rasgos prosódicos de la emoción: estudio de un corpus conversacional. *Phonica*, *16*, 36-53. https://doi.org/10.1344/phonica.2020.16.36-53

Holden, Kyril T. & Hogan, John. T. (1993). The emotive impact of foreign intonation: An experiment in switching English and Russian intonation. *Language and Speech*, *36*(1), 67-88. https://doi.org/10.1177/002383099303600104

Lorette, Pernelle & Dewaele, Jean-Marc (2022). Interpersonal perception of emotional intensity by English first (L1) and foreign (LX) language users in audio(visual) communication, *International Journal of Multilingualism*, https://doi.org/10.1080/14790718.2022.2144326

Ivaz, Lela, Costa, Albert & Duñabeitia, Jon Andoni (2016). The emotional impact of being myself: Emotions and foreign-language processing. Journal of Experimental Psychology: *Learning, Memory, and Cognition*, *42*(3), 489-496. https://doi.org/10.1037/xlm0000179

Izard, Carroll E. (1992). Basic emotions, relations among emotions, and emotion-cognition relations. *Psychological Review*, *99*(3), 561-565. https://doi.org/10.1037/0033-295X.99.3.561

Laukka, Petri (2004). *Vocal Expression of Emotion. Discrete-emotions and Dimensional Accounts* [Doctoral thesis, Uppsala University, Sweden]. https://www.diva-portal.org/smash/get/diva2:165425/FULLTEXT01.pdf

Liu, Pan & Pell, Marc D. (2012). Recognizing vocal emotions in Mandarin Chinese: A validated database of Chinese vocal emotional stimuli. *Behavior Research Methods, 44*(4), 1042-1051. https://doi.org/10.3758/s13428-012-0203-3

Martínez, Hernán & Rojas, Darcy Avendaño (2011). Prosodia y emociones: datos acústicos, velocidad de habla y percepción de un corpus actuado. *Lengua y Habla,* 15(1), 59-72. https://www.researchgate.net/publication/277259369_Prosodia_y_emociones_datos_acusticos_velocidad_de_habla_y_percepcion_de_un_corpus_actuado

Mateo Ruiz, Miguel. (2010). Scripts en Praat para Extracción de Datos Tonales y Curva Estánder. *Phonica*, *6*, 91-111. https://revistes.ub.edu/index.php/phonica/article/view/5601/7381

Padilla-García, Xosé A. (2020). Prosodia emocional y conversación espontánea: bases para el establecimineto de un protocolo de identificación perceptiva. *Phonica*, *16*, 4-35. https://revistes.ub.edu/index.php/phonica/article/view/31819/32844

Pellegrino, Elisa & Maffia, Marta (2016). Expressing and labelling emotions. Languaging Diversity Volume 2: Variationist Approaches and Identities, *2*, 127. Cambridge Scholars Publishing.
Rodero, Emma (2011). Intonation and Emotion: Influence of Pitch Levels and Contour Type on Creating Emotions. *Journal of Voice, 25(1),* 26-33. https://doi.org/10.1016/j.jvoice.2010.02.002
Russell, James A. (1980). A circumplex model of affect. *Journal of personality and Social Psychology*, *39*(6), 1161-1178. https://doi.org/10.1037/h0077714.
Sauter, Disa A., Eisner, Frank., Ekman, Paul & Scott, Sophie K. (2010). Cross-cultural recognition of basic emotions through nonverbal emotional vocalizations. *Proceedings of the National Academy of Science*, *107*(6), 2408-2412. https://doi.org/10.1073/pnas.0908239106
Scherer, Klaus R. (1997). The role of culture in emotion-antecedent appraisal. *Journal of Personality and Social Psychology, 73*(5), 902-922. https://doi.org/10.1037/0022-3514.73.5.902
Wallbott, Harald G. & Scherer, Klaus R. (1986). Cues and channels in emotion recognition. *Journal of Personality and Social Psychology*, *51*(4), 690-699. https://doi.org/10.1037/0022-3514.51.4.690
Wang, Ting, Ding, Hongwei & Gu, Wentao (2012). Perceptual Study for Emotional Speech of Mandarin Chinese. *Speech Prosody*, 653-656. https://www.isca-speech.org/archive_v0/sp2012/sp12_653.html
Wang, Ting & Lee, Yong-cheol (2014). Does restriction of pitch variation affect the perception of vocal emotions in Mandarin Chinese? *The Journal of the Acoustical Society of America, 137*(1), 117-123. https://doi.org/10.1121/1.4904916
Wang, Ting, Lee, Yong-cheol & Ma, Qiuwu (2018). Within and Across-Language Comparison of Vocal Emotions in Mandarin and English. *Applied Sciences*, *8*(12), 1-18. https://doi.org/10.3390/app8122629
Wu, Zong Ji (1996). 赵元任先生在汉语声调研究上的贡献 [La contribución del Sr. Chao Yuenren al estudio de los tonos chinos]. 清华大学学报 [Revista de la Universidad de Tsinghua], 11(3), 58-63. http://www.cnki.com.cn/Article/CJFDTotal-qhdz603.010.htm
Zhao, Tian Shu (2019). La entonación de las preguntas del español hablado por chinos. *Phonica*, 15, 119-140. https://www.researchgate.net/publication/344667535_LA_ENTONACION_DE_LAS_PREGUNTAS_DEL_ESPANOL_HABLADO_POR_CHINOS
Zhu, Yin Yin (2013). Which is the best listener group? Perception of Chinese emotional prosody by Chinese natives, naïve Dutch listeners and Dutch L2 learners of Chinese. *Dutch Journal of Applied Linguistics*, *2*(2), 170-183. https://doi.org/10.1075/DUJAL.2.2.03zhu