Irony Regulates Negative Emotion – in Speakers and Listeners

Valeria A. Pfeifer & Vicky Tzuyin Lai
Department of Psychology & Cognitive Science Program, University of Arizona

Verbal irony is when a speaker uses words whose literal meaning is the opposite of the speakers intended meaning. For example, when someone looks at the giant buffet at a potluck and exclaims: "That's hardly enough food!". Verbal irony is commonly used to express negative emotions (Roberts & Kreuz, 1994), yet it is unclear what irony does to negativity and why irony is useful for expressing negative emotions. Some argue that irony can be used to milden negativity, known as the *tinge hypothesis* (Dews & Winner, 1995). This is supported by empirical evidence from ratings, eyetracking, and Event-related potentials (ERPs) (e.g. Filik et al. 2017, Pfeifer & Lai, 2021). However, past studies mainly considered the speaker, or the statement itself. Here, we propose that irony can effectively reduce negative emotion not just in speakers, but also in listeners, making irony a vital communicative tool to regulate negative emotions in social situations, for example conversations.

Our hypothesis was that irony would reduce negative feelings when compared to literal language. We used a block-design where participants ($N = 54$) saw images of negative events ($N = 128$, mean negativity = 3.01 on a 4-point scale (1 = weak, 4 = strong negativity), e.g. flies on a pie, flat tire) and were instructed to imagine the situation was happening to them. In the verbal block, they then read either literal ($N = 32$) or ironic ($N = 32$) statements about the situation, presented word-by-word, before viewing the same picture for a second time. In the non-verbal block, they either saw "attend" ($N = 32$) or "reinterpret" ($N = 32$) to indicate if they should regulate their emotions or attend to them, before viewing the same picture for a second time. In both cases, participants rated how negative they felt (1 = weak, 4 = strong) after the second image presentation was completed. Electroencephalography (EEG) was recorded throughout the experiment. Participants also reported their language background, success of the *reinterpret* strategy and frequency of irony use. All statements were normed for ironicity.

Averages of behavioral responses are displayed in Figure 1. Paired-t-tests showed that ironic statements led to lower ratings of negativity compared to literal statements ($p = .025$), and that *reinterpret* led to lower ratings of negativity than *attend* ($p < .001$). There also was a positive relationship between how frequently participants used irony in daily conversations and how negative a literal statement made them feel ($p = .049$, $r = .26$), such that using more irony in daily life led to feeling more negative after reading literal statements during the experiment, but no such (reverse) relationship was present for ironic statements.

ERPs ($N = 43$, 11 excluded due to excessive noise) are displayed in Figure 1. ERPs were time-locked to the onset of the literal/ironic word in the verbal block, and to the onset of the attend/reinterpret instructions in the non-verbal block, respectively. Irony elicited a larger prolonged negativity compared to literal statements from 300-900ms, visible on the whole scalp. *Reinterpret* elicited a larger positivity compared to *attend* in 300-500ms, and in frontal channels from 800-1600ms.

We interpret the findings as follows. Behaviorally, irony significantly lowers negative emotion elicited by a negative image compared to literal. While irony is more effective than literal language, it is not as effective as actively regulating one's emotion via cognitive reappraisal. Neurally, similar evidence is found. Irony creates a contrast between the image and the statement, as evident by the enhanced negativity in the traditional N400 timewindow (300-500 ms), and such contrast lingered and continued to be processed (500-900 ms). Cognitive Reappraisal, however, elicits a larger positivity compared to attending to emotions, likely indexing the cognitive effort used in actively regulating emotion. Together with behavioral results, this suggests that irony is successful in decreasing negative emotion, but it accomplishes this in different ways from cognitive reappraisal: rather than actively focusing on

regulating one's response, readers of ironic statements experience a contrast to the situation, which results in less negative emotion, possibly by creating distance, or via Theory of Mind involvement. In other words, irony can be a successful tool that regulates negative emotion, without requiring active participation from the listener. This is important, as it suggests that pragmatically, irony not only mildens negativity in speakers (Pfeifer & Lai, 2021, Filik et al. 2017) but also in recipients, thus, demonstrating that pragmatic functions of irony can be both self- and other serving. Based on the current and previous data, we propose a model of the pragmatic functions of irony (Figure 2) that uses self- and other-serving functions to explain how irony can be simultaneously more hurtful and more amusing (Boylan & Katz, 2013).

