

This is an offprint from:

Dick Schram and Gerard Steen (eds)  
*The Psychology and Sociology of Literature.*  
*In honor of Elrud Ibsch.*

John Benjamins Publishing Company  
Amsterdam/Philadelphia  
2001

(Published as Vol. 35 of the series  
UTRECHT PUBLICATIONS IN GENERAL AND  
COMPARATIVE LITERATURE,  
ISSN 0167-8175)

ISBN 90 272 2224 X (Hb; Eur.) / 1 58811 024 9 (Hb; US)

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## Irony and its discontent

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One of irony's notorious characteristics is its beguiling nature (cf. Booth 1974). When speakers assume a different voice, pretense (Clark and Gerrig 1984; Clark 1996), or some guise (Haiman 1990, 1998), they may mislead even the adult addressee,<sup>1</sup> who may not be able to detect the counterfeit and derive the ironic intent.

The deceitful nature of irony has not been lost on artists and writers, who have manipulated it for various purposes, most notably, the insertion of novel, dissident ideas (Giora in press c; Walker 1991). Irony's indirectness acts as a shield which masks a genuine intent deemed risky by the speaker. Consider the following poem by the Israeli poet, Yona Wallach (1997), which has been taken literally by most readers, but which, in fact, assumes a guise — man's voice, language, and fantasies — to convey subversiveness:

(1) Strawberries<sup>2</sup>

When you come to sleep with me  
wear a black dress  
printed with strawberries  
and hold a basket of strawberries  
and sell me strawberries  
tell me in a sweet light voice  
strawberries strawberries  
who wants strawberries  
don't wear anything under the dress  
afterwards  
strings will lift you up  
invisible or visible  
and lower you  
directly on my prick.

Yona Wallach is one of the most important feminist poets worldwide. Her literary accomplishments rest, among other things, on her ability to integrate the language and topics of women's and men's poetry (Rattok 1997:75). "Strawberries" is

exemplary in this respect. It adopts males' pornographic language in order to protest women's oppression by the self-same language and industry. The disguised protest, however, has escaped the eyes of a lot of Wallach's readers, who took her poetry literally as a celebration of sexuality — a topic that has hitherto dominated men's writings. According to Rattok (1997), however, Wallach is ironic. Her critical intent may not be as obvious in "Strawberries" as it is in the following poem, which portrays a pornographic show:

(2) Tefillin<sup>3</sup>

Come to me  
 don't let me do anything  
 you do it for me  
 do everything for me  
 what I even start doing  
 you do instead of me  
 I'll put on tefillin  
 I'll pray  
 you put on the tefillin for me too  
 bind them with delight on my body  
 rub them hard against me  
 stimulate me everywhere  
 make me swoon with sensation  
 move them over my clitoris  
 tie my waist with them  
 so I'll come quickly  
 play them in me  
 tie my hands and feet  
 do things to me  
 against my will  
 turn me over on my belly  
 and put the tefillin in my mouth  
 bridle reins  
 ride me I am a mare  
 pull my head back  
 till I scream with pain  
 and you're pleased  
 then I'll move them onto your body  
 with unconcealed intention  
 oh how cruel my face will be  
 I'll move them slowly over your body  
 slowly slowly slowly  
 around your neck I'll move them  
 I'll wind them several times around your neck, on one side  
 and on the other I'll tie them to something solid

especially heavy maybe twisting  
 I'll pull and I'll pull  
 till your soul leaves you  
 till I choke you  
 completely with the tefillin  
 that stretch the length of the stage  
 and into the stunned crowd.

In this poem, the speaker is acting out her anger with pornography. At the end of the piece, the speaker strangles her abuser by using the ritual ropes used by men in prayers that exclude women. This poem leaves no doubt as to Wallach's stance: rather than endorsing it, Wallach dissociates herself from the language and practice of oppressive pornography.

Wallach is by no means the only author whose irony has been lost on most of her readers. Resorting to irony has also cost other authors such as Swift (*A Modest Proposal*) and Austin (*Pride and Prejudice*) the price of being misunderstood by their contemporary readers (cf. Booth 1974).

Though these poetic examples may be suggestive as to why literary irony is easy to ignore, misinterpret, or miss, our daily experience with irony seems to suggest the opposite: irony is ubiquitous and much easier to understand than implied by the above examples (see also Gibbs 1994).

## 1. Comprehension

Indeed, one of the most heated debates within linguistics and psycholinguistics is whether irony (or nonliteral language, in general) requires a special (sequential) process (e.g. Grice 1975; Searle 1979), or whether it is interpreted on patterns similar to those induced by literal language (e.g. Gibbs 1986a,b; Giora in press b; Glucksberg 1995; Sperber and Wilson 1986/95: 239).

### 1.1 Processing models

#### *Direct access view*

Researchers attributing to contextual information a primary role in language comprehension assume that literal and nonliteral language involve equivalent processes: in a rich ecology, contextual information affects comprehension very early on so that comprehenders retrieve the contextually appropriate meaning more or less directly, without having to go through an incompatible phase (for a similar view regarding lexical ambiguity see also Vu et al. 1998). This implies that in a literally biasing context (a sunny day), it is only the literal interpretation ("nice weather" of

*What a lovely day for a picnic*) that is recovered; in an irony inducing context (a stormy day), it is only the ironic interpretation (“lousy weather”) that is tapped.<sup>4</sup>

The assumption that context significantly governs comprehension features dominantly in the relevance theoretic account. According to Sperber and Wilson (1986/95), context is not fixed in advance, but is searched for the purpose of rendering an utterance relevant. Utterance interpretation is thus entirely dependent on the contextual information brought to bear. Recruiting the appropriate context results in tapping the contextually appropriate meaning directly without having to go through an incompatible phase which will require revisitation. As a result, processing irony, for instance, an “echoic interpretive use in which the communicator dissociates herself from the opinion echoed with accompanying ridicule or scorn” (Wilson and Sperber 1992:75), need not differ from processing a similar utterance in which the communicator endorses the opinion echoed. Both should be interpreted on similar patterns. While irony involves the speaker’s dissociation from the opinion echoed, literal interpretation involves endorsement of the echo (Sperber and Wilson 1986/95:239). The echoic mention view of irony (Jorgensen et al. 1984; Sperber 1984; Sperber and Wilson 1981, 1986/95; Wilson and Sperber 1992; but see Curc6 2000, submitted; Giora 1997b, 1998a,b; Smith and Wilson 1992; Yus 1998), is thus consistent with a direct access view according to which contextual information affects comprehension to the extent that it prevents activation of irrelevant interpretations.

