

Towards a Formal Semantics of Verbal Irony

Julian J. Schlöder

Institute for Logic, Language and Computation

University of Amsterdam

julian.schloeder@gmail.com

Abstract

This paper presents a formal semantics of verbal irony in assertions. In particular, it makes precise what is meant by the common intuition that an ironic utterance expresses *the opposite* of its literal meaning. We start by considering cases of verbal irony that are marked by a particular prosodic tune in English. We then demonstrate that an extant model for intonational meaning can be extended to capture ironic prosody. Afterwards, we discuss how to expand this semantics to cases of irony that are not marked by prosody.

1 Irony and Prosody

The goal of this paper is to formally model some intuitions about *verbal irony*. We first approach the topic as a problem in the *semantics of intonation* and assign a semantics to one particular prosodic *tune* that appears to mark an utterance as ironic. This semantics in particular specifies how to compute *the opposite* of the literal content of an ironic utterance. We then investigate how this semantics could generalise.

Formalising intonational meaning faces many difficulties. One central problem is that tunes fall on a *spectrum* that resists comprehensive sorting into *discrete* categories. This presents a problem for symbolic approaches in general, as then intonational meaning also resists discretisation (Ladd, 1980; Calhoun, 2007). However, intonation *can* be studied formally by considering clear, exaggerated tunes where the intuitions about the associated meanings are uncontroversial (see e.g. Steedman (2014), Schlöder and Lascarides (2015)).

Empirical data suggests that irony is linked to *prosodic contrasts* (Bryant, 2010). In this paper we will consider one such tune: a *steep fall* fol-

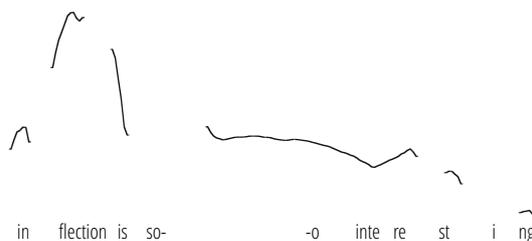


Figure 1: Tune of example 1.

lowed by a *stretched, sustained low pitch*, which robustly leads to ironic readings. We will annotate this tune with a downward arrow \downarrow at the fall. Example (1) with the tune in Fig. 1 is an example of an ironic utterance with this tune (note in particular the stretched vowel in “so”).¹

- (1) a. Inflection is \downarrow so-o interesting.
 \rightsquigarrow *inflection is very uninteresting.*

The significance of prosody with respect to irony can be appreciated by considering a minimal pair where the tune of an utterance makes the difference between acceptance and rejection. (2) is one such case (\nearrow marks a high pitched accent).

- (2) a. A: Are you going to Mike’s show tonight?
b. B: I’ll \nearrow definitely go to that. \rightsquigarrow *will go*
b’. B: I’ll \downarrow de-finitely go to that. \rightsquigarrow *won’t go*

Tune is the only variable that distinguishes (2b) from (2b’). The goal of this paper is to isolate a semantics (in the sense of Ladd’s (1980) *intonational lexicon*) for the tune of (2b’) that makes the right predictions. Note that we are not claiming that the tune in (1) and (2b’) is the *only* tune that marks irony—or that irony requires *any* particular intonation. We return to this in section 4.

2 Irony and Negation

There are many competing explanations of verbal irony, but they—by and large—revolve around a

¹The scene containing (1) can be listened to at <https://www.youtube.com/watch?v=zIavvxoxqvs>

common intuition: that the speaker of an ironic utterance means *the opposite* or *the inverse* of the literal content of their utterance.

On a Gricean account, verbal irony is the flouting of the Maxim of Quality, i.e. the speaker asserts *something recognisably false* and therefore means the opposite; on the *echoic* account an ironic utterance *mentions* a sentence and indicates *dissent* from it (Sperber and Wilson, 1981); on the *joint pretense* account, an ironic utterance invites one's interlocutors to consider a situation in which the utterance would be true and notice how absurd this situation is (Kumon-Nakamura et al., 1995); our own model will follow Martin (1992) in considering irony to be a form of *implicit negation* (also see (Giora, 1995)).

