Using LIWC to Distinguish Irony from Literal Language

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Introduction
Lexical factors have been proposed to play a role in identification of written irony. Roberts and Kreuz (1994) report that two major goals of irony are to show negative emotion and to clarify. Utsumi (2001) suggested that lexical factors such as adverbs and interjections act as cues that help a listener recognize irony by implicitly displaying a negative attitude. Kreuz and Caucci (2007), in an analysis of sarcasm in published works, found that interjections signal ironic intent. Kreuz and Caucci (2006) found that the presence of adverbs, question marks, and exclamation points made people more likely to perceive a statement as sarcastic than literal. Based on these findings, we might expect that ironic statements may have more negative emotion words, more certainty words, and more exclamation points overall than literal statements, with no difference in amount of adverbs, exclamation points, or question marks.

METHOD
To test this hypothesis, we used the LIWC2007 software (Pennebaker, Francis, & Booth-Kewley, 2001) to examine the lexical nature of both ironic and literal statements. The LIWC2007 program is a standard tool for text analysis. It identifies a variety of linguistic characteristics, including the number of words per sentence and the number of words in each word category (see Figure 1).

PARTICIPANTS
We selected 79 participants from a large urban Southern university who were presented with a series of written scenarios in which a positive prediction was followed by a negative outcome, a situation considered most ironic (Kreuz & Lin, 2002). Participants were asked to write a story that was meant to make one of two major goals of irony: to show negative emotion or to clarify. These results were classified as ironic if they were contrary to fact. A subset of the compliments were classified by two judges, who established a high level of reliability using Cohen’s kappa ($\kappa = .84$).

EXPERIMENT 1
In Experiment 1, 70 participants at a large urban Southern university were presented with a series of written scenarios in which positive predictions are followed by negative outcomes. For example, a scenario involving a literal prediction is as follows:

I wish I had taken your bet!

This professor can make even a great lecture sound boring.

You sure were right about the lecture.

Woo, that was so exciting I think I wet myself.

You sure were right about the lecture.

Yeah, that was great! Can’t wait for our next class!

I wish I had taken your bet!

Conclusions
These results suggest that lexical factors can be used to identify ironic statements. However, because Dress, Kreuz, Link, and Caucci (2008) found regional differences in irony use, these results may not generalize. Experiment 2 was conducted to address concerns about generalizing the study results.

Experiment 2
In Experiment 2, Dress, Kreuz, Link, and Caucci (2008) had given scenarios similar to those used in Riondon (2008) to 53 students at a midsize Northern university (see Example 2). These completion were reassessed and classified as ironic or literal by the same person who coded for Experiment 1 and according to the same criteria used in Riondon (2008). These responses were then entered into LIWC2007 in the same manner as in Experiment 1.

Conclusions
These results suggest that lexical factors can be used to identify ironic statements. The nonsignificant results for the adverb category might be attributed to the relatively small internal dictionary for adverbs used by LIWC2007, which contains only 60 words. The significant word count and words per sentence differences echo Fairbairn and Ortony’s (1987) comparison hypothesis with regards to metaphor: perhaps ironic statements can express ideas more economically than literal statements.

References

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Figure 1: Example of LIWC2007 Output File