The processing equivalence hypothesis also underlies the allusional pretense theory (Kumon-Nakamura et al. 1995). According to this view, irony alludes to or reminds the addressee of what should have been — of an expectation or a norm that went wrong (see also Kreuz and Glucksberg 1989). To enable the addressee to appreciate the allusion, irony involves pragmatic insincerity. Positing insincerity allows for various speech-acts beyond assertions to be ironic. For example, when a car driver says *I just love people who signal when turning* when the car ahead of her makes a turn without signaling, the speaker alludes to a social norm to signal upon turning, while simultaneously pretending to compliment the errant driver. Such a view of irony assumes that irony comprehension involves activating the literal meaning of the utterance in order to assess its insincerity and derive the ironic interpretation (see also Glucksberg 1995). It does not, however, assume the precedence of the literal over the nonliteral interpretation, since initial comprehension does not involve an assumption about the speaker’s sincerity. Rather, in any given situation, there is a decision to be made whether the literal meaning is intended sincerely or insincerely. In this way, ironic and literal interpretations involve equivalent processes, resulting in different products, though (Glucksberg, personal communication).

#### *Standard pragmatic model*

In contrast to the processing equivalence assumption, the hypothesis that understanding nonliteral language is a ‘two stage’ process, the first — literal and obligatory, the second — nonliteral and optional, implies that understanding literal and ironic language involve different mechanisms, the latter comprising more complex inferential processes. Thus, while literal interpretation includes no contextually incompatible stage, in understanding irony, the comprehender first computes the contextually incompatible literal interpretation (“nice weather” of *What a lovely day for a picnic*). Since that interpretation is contextually incompatible, it is rejected and replaced by the appropriate meaning (“lousy weather”). This classical processing model, known as “The standard pragmatic model”, originated in Grice (1975) and Searle (1979). The standard pragmatic model assumes that the initial stage of irony comprehension is impervious to context effects (cf. Fodor 1983), involving (a detection of) a breach of a norm, primarily the truthfulness maxim, which is a signal to the addressee to reject the computed literal meaning and derive the ironic intent.

A more recent proposal entitled “relevant inappropriateness” (Attardo 2000) goes beyond the rule violation condition and proposes the breach of contextual appropriateness. While assuming Grice’s relevance maxim for the integration phase, relevant inappropriateness requires that contextual appropriateness be ostensibly violated at the initial phase, so that the comprehender can detect the overt violation and derive the ironic intent. This violation, however, must be only minimally disruptive, though perceivable as disturbing contextual appropriateness. For example, when, in a drought-stricken area, one farmer says to another *Don’t you just love a nice spring rain?* the utterance may be true, yet inappropriate, given the situation of utterance (it is not raining). According to Attardo, violation of contextual appropriateness includes violation of both sincerity and cultural norms or expectations (assumed necessary for irony interpretation by the allusional pretense, see above) and more (for instance deictic inappropriateness).

The joint pretense view (Clark 1996; Clark and Carlson 1982; Clark and Gerrig 1984) is also inspired by the Gricean model (Grice 1978). It assumes a speaker who pretends “to be an injudicious person speaking to an uninitiated audience; the speaker intends the addressee of the irony to discover the pretense and thereby see his or her attitude toward the speaker, the audience, and the utterance” (Clark and Gerrig 1984:12. For a similar view see Boulton as quoted in Booth 1974:105). By saying *What a lovely day for a picnic* on a stormy day, the ironist assumes the identity of another speaker addressing a gullible audience. The present addressee, however, is supposed to take delight in recognizing both the pretense and the intended attitude of ridicule toward the pretending speaker, the audience, and the utterance. According to Clark (1996:368), joint pretense is conceived of as a staged communicative act (see also Kotthoff 1998) where the actual speaker is also an implied speaker performing a sincere communicative act toward an implied

addressee who is also the actual addressee. Both actual participants are intended to “mutually appreciate the salient contrasts between the demonstrated and actual situations”, so that if asked, the actual speaker would deny meaning for the actual addressee what the implied speaker means for the implied addressee.

According to this view, irony is a two-layered act of communication in which the literal meaning is activated and retained by both the speaker and the addressee, who reject it as the intended meaning though they pretend otherwise. Though inspired by Grice (1978), it is not quite clear whether this double-layered approach assumes a sequential or a parallel process.

The possibility that irony involves parallel activation of both the literal and ironic interpretations is also entertained by the tinge hypothesis (Dews et al. 1995; Dews and Winner 1995, 1997, 1999). According to the tinge hypothesis, irony is used to mute the intended negative criticism (for a similar view see Barbe 1995; for a different view see Colston 1997). The positive literal meaning of irony (*That was really funny* said on a mean joke) tinges the addressee’s perception of the intended meaning. Similarly, the negative literal meaning of ironic compliments (*It’s a tough life* said to someone on vacation) mitigates the positively intended meaning. Winner and her colleagues assume that the contextually incompatible, literal meaning of ironic remarks is processed at some level and interferes with the intended meaning. Following Long and Graesser (1988), they propose a dual-process model “in which comprehension may occur after the recognition of an incongruity or simultaneously” (Dews and Winner 1997:405). According to the tinge hypothesis, then, the literal meaning of irony is activated initially, either before or alongside the ironic meaning, and is retained in order to dilute either the criticism or the compliment.