Schlöder and Lascarides (2015) present a formal model of intonation that already goes some way towards a semantics of irony; they assign a semantic term to ironic tunes that expresses *dissent from the literal content of an utterance* and allow this dissent to be strengthened to *assent to the negated utterance*. The predictions of their account are too weak, however. It is not sufficient to just add a negation to the ironic utterance's propositional content. Recall (2b').

(2) b.' B: Yeah, I'll ↓de-finitely go to that.

The negation of the literal content of (2b') is *it is not the case that B will definitely go to the show* which resolves to *B might not go to the show*. The correct reading is however that *B will (definitely) not go*. Giora (1995) can potentially account for this: she makes the *implicit* negations stemming from irony be subject to a preference for *contrary* negation over *contradictory* negation (Horn, 1989, chs. 4–5). This is in particular realised as a preference for narrow over wide scoped negation: *definitely not* is contrary to *definitely*, but *not definitely* is contradictory to *definitely*.

This preference, however, must be formalised to be predictive. One at least has to indicate how to select from the multiple different possibilities to form a contrary negation. In the case of (2b'), at least two such readings are available.

- (3) a. B will definitely not go to Mike's show.
 b. B will definitely go somewhere that is not Mike's show.

Both (3a) and (3b) are contrary to the literal content of (2b'). However, (3b) overstates what B expresses in (2b') because it entails that B will go

somewhere—but this does not seem to be part of the meaning of (2b'). It is unclear what privileges (3a) over (3b) (or other options) if all we have is a general preference for contrariness.

While there might be ways to spell this out, there is another option. The *position of the fall* in the ironic tune we are considering seems to indicate the placement of the negation. For instance, (3b) would be the appropriate interpretation for a third possible answer to (2a).

- (4) a. A: Are you going to Mike's show tonight?
 b." B: Yeah, I'll definitely go to ↓tha-at.

(4b'') is appropriate in a context where there is a salient alternative activity that B could attend and the context moreover suggests that B would prefer this one (e.g. because there is a much better show overlapping with Mike's).

The pattern that the contrary negation is scoped on the word immediately following the fall seems to be robust. Consider some variants of (1).

- (5) a. Inflection is ↓so-o interesting.
 a.' Inflection is so ↓i-interesting.
 a." ↓Infle-ction is so interesting.

One can equally well place the fall before the intensifier or before the predicate to obtain the contrary negation *intensely uninteresting*; (5a'') is felicitous, but gets an additional implicature like in (4b''). However, in (6), placement on 'movie' instead of 'amazing' sounds odd.

- (6) a. A: *Showgirls* is a nice movie.
 b. B: It's an ↓ama-azing movie. ~> *terrible*
 #b.' B: It's an amazing ↓mo-ovie.

We will now model this as follows. We consider the word following the fall to be the prosodic *focus* of the ironic utterance and amend an existing theory for focus to include an implicit negation.

3 Irony and Focus

Geurts and van der Sandt (2004) provide us with a *minimal* theory of prosodic focus. Their *background-presupposition rule* (BPR) states that whenever prosodic focus gives rise to a background $\varphi(x)$, there is a presupposition that $\exists x.\varphi$. In a dynamic model for discourse update, we can specify this as follows (the intended notion of presupposition is van der Sandt's *presupposition as anaphora* model (van der Sandt, 1992)).

Background-Presupposition Rule.

The focus placement separates an utterance into a

foreground f and a background $\varphi(x)$. The variable x occurs freely in the formula φ , and the constituent f is of the type required by x . Write $\langle f, \varphi(x) \rangle$ for a foreground–background pair.

Updating a discourse with $\langle f, \varphi(x) \rangle$ is to update with the *proffered* content $(\lambda x.\varphi)(f)$ and the *presupposed* content $\exists x.\varphi$.

This rule is *minimal* in the sense that other models for focus make *at least* the predictions of the BPR. Two prominent models are the QUD model (Roberts, 2012) and Alternative Semantics (Rooth, 1992); the former stipulates that $\langle f, \varphi(x) \rangle$ presupposes the wh-question $? \lambda x.\varphi$ and the latter that $\langle f, \varphi(x) \rangle$ raises the set of alternatives $\{x \mid \varphi(x)\}$. Under the reasonable assumptions that wh-questions presuppose that there is a true answer, and that sets of alternatives are not empty, both models include the BPR.² Thus, for instance, the discourse in (7) is treated as follows.

