Obligatory Processing of the Literal Meaning of Ironic Utterances: Further Evidence

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We tested the hypotheses that the literal meaning of an ironic utterance is activated during comprehension and (a) slows the processing of the key ironic portion of the utterance (literal activation hypothesis) and (b) slows the processing of the literal portion of the utterance that follows (the spillover hypothesis). Forty-eight stories, each ending in an ironic comment, were constructed. Half of the ironic comments were ironic criticism (positive literal meaning, negative ironic meaning); half were ironic praise (negative literal meaning, positive ironic meaning). Final utterances were divided into 3 phrases: Phrase 1 gave no indication of irony, Phrase 2 contained the key word that made the utterance ironic, and Phrase 3 gave no indication of irony. Each story was then altered by 1 phrase so that the final comment became literal. One version of each of the stories was presented to each of 48 college undergraduates. Stories
were presented 1 sentence at a time, but the final utterances were presented in 3 consecutive phrases. Participants pressed the space bar as soon as they understood the sentence or phrase presented. For ironic criticism, participants took longer to process the key phrases in an irony- than a literal-biasing context, but they took longer to process the final (literal) phrase following irony only when the analysis was performed for item rather than participant variability. For ironic praise, participants again took longer to process the key phrases in an irony- than a literal-biasing context, but this difference did not reach significance, and they did not take any longer to process the final phrase following irony. Thus, results support the literal activation hypothesis in the case of ironic criticism but not ironic praise and provide no clear support for the spillover hypothesis.

Both everyday as well as literary uses of language are riddled with verbal irony (Booth, 1974; Dews, Winner, Nicolaides, & Hunt, 1994; Muecke, 1969). No one has yet demonstrated the existence of a language or culture that does not make use of verbal irony. Although we do not know precisely what the incidence of irony is, some attempts at estimates have been made. For example, on contemporary popular American television shows we noted an average of four instances of verbal irony every half hour. Simple calculation leads to the conclusion that a person who watches 2 hr of popular television per day hears about 5,800 instances of irony a year. Most of the instances of irony on television that we observed were in the most prototypical form of irony, the form we refer to as ironic criticism, in which a positively worded utterance conveys a negative message (e.g., saying “That’s just great” to convey that someone has done something undesirable). Less common, but still heard, were instances of what we refer to as ironic praise, in which a negatively worded utterance conveys a positive message (e.g., saying “You have a hard life” to a friend going off to the Caribbean for an all-expense-paid vacation). Ironic praise, while less common, is readily understood when it echoes a previously stated belief (Gibbs, 1986b; Kreuz & Glucksberg, 1989) and when it alludes to some prior expectation, norm, or convention (Kumon-Nakamura, 1993). In the aforementioned example, the utterance could be echoing (and countering) the culturally held belief that life is hard.

Another estimate of the frequency of irony comes from studies of contemporary American literature. Kreuz, Roberts, Johnson, and Bertus (1996) showed that readers of such literature are exposed to approximately one instance of irony every four pages. And of course we know that verbal irony crops up frequently in everyday conversation. In short, there is no denying the prevalence of irony in our linguistic environment.

Because irony is ubiquitous, this form of language must be accounted for in any theory of language use and understanding. We must understand how irony is processed and whether the mechanisms for understanding irony are the same as, or different from, those used to process literal language. And in addition, we must understand why speakers use irony at all. What social and communicative functions
does irony serve that would lead speakers to choose irony rather than to phrase what they intend to convey in direct and literal speech? In our research, we have tried to develop a theory of the functions served by irony to constrain theories about how irony is processed.