Has any of the approaches gained empirical support? So far, findings have not been monolithic. Some studies support the equivalent processes hypothesis. They show that ironic and nonironic utterances took equally long to read (Gibbs 1986a, b; but see Dews and Winner 1997 and Giora 1995 for a critique of some of the findings), and to involve equal response times to ironically and literally related probes (Giora and Fein 1999a). Others are consistent with the different processes assumption (Dews and Winner 1997, 1999; Giora 1995). They show that utterances took longer to read in ironically than in literally biasing contexts (Gibbs et al. 1995; Giora et al. 1998; Schwoebel et al. 2000), longer to be judged as positive or negative relative to their literal counterparts (Dews and Winner 1997), and to involve longer response times to ironically than to literally related probes (Giora and Fein 1999a; Giora et al. 1998).

## 2. The graded salience hypothesis

Recent research however proposes that the apparently conflicting findings are resolvable in terms of the graded salience hypothesis (Giora and Fein 1999a,b; Giora et al. 1998; Giora 1997a, 1999a,b, in press a). Rather than positing the precedence of contextual information on the one hand (Gibbs 1994; Sperber and Wilson 1986/95; Utsumi 2000; Yus 2000), or the priority of literal meanings on the other (Grice 1975; Searle 1979), the graded salience hypothesis proposes that the factor affecting lexical processing is lexical salience. Lexical salience pertains to privileged meanings — meanings foremost on our mind. A meaning of a word or an expression is salient if it is coded in the mental lexicon. Degree of salience is determined by frequency, conventionality, familiarity, or prototypicality. The more familiar, frequent, conventional, or prototypical a meaning the more salient it is. For instance, both meanings of *bank*, that is, the “financial institution” and the “riverside” meanings, are listed in the mental lexicon. However, for those of us living in urban communities, in which rivers are less common than financial institutions, the commercial sense of bank is more accessible that is, salient; by the same token, the riverside sense is less salient. In contrast, inferences computed on the fly are nonsalient, since they are not coded in the mental lexicon. The claim is that highly salient meanings would always be accessed automatically, irrespective of contextual information. Context has a limited role. It may be predictive and avail appropriate meanings, but it is less effective in blocking salient albeit inappropriate meanings.<sup>5</sup> Rather, it comes into play following the initial access stage, either suppressing or retaining incompatible meanings, or selecting the contextually appropriate sense. For instance, the following joke hinges on the prototypical/salient “male” feature of *rabbi* that gets accessed initially despite the expectation built up by the context (that is the repeated use of the “x is pregnant” construction) and despite contextual misfit:

- (3) What’s the difference between an orthodox, a conservative, and a reform wedding? In an orthodox wedding, the bride’s mother is pregnant. In a conservative wedding, the bride is pregnant. In a reform wedding, the rabbi is pregnant.

According to the graded salience hypothesis, then, interpreting utterances whose multiple interpretations are similarly salient would involve activating these meanings in parallel, irrespective of contextual information. For instance, conventional ironies such as *tell me about it* would involve similar processes in either context. Given that both the ironic interpretation (of the sentence/expression as a whole) and the literal meaning (of the sentence/expression’s constituents) are coded in the mental lexicon, these meanings would be activated in both the literal and irony inducing contexts. In contrast, less familiar ironies such as *what a lovely day for a picnic*, whose literal but not ironic meaning is coded in the lexicon, would involve a sequential process: they would be interpreted literally first and ironically second.

Their literal interpretation, however, would be tapped directly on account of the salience of its constituents. The graded salience hypothesis does not assume that the literal interpretation of the whole statement need to be computed first before the ironic interpretation is derived. It posits, though, that the salient interpretation (for instance the literal meaning of *lovely*) should be activated upon encounter of the linguistic stimulus.

## 2.1 Predictions

The three processing models sketched above have, thus, different predictions regarding irony comprehension.

According to the equivalent processes/direct access view, given a supportive context,

1. an utterance (*what a lovely day for a picnic*) will not take longer to read in an irony than in a literal meaning inducing context;
2. readers would always respond faster to contextually appropriate probes, since they activate only the contextually appropriate meaning. In a literally biasing context (sunny day), only the contextually compatible literal meaning ("nice weather") would be activated. In an ironically biasing context, (a stormy day), this utterance will induce only the contextually compatible ironic meaning ("lousy weather"). Alternatively, if the equivalent processes hypothesis assumes parallel activation of the literal meaning and the attitude (or in/sincerity) invoked, response times to literally and ironically related test words should not differ.
3. these predictions should indifferently hold for familiar and unfamiliar ironies, because it is context rather than salience that primarily governs comprehension.

According to the various versions of the classical model,

1. an utterance will take longer to read in an irony than in a literal meaning inducing context;
2. if measured immediately, even in a highly supportive ironic context, readers would respond faster to literally than to ironically related probes, because they always activate the literal meaning initially. The ironic meaning will lag behind;
3. these predictions should indifferently hold for more and less familiar ironies.

Given that the graded salience hypothesis is concerned with degree of salience and is agnostic with regard to literal and nonliteral language, it predicts that

1. unfamiliar ironies (i.e. utterances whose ironic interpretation derives from ironically biasing contexts) will take longer to read in an irony than in a literal inducing context, since their ironic meaning is not listed in the mental lexicon, while the literal meaning (of their constituents) is. In contrast, familiar ironies (*tell me about it*) will take equally long to read in either context, because they

are coded both ironically and literally. When they are much more salient than their literal equivalents (being as conventional as idioms), they will be processed faster than their literal equivalents;

2. even in a highly supportive, irony inducing context, readers will respond fast to probes related to salient meanings, regardless of contextual information. Regarding less familiar or unfamiliar ironies, this should be true of the literal (or any other conventional) meaning. The ironic meaning will take longer to respond to and will benefit from extra processing time. Similarly, in the literally biasing context, the salient (literal) meaning will be responded to faster than the nonsalient ironic meaning. In contrast, response times to literally and ironically related test words of familiar ironies will not differ. Neither will they benefit from extra processing time.