- (7) a. A: Who does Rachel like?
 presupposes: *Rachel likes someone.*
 b. B: Rachel likes Michael.
 presupposes: *Rachel likes someone.*

In this case, the presupposition of (7b) is bound to the presupposition of A’s question (7a). In contrast, there are cases where the presupposition effected by the BPR is accommodated.

- (8) a. A: Does Rachel like anyone?
 b. B: Rachel likes Michael.
 presupposes: *Rachel likes someone.*

In (8) the presupposition of (8b) cannot be bound and must be accommodated; the contribution of B’s utterance can be paraphrased as *Rachel does like someone—specifically, she likes Michael*.

However, while the BPR models (prosodic) *focus*, it is not sensitive to the overall *tune* of an utterance. The tune can potentially affect the content of both the foreground and the background; see (Beaver and Clark, 2009, p. 47) for a discussion in the context of Alternative Semantics.

Thus, it is not surprising that we need to make amendments to the BPR when attempting to model ironic intonation. Schlöder and Lascarides (ms) argue that fall-rise tunes work by placing an implicit negation in the background. Here, we adapt the BPR to include an implicit negation in the *foreground*. This negation is placed to result in a *contrary reading*.

²Some (e.g. Dryer (1996)) have challenged the idea that focus is directly related to presupposition; Geurts and van der Sandt offer responses that we cannot repeat or evaluate here.

Irony Rule.

If an utterance is intonated with the ironic tune, and the fall is immediately preceding the constituent f then the foreground–background pair of the utterance is $\langle \sim f, \varphi(x) \rangle$ where: (i) $\varphi(x)$ is the background resulting from considering f the foreground of the utterance and (ii) \sim is a meta-operator³ that specifies *contrary negation*:

- if f is a modal or quantifier, $\sim f$ is $f \neg$.
- if f is on a scale, $\sim f$ is an item from the opposite end of the scale;
- if f is a bivalent predicate, then $\sim f$ is $\neg f$;
- if f is an entity, then $\sim f$ is a meta-variable such that for any predicate P , $P(\sim f) = \sim P(f)$.

That is, updating a discourse with this utterance is to update (by usual methods) with the presupposition $\exists x.\varphi$ and the proffer $(\lambda x.\varphi)(\sim f)$.

This rule can be regimented in SDRT (Asher and Lascarides, 2003) with an appropriate semantics for presuppositions (Asher and Lascarides, 1998).

The Irony Rule models some of the examples we have seen so far as follows. Consider first (6b):

- (6) a. A: *Showgirls* is a nice movie.
 b. B: Yeah, it’s an \downarrow ama-zing movie.
 presupp: $\exists x_{predicate}.x(s) \wedge movie(s)$
 proffers: $\sim amazing(s) \wedge movie(s)$
 $\equiv terrible(s) \wedge movie(s)$

The presupposition of (6b) indicates that B’s utterance matches the current topic of the discussion, i.e. the properties of *Showgirls*. Roberts (2012) provides an account of what the current topic is and what it means to match it; this too can be regimented in the present model (Schlöder and Lascarides, ms) and we will not go into the details here. Then, the Irony Rule modifies what B is taken to proffer by adding a *contrary* negation.

By specifying the relative scope of the contrary negation \sim we avoid ambiguities. We show this for (2b’) and (4b’): (In the logical forms we simplify or ignore a number of ancillary details, including tense, possessive case, and the presuppositions associated with proper names.)

- (2) a. A: Are you going to Mike’s show tonight?
 presupp: $\exists s.of(m, s) \wedge show(s)$
 proffers: $?go(b, s)$
 b.’ B: Yeah, I’ll \downarrow de-finitely go to that.
 presupp: $\exists x_{aux}.x(go(b, s))$
 proffers: $\sim \square go(b, s) \equiv \square \neg go(b, s)$

³That is, it is an operator on logical forms; its application is computed when logical form is constructed.