We propose the “Tinge Hypothesis” to account for why irony is used (Dews, Kaplan, & Winner, 1995; Dews & Winner, 1995). We show that irony is perceived as muting the underlying evaluative message. Although ironic criticism (or sarcasm) is commonly assumed to be a particularly biting form of criticism, we showed that in fact ironic criticism is perceived as less negative and confrontational than is literal criticism. In parallel fashion, we show that ironic praise is perceived as less positive and complimentary than is literal praise. Thus, speakers may choose to use ironic criticism in place of literal criticism when they wish to criticize in a muted and less confrontational way. To say to someone who arrives an hour late to a dinner party that he is “on time, as usual” is less hostile than to announce that he is “late, as usual.” The ironic comment is light, mildly humorous, and provides a face-saving out for the late person, who can counter with, “Yes, I am very punctual, aren’t I?” Similarly, speakers may choose to use ironic praise in place of literal praise when they wish to praise but also sting. Suppose you see your fashionably slim friend staring at herself in the mirror worrying that she has gained a pound. You might choose to use irony and say, “Oh, you’re just so fat.” Or you might choose to speak literally and say, “Oh, you’re just so thin.” The ironic version conveys the message that not only is the person thin, but also that her concerns about being fat are silly. There is the sting. The literal version conveys the positive evaluation of thinness without any added sting.

This muting effect could occur only if the literal meaning of the ironic utterance is processed at some level. The evaluative tone of the literal meaning of ironic utterances must “color” the hearer’s perception of the intended meaning. We have argued that the literal meaning of an ironic utterance is accessed when we read or hear such an utterance, and that traces of the literal meaning color the listener’s interpretation of the intended meaning. In the case of ironic criticism, the positive literal meaning “tinges” the negative intended meaning, resulting in a less critical evaluation. Conversely, in the case of ironic praise, the negative literal meaning tinges the positive intended meaning, resulting in a more critical evaluation.

The claim that the literal meaning of irony is accessed and processed is a controversial one. In the 1970s, the linguist Grice (1975) and the philosopher Searle (1993) proposed that we make sense of nonliteral utterances in three sequential steps: (a) We begin by accessing the literal meaning; (b) We test the literal meaning against the context, recognize that it does not make sense, and thus reject it; and (c) Finally, we try out a nonliteral meaning. This “three-stage hypothesis” of nonliteral language comprehension was further developed by Clark and Lucy (1975). According to this model, there is nothing problematic about the notion of accessing the literal meaning of a nonliteral utterance. And according to this
model, comprehending nonliteral language differs from comprehending literal language because it involves an extra inferential step—infering the nonliteral meaning from the relation between the literal meaning and the context.

This traditional view was challenged in the 1980s and 1990s by cognitive psychologists who rejected the notion that there was any kind of principled difference between literal and nonliteral language (Gibbs, 1989; Rumelhart, 1993). They also argued and presented evidence for the claim that comprehension of nonliteral language is no different in underlying process from comprehension of literal language (Gibbs, 1984, 1994; Gibbs & Gerrig, 1989; Gildea & Glucksberg, 1983; Glucksberg, Gildea, & Bookin, 1982; Keysar, 1989; Ortony, Schallert, Reynolds, & Antos, 1978; Sperber & Wilson, 1986). According to this view, the nonliteral meaning of an ironic utterance is automatically derived from its context and the literal meaning need never be accessed (Gibbs, 1982). Thus, understanding irony is no different from understanding literal language: In both cases, the hearer accesses the speaker’s intended message directly. The fact that the ironic speaker has said something different from what was intended does not matter, because the hearer goes directly to what was intended through the use of the context. We refer to this view, in Giora, Fein, and Schwartz’s (1998) terms, as the “processing equivalence hypothesis.”

Yet a third view, the “graded salience hypothesis,” was put forward by Giora (1997). She argued that when we confront an ironic utterance, we initially access the most salient meaning. Except for the most conventionalized forms of irony, the most salient meaning is the literal one. Less salient meanings are accessed later, and these are the nonliteral meanings. (For a similar argument with respect to metaphor, see Blasko & Connine, 1993.) This view differs from the three-stage hypothesis because if the most salient meaning of a nonliteral utterance is nonliteral, the nonliteral meaning will be accessed first. This might occur in the case of conventionalized idioms (e.g., to “spill the beans”) or conventionalized irony (e.g., “Yeah, right”), but would not occur in the case of most forms of irony. Only in cases in which the nonliteral meaning of a nonliteral utterance is less salient than the literal meaning does the graded salience hypothesis make the same predictions as does the three-stage model.