## 2.2 Findings

The vast array of findings prevalent in the literature is consistent with the salience-based view. It demonstrates that, irrespective of the tools employed to test the hypotheses, salient meanings are always accessed upon encounter, regardless of contextual information or literality.

### Reading times

The most popular measure employed by psycholinguists has been reading times of whole utterances embedded in differently biasing contexts. Most of the tested items are nonconventional ironies.<sup>6</sup> Where such items are tested, evidence demonstrates that less salient language (unfamiliar irony) takes longer to process than more salient (literal) language (whose accessibility hinges on the salience of the constituents that make it up). For instance, unfamiliar ironies (*I'd say women have had real progress*), whose literal meaning is more salient than their ironic meaning, took longer to read in an irony (4a) than in a literal (4b) inducing context (cf. Giora et al. 1998; Giora and Fein 1999a):

- (4) a. Just how far have women risen in the film community?  
According to M. P., who was at Woman in Film luncheon recently in Los Angeles, it has actually been a very good year for women: Demi Moore was sold to Robert Redford for \$1 million in the movie *Indecent Proposal*... Uma Thurman went for \$40,000 to Robert De Niro in the recent movie, *Mad Dog and Glory*. Just three years ago, in *Pretty Woman*, Richard Gere bought Julia Roberts for what was it? \$3,000?  
"I'd say women have had real progress."
- b. Just how far have women risen in the film community?  
According to M. P., who was at Woman in Film luncheon recently in Los Angeles, it has actually been a very good year for women: Demi Moore

earned \$10 million in the movie *Indecent Proposal*... Uma Thurman made \$400,000 in the recent movie, *Mad Dog and Glory*. Just three years ago, in *Pretty Woman*, Julia Roberts earned — what was it? \$130,000? “I’d say women have had real progress.”

Similarly, in Gibbs (1986a), such ironies (*You are a big help*), projecting an attitude of dissociation from what is echoed (5a), took longer to read than their literal equivalents (*Thanks for your help*, 5b), projecting an attitude of endorsement or acknowledgment (cf. Giora 1995 for reinterpretation of Gibbs’ findings):

- (5) a. Harry was building an addition to his house. He was working real hard putting in the foundation. His younger brother was supposed to help. But he never showed up. At the end of a long day, when Harry’s brother finally appeared, Harry said to his brother:  
“You are a big help.”
- b. Greg was having trouble with calculus. He had a big exam coming up and he was in trouble. Fortunately, his roommate tutored him on some of the basics. When they were done, Greg felt he’d learned a lot. “Well” he said to his roommate,  
“Thanks for your help.”

Dews et al. (1995) and Dews and Winner (1997, 1999) used a different methodology. They asked subjects to judge the intended meaning of utterances and recorded their responses. Results showed that less familiar ironies took longer to be judged as positive (*It’s a tough life* said to someone on vacation) or negative (*That was really funny* said on a mean joke) than their literal interpretations. Such findings suggest that the contextually incompatible, literal meaning of less familiar ironies is accessed automatically, and interferes with the process.

In addition Schwoebel et al. (2000), compared reading times of ironic praise (6) and ironic criticism (7) (illustrated by the first phrase in bold) and their literal counterparts (illustrated by the second phrase in bold):

- (6) Ironic praise  
Sam complained to his mother that he had too much homework. He said it would take him the whole weekend. On Saturday morning, he started his work, **and was all done in one hour/by the end of the day he had finished less than half**. His mother said: “Your work load is overwhelming this weekend.”
- (7) Ironic criticism  
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/incisive and knowledgeable answers**. Allen said: “That guy is brilliant at answering questions.”

They found that participants took longer to read the target phrase (*Your work load is overwhelming this weekend*) in the ironically than in the literally biasing context,

though this difference was significant only for the ironic criticism targets and only by item analysis.

That salience rather than literality is a primary factor affecting initial processing is even more evident when reading times of familiar figurative utterances (*This one’s really sharp*) embedded in contexts inviting the salient (metaphoric) meaning (8a) are compared with their reading times in contexts inviting their nonsalient (ironic) meaning (8b):<sup>7</sup>

- (8) a. You are a teacher at an elementary school. You are discussing a new student with your assistant teacher. The student did extremely well on her entrance examinations. You say to your assistant,  
“This one’s really sharp.”
- b. You are a teacher at an elementary school. You are gathering teaching supplies with your assistant teacher. Some of the scissors you have are in really bad shape. You find one pair that won’t cut anything. You say to your assistant,  
“This one’s really sharp.”

As shown in Gibbs (1998), unfamiliar (ironic) targets (8b) took longer to read than their familiar (metaphoric) counterparts (8a; see Giora in press a for a discussion).

Pexman, Ferretti and Katz (2000) present similar findings. In their study, familiar metaphors (*Children are precious gems*) took longer to read in an irony (9c) than in a metaphor (9b) inducing context relative to a neutral control (9a).<sup>8</sup> Though contextual information (knowledge about speakers who are inclined towards nonliteral vs. literal language, e.g. scientist vs. man) speeded up irony processing, it nevertheless did not block salient (metaphoric) albeit contextually inappropriate meanings:

- (9) a. A man was talking to Jodie about his niece and nephew who had visited him recently. During the conversation the man said: “Children are precious gems.” This made Jodie think about her cousins.
- b. A scientist was talking to Jodie about his niece and nephew who had visited him recently. The scientist had really enjoyed having the children around. During the conversation the man said: “Children are precious gems.” This made Jodie think about her cousins.
- c. A scientist was talking to Jodie about his niece and nephew who had visited him recently. The scientist had found the children to be loud and disruptive and had not enjoyed their visit. During the conversation the scientist said: “Children are precious gems.” This made Jodie think of her cousins.

In both studies, the metaphoric reading was the salient reading, whereas the ironic reading was nonsalient (that is entirely dependent on context), and probably involved accessing the salient (metaphoric) meaning first before adjusting it to contextual information.