Figure 1: *Left*: Average ERP waveforms for non-verbal and verbal blocks, timelocked to the critical word (verbal) or the onset of the instructions (non-verbal). Non-verbal block shows frontal and parietal channels, verbal block shows central channels. *Right*: Average ratings of negativity on a 1-4 scale (1 = weak to 4 = strong).
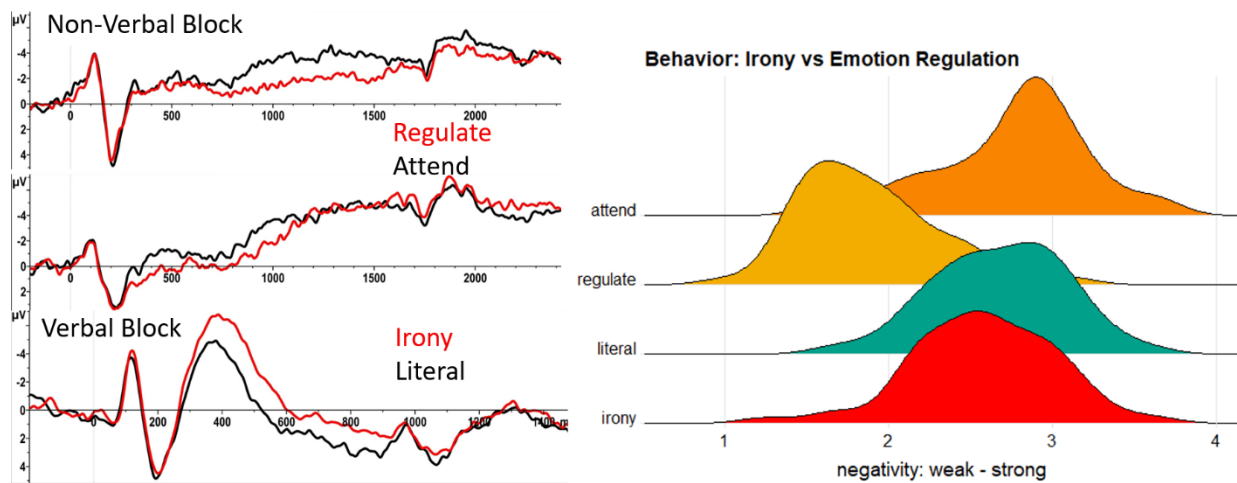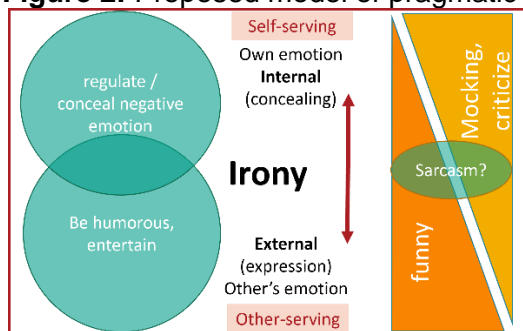

Figure 2: Proposed model of pragmatic functions of irony

References: Roberts, R. M., & Kreuz, R. J. (1994). Why do people use figurative language?. *Psychological science*, *5*(3), 159-163.; Dews, S., & Winner, E. (1995). Muting the meaning a social function of irony. *Metaphor and Symbol*, *10*(1), 3-19.; Pfeifer, V. A., & Lai, V. T. (2021). The comprehension of irony in high and low emotional contexts. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*.; Filik, R., Brightman, E., Gathercole, C., & Leuthold, H. (2017). The emotional impact of verbal irony: Eye-tracking evidence for a two-stage process. *Journal of Memory and Language*, *93*, 193-202.; Boylan, J., & Katz, A. N. (2013). Ironic expression can simultaneously enhance and dilute perception of criticism. *Discourse Processes*, *50*(3), 187-209.