Giora (1995) distinguished her view of irony from the traditional three-stage hypothesis in another key respect. According to the three-stage hypothesis, once the literal meaning is recognized to be wrong, it is rejected. According to Giora’s “indirect negation” view of irony, even though the hearer recognizes the literal meaning to be the wrong interpretation, the literal meaning is retained, not suppressed. The literal meaning plays a role in irony comprehension because it contrasts sharply with the ironic meaning, and this contrast is part of the speaker’s message. If it were not, the speaker might as well have uttered the literal paraphrase of his or her irony. The claim of the indirect negation view that the rejected literal meaning is still retained for its contrast effect is entirely consistent with the claim of the tinge hypothesis. For if the literal meaning were fully suppressed once
the utterance was recognized as ironic, there would be no way for the literal meaning to tinge the evaluative tone of the speaker’s conveyed message.

These conflicting views of how nonliteral language is processed can be tested using reaction time measures to access processing time. The three-stage model predicts that comprehension of the nonliteral meaning of irony should take longer than comprehension of the literal meaning of literal utterances because the former involves three stages, whereas the latter involves only one. In contrast, the processing equivalence hypothesis predicts that the nonliteral meaning of irony should take no longer than comprehension of the literal meaning of literal utterances. The graded salience hypothesis makes the same prediction as the three-stage hypothesis as long as the ironic utterances are not overly conventionalized: Therefore, ironic utterances should take longer to understand than literal ones.

What is the evidence? Gibbs (1986a, 1986b) compared the time taken to comprehend sarcasm versus “equivalent” literal paraphrases, or versus the same comments used literally. He showed that people take less time to process sarcasm than literal paraphrases (e.g., “You’re a big help” vs. “You have not helped”; Gibbs, 1986b, Experiment 1) and thus argued for the equivalence of processing of ironic and literal language. However, when he compared time to comprehend identical utterances in literal versus ironic contexts, different results emerged. In one study, participants understood the sarcastic versions more rapidly (e.g., “Sure is nice and warm in here”; Gibbs, 1986a, Experiment 1). But in two others, participants understood the two versions in an equally rapid amount of time (Gibbs, 1986b, Experiment 1) or took longer for the sarcastic ones (Gibbs, 1986b, Experiment 3). When Giora (1995) reanalyzed Gibbs’s (1986) results, she found that the identical utterances took longer when in ironic contexts, but reported that the same comparison did not reach significance in Gibbs, O’Brien, and Doolittle (1995). We conclude from this that Gibbs’s results have not ruled out the possibility that some aspects of the literal meaning of nonliteral utterances are indeed processed.

Several studies have tested comprehension of identical utterances in ironic versus literal contexts and have found evidence that the literal meaning of ironic utterances is processed. It takes longer to read sentences on a computer screen when these sentences follow an irony-biasing context rather than one that biases the hearer toward the literal meaning (Giora et al., 1998). Processing unfamiliar ironies facilitates the literal meaning instantly and facilitates the nonliteral meaning only 1,000 msec after offset, but not at the cost of suppressing the salient literal meaning. In contrast, familiar ironies facilitate both meanings right after offset (Giora & Fein, 1999a; see also Giora, 1999). And both the literal and ironic meanings of ironies are activated for children (9- to 10-year-olds; Giora & Fein, 1999b).

Consistent with the findings of Giora et al. (1998), we have also shown that it takes longer to process utterances in an irony-biasing than a literal-biasing context (Dews & Winner, 1999). We presented participants with instances of ironic praise and criticism on a computer screen and asked them to press a key as quickly as pos-
sible to indicate whether the speaker was intending to convey something positive or negative. Along with the irony, we presented the identical utterances used literally. Thus, each sentence appeared as both ironic praise and literal criticism, or as ironic criticism and literal praise, but no individual heard the same sentence in both an ironic and a literal context.

If hearers process the literal meaning, then the evaluative tone of the literal meaning should interfere with judging the evaluative tone of the nonliteral (speaker’s) meaning and slow down responses to the ironic utterances. And this is precisely what we found. People took significantly longer to judge ironic criticism as negative (e.g., “Good move” to a person whose has just done something foolish) than to judge the identical utterance used literally as positive (e.g., “Good move” to a person whose has just done something clever). We also found that people took longer to judge ironic praise as positive (e.g., “We never do anything fun” to a companion on a dream vacation) than to judge the identical phrase used literally as negative (e.g., “We never do anything fun” to a roommate who has been studying hard for finals). We argued that these results demonstrate that the positive literal meaning of the ironic utterance conflicts with the negative intended meaning and that the negative literal meaning of the ironic utterance conflicts with the positive intended meaning. This kind of conflict could, of course, occur only if the literal meaning of irony is accessed prior to (or simultaneously with) the nonliteral meaning, and if the literal meaning is retained along with the nonliteral meaning.