Findings in Gibbs et al. (1995) may also be explained by the graded salience hypothesis. Gibbs et al. investigated comprehension of intended and unintended (situational) irony (*I would never be involved in any cheating*). An utterance is considered an unintended irony in case it is intended literally but is perceived as ironic by overhearers. In Gibbs et al., intended ironies (10a) took longer to read than their unintended equivalents (10b):

- (10) a. Intended irony  
John and Bill were taking a statistics class together. Before the final exam, they decided to cooperate during the test so they worked out a system so they could secretly share answers. After the exam, John and Bill were really pleased with themselves. They thought they were pretty clever for beating the system. Later that night, a friend happened to ask them if they ever tried to cheat. John and Bill looked at each other and laughed, then John said, "I would never be involved in any cheating."
- b. Unintended irony  
John and Bill were taking a statistics class together. They studied hard together, but John was clearly better prepared than Bill. During the exam, Bill panicked and started to copy answers from John. John did not see Bill do this and so did not know he was actually helping Bill. John took the school's honor code very seriously. Later that night, a friend happened to ask them if they ever tried to cheat. John and Bill looked at each other, then John said, "I would never be involved in any cheating."

Though subjects' reports demonstrate that they perceived the unintended irony and considered it even more ironic than the intended irony, it is possible that their reading times reflect only their comprehension of the salient, literally intended interpretation.

Some studies, however, present faster reading times for less familiar than for familiar language (Gibbs 1986a,b). In Gibbs (1986a), ironies (*You are a big help*, 5a) were faster to read than their intended interpretations (*You are not helping me*, [11]). In Giora (1995), I explained this finding in terms of coherence imbalance. Given the discourse context, the final utterance (*You are not helping me*) is redundant; the alternative, ironic ending (see 5a) is far more informative (on the assumption, of course, that the salient/literal meaning is activated first):

- (11) Harry was building an addition to his house. He was working real hard putting in the foundation. His younger brother was supposed to help. But he never showed up. At the end of a long day, when Harry's brother finally appeared, Harry said to his brother:  
"You are not helping me."

(11) and (5a) are, therefore, incomparable. Similarly, in Gibbs (1986b), targets (*Sure is nice and warm here*) took longer to read and to make a paraphrase judgments in a literally (12) than in an ironically (13) biasing contexts:

- (12) Tony's roommate always kept the windows open in the living room. He did this even if it was freezing out. Tony kept mentioning this to his roommate but to no avail. Once it was open and Tony wanted his roommate to shut it. Tony couldn't believe that his roommate wasn't cold. He said to him,  
[Ironic target] "Sure is nice and warm here".  
[Paraphrase] "Please close the window".
- (13) Martha went over to her sister's house. It was freezing outside and Martha was glad to be inside. She said to her sister, 'your house is very cozy'  
[Literal target] "Sure is nice and warm here".  
[Paraphrase] "This room is warm".

Indeed, in the literally biasing contexts, these targets are redundant, being a sort of reiteration of a previous utterance (e.g. "Your house is very cozy"). In contrast, their ironic counterparts are a lot more informative. It is thus possible that the longer reading times found in Gibbs' studies do not provide for a counter example but were caused by relative incoherence.<sup>9</sup> As for paraphrase judgments, in Giora (1995), I suggest that paraphrase judgments of ironic targets are easier to make, because comprehension of irony involves paraphrasing, that is rephrasing the surface (usually literal) interpretation which provides comprehenders with a ready-made paraphrase that is easier to recognize. This is not true of literal targets.<sup>10</sup>

All other things being equal, then, findings from reading times of whole utterances are better accounted for by the graded salience hypothesis. They show that salient meanings are processed faster than their nonsalient equivalents, regardless of context or literality.

#### Response times

Response times pertain to the time it takes subjects to make a lexical decision as to whether a test word is a word or a nonword. In Giora et al. (1998) and Giora and Fein (1999a), we measured response times to literally and ironically related test words.<sup>11</sup> While unfamiliar ironies have only one salient meaning — the literal meaning, familiar ironies (*Tell me about it*) have also their nonliteral ironic meaning listed in the mental lexicon (see note 6 on how we controlled for salience). According to the graded salience hypothesis, unfamiliar ironies (4a above) should facilitate literally related test words initially while ironically related test words would be facilitated only after a delay. In contrast, familiar ironies (14a below) should facilitate both meanings initially, regardless of context. Indeed, unfamiliar ironies (*I'd say women have had real progress*) facilitated only their literally related test word (e.g. "success") initially (150 msec after offset of the target sentence) in both the literally and ironically biasing contexts. The ironic test word ("regress") lagged behind and was facilitated only 2000 msec after offset of the ironic target sentence. In contrast, familiar ironies (*Tell me about it*) facilitated initially both their literally ("disclosing") and ironically ("known") test words in both types of context:

- (14) a. Ziv visited his friend, Ran, in New York. Ran advised him to use the subway, but Ziv insisted on renting a car. Three days later, Ziv gave up and told Ran: I have had enough. The traffic jam here is incredible. Ran said: "Tell me about it."  
 b. In the middle of the night Royi woke up and started crying. His mother heard him and went up to his room. "What happened?" she asked. Royi said that he had had a nightmarish dream. His mother said: "Tell me about it."

These findings are accountable only by the graded salience hypothesis. They demonstrate that salient meanings are accessed initially, regardless of either context or literality.

### 2.3 Interpretation

As shown earlier, initial access is automatic. It involves activating both contextually compatible and incompatible meanings on account of their salience. While it is plausible to assume that contextually compatible meanings integrate with the sentence or discourse context and contribute to the utterance interpretation, it is not clear whether contextually incompatible meanings are automatically discarded as irrelevant and excluded from the interpretation processes.

