The role of intonation in idiomatic disambiguation
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Statement of the problem
The sentences in (1) exhibit an ambiguity that stems from the fact that, in addition to a literal interpretation, they also have an idiomatic interpretation.

(1) a. Tomás se apretó el cinturón
   'Tomás tightened his belt'

   b. Tomás se apretó el cinturón
   'Tomás reduced costs'

The literature claims that this ambiguity is resolved in the semantics – a speaker uses lexical knowledge and context, among other things, to determine which interpretation is the most appropriate. It is widely assumed that phonology plays little to no role in helping resolve this ambiguity (Katz and Postal 1967, Fraser 1970). Given this view, there should be no systematic differences in how the sentences are produced, and, consequently, in the absence of context, speakers should not be able decide which interpretation to assign to an out-of-the-blue utterance containing those words. However, this assumption has never been tested experimentally.

This study takes a look at the role that may exist between intonation and idiomaticity. Intonation in non-tonal languages is used as a way to mark semantic distinctions at the propositional level – as it is the case of declaratives vs interrogative statements (O’Rourke 2012). Recent work has found that intonation serves other pragmatic purposes. Among these, Nibert (1999) shows that by using intermediate prosodic phrases, speakers reliably signal their intended reading of an otherwise syntactically ambiguous sentence. Face (2001, 2002) finds that speakers manipulate the intonational structure of a sentence to signal changes in broad vs narrow focus with early peak alignment. Rao (2013) reports that changes in F0, intensity, duration, and speech rate can be used to signal sarcasm.

This opens the door for the two goals of this study. The first goal is to falsify that a sentence intended to be interpreted compositionally is identical to that same sentence when interpreted idiomatically for the subset of idioms made up by a verb and its object (VO idioms). The second goal is contingent on the first goal: if a difference is found between the two readings, how systematic is this difference and what does it tell us about idiom production?

Experiment
Following this vein of research, a corpus of twenty VO idioms was created to test if differences in production could be found while controlling for compositional or idiomatic intent. The participants (n=13; 6 females, 7 males, college educated, native Spanish speakers). For each of the idioms tested, two scenarios were crafted. The participants were asked to read each scenario out loud. The interviewer and the participants discussed the meaning of the passage. After the participants felt ready, the interviewer would ask the question 'what happened? The participants answered the question with a summarizing statement containing the target phrase. In the case of (1), it was apretarse el cinturón 'tighten his belt'.

The background story leading to each scenario was controlled for number of sentences, protagonists, and informational content. These background stories were minimally different, but crucially one was conducive to the compositional interpretation, the other to the idiomatic one. For example, the background stories providing the context for (1) shared the same character. The participants then read about an event involving the character (buying a new outfit vs suffering losses in the stock market). The last sentence disambiguates what the intended interpretation is. For instance, in (1a), the character puts on a pair of pants, tightens his belt, puts on a shirt and goes
to a bar. In (1b), the character suffers losses in the stock market, and has to adjust his lifestyle accordingly.

Results

Each compositional-idiomatic pair of sentences was analyzed using Praat. Maximum, minimum and mean values of F0 and intensity were extracted for subject, verb and object. The same values of F0 were measured at the phrasal level. Additionally, speech rate and duration for the entire phrase and the individual constituents were also extracted as these variables have been found to be good indicators of pragmatic variation in the aforementioned literature.

At this time, the picture surfacing (20% of the data entered) shows that participants are producing each pair with systematic differences in F0. Once the entire data is entered, a paired sample t-test will be used to establish whether the two readings are systematically different. Figure 1 below shows that the same speaker produces both sentences with a systematic difference in maximum (1), minimum (2) and mean (3) F0 values for the object. Similar results are seen for the verb, the subject, and the utterance in general with the upper blue line representing compositional F0 values and the bottom red line idiomatic values of F0.

Conclusion and next steps

Assuming that the trend shown above holds, the existing literature on idiomatic phrases will need to be revised to indicate that an idiomatic sentence is not, in fact, prosodically identical to its compositional counterpart.

Contingent on that result, the research question to be explored next is about the role of intonation as it relates to idioms. Subsequent work will explore if intonation is a strategy available to speakers to signal their intent when an idiomatic chunk is present in the utterance. To explore this question, the sentences already produced in this experiment will be used in a perceptual test. Stripped of their context, participants will be presented simply with the statement shown in (1) and asked to decide whether the utterance they hear is more likely to match the compositional context 'Tomás tightened his belt' or the idiomatic one 'Tomás reduced expenses'.

Selected References