In this study, we sought to pinpoint the precise point in the ironic sentence at which the processing is slowed. Studies of metaphor and idiom processing have demonstrated that processing is slowed “online” as the sentence is being read (Blasko & Connine, 1993; Cacciari & Tabossi, 1988; Janus & Bever, 1985). We hypothesized that the slowing effect would be the greatest at the precise point at which the word or words appear that render the utterance ironic rather than literal. We also hypothesized that this slowing effect would carry over into the final phrase of the utterance. Such a finding would be consistent with one of the findings reported by Giora et al. (1998, Experiment 3). These researchers found that after hearing ironic utterances, people responded faster to a literally than an ironically related word when it was presented 1,000 msec after the utterance, indicating that the literal meaning was still more highly activated than the ironic meaning. In contrast, people responded just as quickly to the ironically related word when it was presented 2,000 msec after the utterance, indicating that by this point both meanings were equally activated. These results suggest that it takes a while for the ironic interpretation of irony to consolidate. Hence, we hypothesized that we would be able to detect some slowing of processing even after the key ironic word had been processed: The consolidation of the ironic interpretation should slow processing of the final part of the utterance even if that final part were entirely literal.

We presented participants with ironic utterances following a context of three or four sentences. Ironic utterances were broken into three phrases, and phrases were
presented one at a time. Phrase 1 alone gave no indication of irony; Phrase 2 contained the key word that revealed that the utterance was ironic; Phrase 3 again gave no indication of irony. We hypothesized that both Phrase 2 and 3 would be delayed in the ironic as compared to the literal version, but that the delay in Phrase 3 would be smaller than that in Phrase 2. We refer to this hypothesis as the “spillover” hypothesis, because we are suggesting that the processing of the ironic word(s) spills over and interferes with the processing of literal words that follow immediately after the ironic words.

**METHOD**

**Participants**

Twenty college undergraduates participated in the item development phase of this study as part of a course requirement. Later, 48 college undergraduates, who were paid $10 for their participation, served as the experimental participants. There were 44 female and 4 male participants. This uneven ratio was not intentional, but because we were not investigating sex differences, we did not attempt to rectify this ratio.

**Materials and Procedure**

Forty-eight 3- to 5-sentence stories, each ending in an ironic comment by a character, were first constructed. We refer to these as “ironic” stories and to the final comment as the “target” sentence. Each ironic story was then altered by one phrase so that the target statement was clearly intended literally. In the following example, the irony-biasing and literal-biasing contexts are in italics.

A new professor was hired to teach philosophy. The professor was supposed to be really sharp. When Allen asked several questions, the professor offered naive and ignorant/incipisve and knowledgeable answers. Allen said: That guy is brilliant at answering questions.

(The first italic phrase appeared in the ironic version; the second italic phrase appeared in the literal version.)

Half of the ironic versions ended in ironic criticism, in which a literally positive utterance conveys a critical, negative meaning, as in the aforementioned example. In their literal versions, ironic criticism stories ended in literal praise, in which a literally positive utterance conveys a praising, positive meaning. Thus, Allen criticizes the poor professor (behind his back) in the ironic version by referring to him as brilliant and praises the good professor (again behind his back) in the literal version.
The remaining half of the ironic stories ended in ironic praise. In their literal versions, ironic praise stories ended in literal criticism, in which a literally critical utterance conveys a critical, negative meaning. For example:

Maryellen expected to rough it when she went camping on a remote island off the coast of Maine. When she arrived, she found camping grounds with \textit{running water and hot showers}/\textit{no running water and no showers}. Maryellen said: Life is going to be primitive on this vacation.