### 2.4 Predictions

According to the tinge hypothesis (Dews et al. 1995; Dews and Winner 1995, 1997, 1999), the indirect negation view (Giora 1995, in press a; Giora et al. 1998) and joint pretense view (Clark 1996; Clark and Gerrig 1984), the contextually incompatible literal meaning is functional in irony interpretation. On the tinge hypothesis, it dilutes the criticism or the praise. According to the indirect negation view, it provides for a reference point relative to which the criticized state of affairs is weighed. According to the pretense view, it allows for intimacy, excluding the uninitiated audiences. Setting out from a functional viewpoint, then, these theories assume that the apparently incompatible literal meaning should not be discarded automatically as might be assumed by the standard pragmatic model (Grice 1975).

### 2.5 Findings

In my studies with colleagues we tested this hypothesis. In Giora and Fein (1999a) and Giora et al. (1998), we show that in the ironically biasing context, the literal meaning of both familiar and less familiar ironies is active even after a delay (of 1000–2000 msec). Even two seconds after offset of the ironic target sentence, when the compatible (ironic) meaning becomes available, the level of activation of the literal meaning is not reduced.

Using an offline measure, we show that while utterances embedded in literally biasing contexts (15b) are processed only literally, when embedded in ironically biasing contexts (15a) they retain both their literal and ironic meanings (Giora and Fein 1999b). Having read such passages, participants were able to fill in fragmented words (li-le; s-p) related to both the literal ("little") and ironic ("stop") meanings of the target sentence following the ironically biasing context, while mostly literally related test words following the literally biasing context:

- (15) a. After he has finished eating pizza, falafel, ice-cream, wafers and half of the cream cake his mother had baked for his brother Benjamin's birthday party, Moshe started eating coated peanuts. His mother said to him: "Moshe, I think you should eat something."  
 b. At two o'clock in the afternoon, Moshe started doing his homework and getting prepared for his Bible test. When his mother came home from work at eight p.m., Moshe was still seated at his desk, looking pale. His mother said to him: "Moshe, I think you should eat something."

Further, findings in Winner (1988), Dews et al. (1995), Dews and Winner (1997, 1999) show that critical and complimentary ironies are considered less aggressive/complimenting than their direct, literal alternatives whose criticism and praise are muted (by the literal meaning).

Research of naturally occurring discourse is also consistent with the view that the (salient) literal meaning of (unfamiliar) ironies is retained for further processes. For instance, Giora and Gur (submitted) and Kotthoff (1998, submitted) show that in friendly conversations, interlocutors rejoin the literal meaning of ironic utterances in order to produce humor. According to Kotthoff, this is not the case when unfriendly conversations are at stake, such as those taking place among hostile interlocutors participating in interview shows.

The following (taken from Kotthoff 1998) is an example of concurring with the literal meaning, typical of friendly conversations:

- (16) a. M: Du hasch grad son opulentes Sozialleben.  
 You have been having such an opulent social life lately.  
 b. D: total was los grad, weil ich nämlich initiativ  
 A lot has been going on lately, because I have taken  
 c. geworden bin jetzt.  
 the initiative now.  
 d. M: HAHAHAHAAAA

In this extract, the ironic utterance (16a) is responded to literally, invoking self-irony. Given D's known inclination to the opposite, M's description of D's 'opulent' social life is entirely inappropriate. Recently, however, D was involved in two dinner parties. While concurring with M's literal contribution, D further elaborates on it by presenting 'evidence'. His reference to his 'initiative', which he apparently lacks,



induces laughter. D's response to the literal meaning is instant. He not only processes M's irony, but immediately counters it by topping it, suggesting that the literal meaning is highly accessible and has not been suppressed by the comprehender.

Indeed, the role irony plays in self-protection (Giora 1995, in press c; Groeben and Scheele 1984) is highly dependent on comprehenders both accessing and retaining the literal meaning. While the literal meaning may be highly misleading (cf. Wallach's examples above), it nevertheless helps mask subversive ideas when impunity is imminent. Thus, even when laughing at ourselves, we may still dissociate ourselves from the norms echoed, which we have failed to meet (Kotthoff 2000). Indeed, Kotthoff shows that "female narrators organize their presentations so that other people do not laugh at their expense, but rather at the expense of norms which they mock collectively by laughing at them" (1999: 55).

In all, evidence adduced in the lab as well as in naturally occurring conversations is consistent with the view that contextually inappropriate meanings, activated on account of their salience, are retained in the mind of interlocutors and are utilizable for further processes. Seemingly irrelevant information, then, is not discarded automatically once it may be instrumental.

### 3. Conclusions

Empirical research demonstrates that initial access is automatic, salience sensitive, and impervious to filtering context effects: comprehension of unfamiliar (though commonplace) irony involves accessing the salient (usually, but not always, literal) meaning initially, irrespective of contextual information. The contextually compatible, nonsalient (usually ironic) meaning requires extra processing time for its derivation — it is a post access process affected by contextual information. However, while initial access is automatic, involving both contextually compatible and incompatible meanings, suppression of apparently incompatible meanings is not. Meanings utilizable while constructing the discourse are not discarded automatically even when contextually inappropriate (for instance the literal meaning of irony).

Such processing mechanisms may explain irony's beguiling nature. Under some circumstances, comprehenders may be content with the salient, literal meaning, terminating search for alternative interpretations. This may hold even for poetic texts (cf. Wallach's poems 1–2 above), which tend to invite extra processing (Steen 1994). No wonder irony serves to convey subversive ideas: being processed saliently first, it has the potential of concealing the authentic intent, which may be missed by the uninformed audiences. Ironically, however, the self-same illusive nature may act like a boomerang. Taken at face value, irony may be risky for its initiator who will be penalized for what she said but did not intend (cf. Hutcheon 1994).