(4) b." B: Yeah, I'll definitely go to ↓tha-at.

presupp: $\exists x_{entity}.\Box go(b, x)$

proffers: $\Box go(b, \sim s) \equiv \Box \neg go(b, s)$

Thus, the proffered contents of (2b') and (4b'') are the same: both are—by way of irony—negative answers to A's question in (2a). But while in (2b') the presupposition effected by the Irony Rule is a tautology (because for any p there is a modality ∇ such that ∇p), the presupposition of (4b'') entails that B is going somewhere—just not to Mike's show. This is precisely the difference between the two competing contrary negations in (3).

Overall, the placement of the steep fall in the tune we are considering here appears to be quite flexible, and the Irony Rule predicts this. Similarly to (2) and (4), the utterances in (5) are all assigned the same proffered content, but the presupposition varies in (5a''). The anomalous (6b') on the other hand is assigned the absurd interpretation that *Showgirls is not a movie*.

(6) #b.' B: It's an amazing ↓mo-ovie.

presupp: $\exists x_{predicate}.\text{amazing}(s) \wedge x(s)$

proffers: $\text{amazing}(s) \wedge \sim \text{movie}(s)$

$\equiv \text{amazing}(s) \wedge \neg \text{movie}(s)$

4 Beyond Intonation

As said, we do not claim that every ironic utterance must carry a particular tune. The following is an example by Cutler (1977) for irony that is not marked by prosody.

(9) *Upon entering a restaurant devoid of custom.*

a. A: Looks like a really popular place.

In cases like (9) it is the salient contrast between what is said and what is actually the case that leads us to an ironic interpretation. Cutler does not provide a tune to go with the utterance, but it seems to us that (10a) would be natural, and moreover that one *can* use ironic intonation as in (10b).

(10) a. A: Looks like a ↗really popular place.

b. A: Looks like a ↓rea-ally popular place.

Now note that the Irony Rule makes the correct prediction for (10b). With this in mind, there does not seem to be anything that would stop us from saying that we use the Irony Rule instead of the BPR in *any* situation where an utterance is ironic. That is, we generalise the Irony Rule to also capture utterances like (10a), and take the foreground f to be the focus of the utterance.⁴

⁴There seems to be a tacit consensus that *every* assertion has a focus; McNally (1998) spells this out.

Similar extensions could be made to cases of *written* verbal irony, e.g. as marked by scare quotes. (11) is cited from Predelli (2003).

(11) a. this remarkable piece of 'art' consists of
a large canvas covered with mud (...)

Again, applying the Irony Rule to (11a) under $f = \text{art}$ makes the correct predictions here. Similar things can be said about written irony marked by some form of irony punctuation.

However, one needs to spell out such extensions of the Irony Rule with great care. Not every false utterance is ironic, and neither is every instance of scare-quoting (Predelli, 2003). There are many potential cues that speakers can employ to signal irony, including intonation, facial expression, gesture, hyperbole *etc.*—and then irony is still frequently misunderstood (Cutler, 1974; Kreuz and Roberts, 1995; Bryant and Fox Tree, 2005). We cannot offer a formalisation of all these cues here.

Then there are still cases of irony where it takes the form of playful mockery instead of the implicit assertion of a negative. Wilson (2006) demonstrates this with (12a,b), said to a very careful driver that always makes sure the tank is filled; the utterances mock this behaviour ironically.⁵

(12) a. A: Do you think we should stop for petrol?

b. A: I really appreciate cautious drivers.

(12a) is no assertion, and it does not seem to be the case that (12b) means that A dislikes (contrary to *appreciate*) cautious drivers. Thus, the cases in (12) go beyond what our Irony Rule captures.

5 Conclusion

We have given a fully formal model for verbal irony, insofar as irony is understood as meaning the opposite of what one has asserted literally. The contribution of the model is in particular to make formally precise what we mean by 'the opposite'. The model starts out as a model of ironic intonation and embeds seamlessly into an extant model of intonation in discourse, but it stands to reason that it may extend to ironic assertions that are not specifically marked by intonation.

⁵A reviewer points out that there is also pragmatic irony: *Thanks for holding the door* after a door has *not* been held. The Irony Rule can potentially explain this; it yields *thanks for not holding the door*. This is a proffer that fulfills preparatory conditions for thanking, so we can continue with standard pragmatic reasoning. Note that one can *explicitly* utter *thanks for not holding the door* to make, by and large, the same speech act as an ironic *thanks for holding the door*.

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