Thus, in the ironic version, Maryellen praises the unexpectedly good conditions by calling them primitive and thus conveys a positive evaluation. And in the literal version, she makes a negative evaluation of the bad conditions by calling them, correctly, primitive. (We refer to a positive evaluation as a form of praise, and a negative evaluation as a form of criticism.)

During item development, the 20 participants were asked to read printed copies of the stories and (a) decide whether the final sentence was ironic or literal and (b) underline the word or words in the final sentence that made the final sentence either ironic or literal. Ten of the participants read and responded to one version of each of the 48 stories, whereas the remaining 10 participants read and responded to the other version of the 48 stories. Of the 48 stories read by each participant, 12 ended with ironic praise, 12 with literal criticism, 12 with ironic criticism, and 12 with literal praise. None of the ironies were highly conventionalized. The stories were presented in random order.

In general, participants agreed on whether the final sentences of each story were ironic or literal: At least 90\% agreement was observed for all but 4 of the 48 stories. Similarly, participants agreed on which word(s) indicated whether the final sentence was literal or ironic: At least 90\% agreement was observed for all but 14 of the stories. Both versions of the stories that yielded less than 90\% agreement for either irony judgments or the critical word(s) judgments were revised and then repiloted with a different set of 20 participants. After revision, all of the stories yielded at least 90\% agreement.

Both versions of each of the 48 stories described earlier then served as test stories that were presented one sentence or phrase at a time on a Macintosh Quadra computer. The sentences/phrases appeared centered on the computer screen as black 12-point Times font against a white background. The main body of each story appeared one sentence at a time. The final (target) sentence of each story appeared one phrase or word at a time, such that each final sentence appeared across three consecutively presented phrases. The first phrase appeared before the critical word(s) identifying the intended meaning of the final sentence (i.e., before the word or words identified during item development as making the sentence either ironic or literal). The second phrase ended with the key word(s) identified during item development as indicating that the sentence was either literal or ironic. The third
phrase appeared after the key word(s) and completed the final sentence. Thus, for the ironic criticism example cited earlier, the phrases seen in the ironic version were: That guy/is brilliant/at answering questions. And for the ironic praise example cited earlier, the phrases were: Life/is going to be primitive/on this vacation.

Two versions of a true/false question were also created for each story to assess participants’ comprehension of the intended meaning of the target sentence (e.g., Allen thinks the professor is smart/stupid; Maryellen thinks the camping facilities are good/poor). Comprehension questions were included so that we could eliminate processing time responses to items that participants did not understand.

Four practice stories, ending with one of each of the four final sentence types (i.e., ironic criticism, literal praise, ironic praise, or a literal criticism) were constructed along with 24 distracter stories, consisting of 12 stories ending with literal criticism and 12 stories ending with literal praise. The distracter stories were included along with the test stories so that there were more literal than ironic statements, and so that we would thus more closely approximate the relative frequency of ironic and literal statements in everyday language usage. Both practice and distracter stories were presented as described earlier for test stories. The first four stories participants received were practice stories.

Thus, out of 72 stories (not counting the 4 practice stories), participants were presented with 48 (24 distracters, 24 test stories) ending in literal statements and 24 ending in ironic statements. Even though this ratio of ironic to literal utterances overrepresents the ratio heard in natural speech, participants did hear twice as many literal as ironic statements. Thus, they were unlikely to get into a mode of expecting irony.

A single factor (Target Sentence Type: Ironic Praise, Literal Criticism, Ironic Criticism, and Literal Praise) within-subject design was used. One version of each of the 48 test stories and each of the 24 distracter stories was presented to each participant. Counterbalancing ensured that each version of each story was presented along with each version of each comprehension question equally, often across participants. A random order of story presentation was determined by the computer for each participant.

Participants were tested individually. They were told to press the space bar when they were ready to begin reading each story and “immediately after you have read and understood each sentence or phrase that appears on the screen.” Participants were also instructed to use their preferred hand to press the space bar. Each sentence/phrase remained on the screen until a participant pressed the space bar. When the space bar was pressed, the sentence/phrase appearing on the screen was replaced by the next sentence/phrase in a story. Each story was immediately followed by a true/false question concerning the intended meaning of the final sentence of the story. Each true/false question appeared on the screen along with a prompt for participants to press the “t” key if they thought the statement was true and the “f” key if they thought the statement was false. The correct answer to half of the true/false questions was “true” and for the other half the correct answer was “false.”
PsychLab software was used to present stimuli, record latencies to press the space bar after each of the three phrases of the final sentence of each story, and record accuracy data for the true/false questions (Gum, 1998).