### Notes

1. On how children fail to understand irony see Winner (1988), and Giora (1998c) for a review.
2. The poem was originally published in Hebrew in 1983.
3. Tefillin are the phylacteries — a religious prop made of strings with which male Jews bind themselves in their Morning Prayer — a ritual which is denied to women. The English translation is taken from Wallach's (1997). The poem was originally published in Hebrew in 1983.
4. For an interesting view about how irony highlights ironic context see Utsumi (2000).
5. But see Peleg, Giora and Fein (2001) for a more constrained view regarding context effects.
6. Most studies haven't looked into the familiarity/salience factor. In our studies, we controlled for salience by asking native speakers to act as lexicographers and write down the context-less meanings of sentences and phrases that came to mind first. A sentence which received an ironic interpretation by more than half of the tested population was classified as familiar irony (*tell me about it*). Sentences not reaching that threshold (many of which were items used by other researchers such as Gibbs 1986a, Sperber and Wilson 1986/95 and Wilson and Sperber 1992) were classified as unfamiliar ironies (Giora and Fein 1999a). We also used completion of word fragments or word stems out of context to measure salience out of context (cf. Giora and Fein 1999b).
7. The set of metaphors tested is made up of conventional (salient) metaphors (Gibbs, personal communication).
8. In Pexman et al. (2000) degree of salience was established on the basis of norming data.
9. This incoherence, however, is not reflected in the readers' judgements.
10. There was another target, which also exhibited longer reading times and judgments times than the ironic target — the nonsarcastic indirect request: "Why don't you close the window?" However, given the rating study (p. 45), it is not clear whether subjects understood this target as a nonsarcastic question or as a nonsarcastic indirect request. It is quite possible that they understood it as a nonsarcastic question, contextual information being ambiguous between the two alternatives.
11. The studies were conducted in Hebrew.
12. On the role of suppression in figurative language comprehension see Gernsbacher et al. (in press).
13. Surprisingly, however, in the literally biasing context, the salient ironic meaning of familiar ironies was not suppressed after a delay of 1000 msec (Giora and Fein 1999a). It is possible that some meanings are so highly salient, they are difficult to discard.

### References

- Attardo, S. 2000. "Irony as relevant inappropriateness". *Journal of Pragmatics* 32: 793–826.
- Barbe, K. 1995. *Irony in Context*. Amsterdam/Philadelphia: Benjamins.
- Booth, W. 1974. *A Rhetoric of Irony*. Chicago: University of Chicago Press.
- Clark, H.H. 1996. *Using Language*. Cambridge, England: Cambridge University Press.
- Clark, H.H. and Carlson, T.B. 1982. "Hearers and speech acts". *Language* 58: 332–373.
- Clark, H.H. and Gerrig, R. 1984. "On the pretense theory of irony". *Journal of Experimental Psychology: General* 113: 121–126.
- Colston H.L. 1997. "Salting a wound or sugaring a pill: The pragmatic functions of ironic criticism". *Discourse Processes* 23: 25–45.