RESULTS

To test the hypothesis that ironic utterances take longer to process than do literal ones, comparisons were restricted to identical statements in irony-biasing versus literal-biasing contexts. Two repeated measures analyses of variance (ANOVAs) were performed. One analysis compared latencies for ironic criticism and literal praise, and the other analysis compared latencies for ironic praise and literal criticism. These two analyses were conducted three times: first for latencies to process the first phrase, which appeared before the key word(s) indicating the intended meaning of the target sentence; second for latencies to process the phrase that ended with the key word(s); and finally for latencies to process the third phrase, which appeared after the key word(s).

Only latency data for stories in which the true/false question was answered correctly were included in analyses. Thirteen participants, who answered fewer than 70% of the true/false questions correctly, were excluded from analyses of the latency data because their low accuracy rates indicated that they did not understand or were not attending to the experimental task. These relatively high error rates probably occurred because participants had to judge nonconventionalized irony given very little context.

Latencies greater than 3,000 msec were considered outliers and were also not included in analyses. Prior to analyses, each participant’s latency data were transformed into $z$ scores to reduce variability (Srinivas, 1995). The $z$ scores were calculated for each participant by subtracting each latency from a participant’s mean latency and dividing the resulting value by the participant’s standard deviation. All reported comparisons include analyses by participant (F1) and item (F2) variability.

Ironic Criticism and Literal Praise

The mean percentages of correct responses to the true/false comprehension questions following stories ending with ironic criticism and literal praise were 84% and 94%, respectively, indicating that both types of utterance were understood most of the time. (These percentages, as well as those following for ironic praise/literal criticism, were calculated after eliminating the 13 individuals who scored less than 70% correct.)

Figure 1 represents mean latencies (in msec) for Phrases 1, 2, and 3 of ironic criticism and literal praise target sentences. As can be seen, participants took about the same amount of time to process the first phrase of the matched ironic ($M = 606,$
SD = 194) and literal comments (M = 612, SD = 180). ANOVAs indicated no reliable difference between these two response times, F1(1, 34) = 0.11, MSE = .12, p < .75; F2(1, 23) = 0.36, MSE = .02, p < .56. Figure 1 also shows longer latencies to process the target phrase when that phrase appeared after an irony-biasing context (M = 653, SD = 244) than when it appeared after a literal-biasing context (M = 609, SD = 200). ANOVAs indicated that this difference was significant, F1(1, 34) = 5.53, MSE = .08, p < .03; F2(1, 23) = 7.62, MSE = .03, p < .02. The longer processing time for the ironic phrase supports Giora’s graded salience hypothesis and is consistent with the view that both the literal and intended meaning of ironic statements are processed.

The spillover hypothesis was not supported. Figure 1 shows that indeed participants took longer to process the final phrase in the irony-biasing context (M = 751, SD = 295) than in the literal-biasing context (M = 714, SD = 272). The analysis by item variability indicated that mean latencies at Phrase 3 were reliably longer when that phrase followed an ironic-biasing rather than a literal-biasing context, F2(1, 23) = 4.95, MSE = .03, p < .04. However, when the analysis was performed by participant variability, the difference did not reach significance, F1(1, 34) = 2.35, MSE = .08, p < .14. Thus, there was no consistent support for the spillover hypothesis that listeners are still processing ironic criticism after the key phrase, which then slows down the processing of the final part of the utterance.

Ironic Praise and Literal Criticism

The mean percentages of correct responses to the true/false comprehension questions following stories ending with ironic praise and literal criticism were 81% and
96%, respectively, indicating that both types of utterance were understood most of the time. Figure 2 represents mean latencies (in msec) for Phrases 1, 2, and 3 of ironic praise and literal criticism.

As shown in Figure 2, participants took longer to process the first phrase in the literal-biasing context ($M = 555, SD = 157$) than in the irony-biasing context ($M = 519, SD = 158$). This difference approached but did not quite reach significance, $F1(1, 34) = 4.16, MSE = .07, p < .05; F2(1, 23) = 4.24, MSE = .03, p < .06$. Because the two phrases being compared were identical, and because they were the first sentences and thus did not differ in preceding context, we cannot explain this effect and suggest that it is possibly spurious. Note also that the longer latencies were for the sentences in the literal contexts. This is the opposite pattern found for the second phrase containing the key word.

As shown in Figure 2, participants took longer to process the ironic ($M = 671, SD = 282$) than the literal ($M = 621, SD = 233$) target phrases. Although this result is consistent with the graded salience hypothesis, the difference in latencies did not reach significance, $F1(1, 34) = 1.99, MSE = .21, p < .17; F2(1, 23) = 1.95, MSE = .07, p < .18$. Despite the fact that the difference between the latency to understand the literal and ironic phrases was about the same for both types of irony, the variability in response times was considerably greater in the case of ironic praise ($SD = 282$) than ironic criticism ($SD = 244$). This may well reflect the fact that ironic praise is a less common form of irony than is ironic criticism.

Again, no support was found for the spillover hypothesis. As shown in Figure 2, there was almost no difference in latencies to process the third phrase in the ironic context ($M = 763, SD = 273$) than in the literal context ($M = 776, SD = 297$). These two latencies did not differ at the level of participant variability, $F1(1, 34) = 0.02,$
However, this difference approached significance at the level of item variability, $F_{2(1, 23)} = 3.06, MSE = .03, p < .10$, and this difference was in the opposite direction from that predicted by the spillover hypothesis.

**DISCUSSION**

This study replicates and extends the results of Dews and Winner (1999) and is consistent with the results reported by Giora et al. (1998). An utterance intended ironically takes longer to process than that same utterance intended literally, if the irony takes the prototypical form of ironic criticism. Although irony in the less typical form of ironic praise also took longer, this difference did not reach significance. We can only speculate here that our failure to demonstrate reliably longer processing time for the atypical form of irony was due to the high variability in response due to the oddity of ironic praise.

The fact that the prototypical form of irony took longer to process than the identical utterances in literal contexts indicates clearly that the literal meaning of the irony must be processed at some level. This result is also consistent with the tinge hypothesis, according to which the underlying message conveyed by irony is muted or tinged by the evaluative tone of the literal meaning.

No support was shown for the spillover hypothesis. Only in the case of ironic criticism, and only when the analysis was performed at the level of item variability, did we demonstrate slower processing time for the phrase following the ironic key phrase. We conclude, thus, that processing of the literal meaning of the ironically intended words slows momentarily the processing of the ironic meaning. However, the consolidation of the ironic meaning does not spill over into the final phrase and disrupt or slow the processing of the literal meaning that follows.

The lack of support for the spillover hypothesis is consistent with studies showing that the literal meaning of metaphors and idioms is processed and completed online during comprehension of the critical word or words (Blasko & Connine, 1993; Cacciari & Tabossi, 1988; Janus & Bever, 1985). In general, then, it seems likely that obligatory processing of the literal meaning of ironic statements occurs during the comprehension of the word(s) critical to the intended meaning of a sentence, with little or no enduring processing costs occurring after comprehension of the critical word(s).

The finding that understanding irony takes longer than understanding literal language shows that to make sense of irony we must recognize (whether consciously or unconsciously) the discrepancy between the evaluation implied by the literal meaning and the evaluation intended (as also argued by Giora, 1995, in her indirect negation view of irony). Hearers who only recognize the intended meaning of an ironic utterance, without noting at some level what was said literally, have not fully understood the irony. Such hearers are not perceiving a difference between an ironic utter-
ance and its literal equivalent. Full understanding of nonliteral language involves, in Olson’s (1988) words, a recognition that the utterance is not just “plain talk” (p. 218). Hence, deriving both the intended meaning and aspects of the literal meaning are obligatory for fully interpreting a speaker’s ironic intent. Irony is not equivalent to its literal paraphrase. If it were, there would be no need to speak ironically, and irony would not be such a ubiquitous linguistic phenomenon.

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