- Curcú, C. 1998. "Indirect echoes and verbal humor". In *Current Issues in Relevance Theory*, V. Rouchota and A. H. Jucker (eds), 305–325. Amsterdam and Philadelphia: John Benjamins.
- Curcú, C. 2000. "Irony: Negation, echo and metarepresentation". *Lingua* 110: 257–280.
- Curcú, C. in press. *The Pragmatics of Humorous Interpretations: A Relevance-Theoretic Approach*. Amsterdam: Benjamins.
- Dews, S. and Winner, E. 1995. "Muting the meaning: A social function of irony". *Metaphor and Symbolic Activity* 10: 3–19.
- Dews, S. and Winner, E. 1997. "Attributing meaning to deliberately false utterances: The case of irony". In *The Problem of Meaning: Behavioral and Cognitive Perspectives*, C. Mandell and A. McCabe (eds), 377–414. Amsterdam: Elsevier.
- Dews, S. and Winner, E. 1999. "Obligatory processing of the literal and nonliteral meanings of ironic utterances". *Journal of Pragmatics* 31: 1579–1599.
- Dews, S., Kaplan, J. and Winner, E. 1995. "Why not say it directly? The social functions of irony". *Discourse Processes* 19: 347–368.
- Fodor, J. 1983. *The Modularity of Mind*. Cambridge: MIT Press.
- Gernsbacher, M.A., Keysar, B. and Robertson, R.W. In press. "The role of suppression and enhancement in understanding metaphors". *Journal of Memory and Language*.
- Gibbs, R. W. Jr. 1986a. "On the psycholinguistics of sarcasm". *Journal of Experimental Psychology: General* 115: 3–15.
- Gibbs, R. W. Jr. 1986b. "What makes some indirect speech acts conventional?" *Journal of Memory and Language* 25: 181–196.
- Gibbs, R. W. Jr. 1994. *The Poetics of Mind*. Cambridge: Cambridge University Press.
- Gibbs, R. W. Jr. 1998. "Comments on what we have thus far". In *Figurative Language and Thought*, A. Katz, C. Cacciari, R. Gibbs and M. Turner (eds). New York: Oxford University Press.
- Gibbs, R. W. Jr., O'Brien, J. and Doolittle S. 1995. "Inferring meanings that are not intended: Speakers' intentions and irony comprehension". *Discourse Processes* 20: 187–203.
- Giora, R. 1995. "On irony and negation". *Discourse Processes* 19: 239–264.
- Giora, R. 1997a. "Understanding figurative and literal language: The graded salience hypothesis". *Cognitive Linguistics* 7: 183–206.
- Giora, R. 1997b. "Discourse coherence and theory of relevance: Stumbling blocks in search of a unified theory". *Journal of Pragmatics* 27: 17–34.
- Giora, R. 1998a. "Discourse coherence is an independent notion: A reply to Deirdre Wilson". *Journal of Pragmatics* 29: 75–86.
- Giora, R. 1998b. "When is Relevance? On the role of salience in utterance interpretation". *Revista Alicantina de Estudios Ingleses* 11: 85–94.
- Giora, R. 1998c. "Irony". In *Handbook of Pragmatics*, J.-O. Östman, J. Verschueren, J. Blommaert and C. Bulcaen (eds), 1–21. Amsterdam: Benjamins.
- Giora, R. 1999. "On the priority of salient meanings: Studies of literal and figurative language". *Journal of Pragmatics* 31: 919–929.
- Giora, R. In press a. *On our Mind: Salience, Context, and Figurative Language*. New York: Oxford University Press.
- Giora, R. In press b. "Literal vs. figurative language: Different or equal?". *Journal of Pragmatics*.
- Giora, R. In press c. "Masking one's themes: Irony and the politics of indirectness". In *Thematics in Psychology and Literary Studies*, W. van Peer and M.M. Louwerse (eds). Amsterdam: Benjamins.
- Giora, R. and Fein, O. 1999a. "Irony: Context and salience". *Metaphor and Symbol* 14: 241–257.
- Giora, R. and Fein, O. 1999b. "Irony comprehension: The graded salience hypothesis". *Humor* 12: 425–436.
- Giora, R., Fein, O. and Schwartz, T. 1998. "Irony: Graded salience and indirect negation". *Metaphor and Symbol* 13: 83–101.
- Giora, R. and Gur, I. Submitted. "Irony in conversation: Salience and context effects". In *Polysemy*, B. Nerlich (ed.).
- Glucksberg, S. 1995. "Commentary on nonliteral language: Processing and use". *Metaphor and Symbolic Activity* 10: 47–57.
- Grice, P.H. 1975. "Logic and conversation". In *Speech Acts. Syntax and Semantics* Vol. 3, P. Cole and J. Morgan (eds), 41–58. New York: Academic Press.
- Grice, P.H. 1978. "Some further notes on logic and conversation". In *Pragmatics. Syntax and Semantics* Vol. 9, P. Cole and J. Morgan (eds), 113–127. New York: Academic Press.
- Groeben, N. and Scheele, B. 1984. *Produktion und Rezeption von Ironie. Pragmalinguistische Beschreibung und psycholinguistische Erklärungshypothesen*. Tübingen: Günther Narr.
- Haiman, J. 1990. "Sarcasm as theater". *Cognitive Linguistics* 1: 181–203.
- Haiman, J. 1998. *Talk is Cheap: Sarcasm, Alienation, and the Evolution of Language*. Oxford: Oxford University Press.
- Hutcheon, L. 1994. *Irony's Edge: The Theory and Politics of Irony*. London/New York: Routledge.
- Jorgensen, J., Miller, G. A. and Sperber, D. 1984. "Test of the mention theory of irony". *Journal of Experimental Psychology: General* 113: 112–120.
- Kotthoff, H. 1998. "Irony, quotation, and other forms of staged intertextuality: Double or contrastive perspectivation in conversation". In *List Working Paper 5*. University of Konstanz.
- Kotthoff, H. 2000. "Gender and joking: On the complexities of women's image politics in humorous narratives". *Journal of Pragmatics* 32: 55–80.
- Kotthoff, H. Submitted. "Responding to irony in different contexts: Cognition and conversation". *Journal of Pragmatics*.
- Kumon-Nakamura, S., Glucksberg, S. and Brown, M. 1995. "How about another piece of the pie: The allusional pretense theory of discourse irony". *Journal of Experimental Psychology: General* 124: 3–21.
- Kreuz R. and Glucksberg, S. 1989. "How to be sarcastic: The reminder theory of verbal irony". *Journal of Experimental Psychology: General* 118: 347–386.
- Long, D.L. and Graesser, A. 1988. "Wit and humor in discourse processing". *Discourse Processes* 11: 35–60.
- Peleg, O., Giora, R. and Fein, O. 2001. "Salience and context effects: Two are better than one". *Metaphor and Symbol*.
- Pexman P., Ferretti, T. and Katz, A. 2000. "Discourse factors that influence irony detection during on-line reading". *Discourse Processes* 29: 201–222.
- Rattok, L. 1997. *Angel of Fire: The Poetry of Yona Wallach*. Tel Aviv: Hakibbutz Hameuchad (In Hebrew).
- Schwoebel, J., Dews, S., Winner, E. and Srinivas, K. 2000. "Obligatory processing of the literal meaning of ironic utterances: Further evidence". *Metaphor and Symbol* 15: 47–61.
- Searle, J. 1979. *Expression and Meaning*. Cambridge, England: Cambridge University Press.
- Sperber, D. 1984. "Verbal irony: Pretense or echoic mention". *Journal of Experimental Psychology: General* 113: 130–136.
- Smith, N. and Wilson, D. 1992. "Introduction". *Lingua* 87: 1–10.
- Sperber, D. and Wilson, D. 1981. "Irony and the use-mention distinction". In *Radical Pragmatics*, P. Cole (ed.), 295–318. New York: Academic Press.
- Sperber, D. and Wilson, D. 1986/1995. *Relevance: Communication and Cognition*. Oxford: Blackwell.
- Steen, G. 1994. *Understanding Metaphor in Literature*. London: Longman.

- Utsumi, A. 2000. "Verbal irony as implicit display of ironic environment: Distinguishing ironic utterances from nonirony". *Journal of Pragmatics* 12: 1777-1807.
- Vu, H., Kellas, G. and Paul, S.T. 1998. "Sources of sentence constraint in lexical ambiguity resolution". *Memory & Cognition* 26: 979-1001.
- Walker, N. 1991. *Feminist Alternatives*. Jackson and London: University Press of Mississippi.
- Wallach, Y. 1997. *Wild Light*. Translated by L. Zisquit. Riverdale-on-Hudson, New York: The Sheep meadow Press.
- Wilson, D. and Sperber, D. 1992. "On verbal irony". *Lingua* 87: 53-76.
- Winner, E. 1988. *The Point of Words: Children's Understanding of Metaphor and Irony*. Cambridge Mass. London: Harvard University Press.
- Yus, F. 1998. "A decade of relevance theory". *Journal of Pragmatics* 30: 305-345.
- Yus, F. 2000. "On reaching the intended ironic interpretation". *International Journal of Communication* 10: 27-78.

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