Diana Mazzarella* and Nausicaa Pouscoulous

Ironic speakers, vigilant hearers

https://doi.org/10.1515/ip-2023-2001

Abstract: Verbal irony characteristically involves the expression of a derogatory, dissociative attitude. The ironical speaker is not only stating a blatant falsehood or irrelevant proposition; she is also communicating her stance towards its epistemic status. The centrality of attitude recognition in irony understanding opens up the question of which cognitive abilities make it possible. Drawing on Wilson (2009), we provide a full-fledged account of the role of epistemic vigilance in irony understanding and suggest that it relies on the exercise of first- and second-order vigilance towards the content, the ironic speaker as well as the source of the irony.

Keywords: attitude; developmental pragmatics; epistemic vigilance; irony; source monitoring

1 Introduction

There is a widespread consensus among philosophers of language and linguists that verbal irony involves attitude expression. This observation goes back to H. Paul Grice, who acknowledged that "irony is intimately connected with the expression of a feeling, attitude or evaluation. I cannot say something ironically unless what I say is intended to reflect a hostile or derogatory judgment or a feeling such as indignation or contempt" (Grice 1978/1989: 53–54). While the precise characterization of the ironical attitude is still the object of debate, theorists agree on its centrality in accounting for the nature and communicative function of verbal irony.

To illustrate this, let us consider the following example. Diana has advised Nausicaa and Richard to try the new vegetarian restaurant close to the university campus. After a very disappointing main course, Nausicaa tells Richard "The food is really succulent!" While it is clear that Nausicaa believes the opposite of what she literally says, conveying this belief is arguably not her primary intention. First, if Nausicaa assumed Richard to know already that she believes the food to be disappointing (and to share this belief), her statement would be uninformative. Second, if she primarily wanted to communicate that she dislikes the food, her

***Corresponding author: Diana Mazzarella**, University of Neuchâtel, Neuchâtel, Switzerland, E-mail: diana.mazzarella@unine.ch
Nausicaa Pouscoulous, University College London, London, UK

utterance would be unnecessarily indirect (see Sperber and Wilson 1981: 300–301). What is Nausicaa's primary intention then?

According to the Echoic account of verbal irony (Sperber and Wilson 1981; Wilson and Sperber 2012), an ironical speaker intends to communicate a derogatory attitude towards a thought that is *echoed* by the proposition literally expressed by the utterance (e.g., *The food was really succulent*) and that is attributed to a source other than the speaker herself at the present time (e.g., to Diana). In the example, the ironical statement echoes the thoughts expressed by Diana's appreciative remarks about the restaurant, from which Nausicaa intends to dissociate herself as she finds them ludicrously false. Interestingly, though, irony does not always require stating the opposite of what one believes. For instance, after their dissatisfying lunch, Nausicaa could ironically ask Richard: "Did you remember to get their business card? " In these circumstances, the question is blatantly irrelevant. The speaker could thus utter it to express a dissociative attitude towards her previous expectation that the lunch would be memorable, and the restaurant worth being considered for future occasions. Crucially, according to the Echoic account of verbal irony, in both cases, the speaker echoes a thought that she considers blatantly false or ludicrously irrelevant as a means to make her attitude towards it mutually manifest among the interlocutors.

According to the Pretense account of verbal irony (Clark and Gerrig 1984), the ironical speaker pretends to be someone sincerely uttering the statement at issue (e.g., "The food is really succulent!") in order to convey a derogatory attitude towards the people who might express such an idea or accept it (e.g., Diana), and towards the statement itself. The ironical attitude is thus taken to target people and utterances, not propositions: it addresses the pretended speaker, the pretended audience and the pretended statement. In the example, the addressee, Richard, is meant to recognize the pretense and enjoy the sense of complicity with Nausicaa that can arise from this recognition.

Attitude expression thus appears to be a key element of verbal irony across the Echoic and the Pretense accounts. For our purposes, we will ignore the differences between the two and focus on the uncontested claims that ironical statements are primarily meant to convey an attitude and that this attitude is derogatory in nature. Importantly, the attitude expressed by verbal irony is communicated in an implicit way. When uttering "The food was really succulent!" Nausicaa invites Richard to *infer* that she intends to express a dissociative attitude. She could convey the same attitude explicitly, e.g., by stating "It was silly of us to expect that the food would be succulent. Diana is known for her poor taste!" Clearly, though, this utterance would not be considered as a case of verbal irony. Irony requires the attitude to be implicit. Furthermore, as Sperber and Wilson (1986/1995: 239) maintain, "[t]he attitude expressed by an ironical utterance is invariably of the rejecting or disapproving

kind". Ironical statements may implicitly communicate an entire range of dissociative attitudes and emotions, and fall on a continuum with other attributive uses of language:

> Dissociative attitudes themselves vary quite widely, falling anywhere on a spectrum from amused tolerance through various shades of resignation or disappointment to contempt, disgust, outrage or scorn. The attitudes characteristic of verbal irony are generally seen as coming from the milder, or more controlled, part of the range. However, there may be no sharp cut off point between dissociative attitudes that are clearly ironical and those that are not. (Wilson 2009: 20–21)

Recent developments in pragmatic theory on the place of non-propositional effects in interpretation have further contributed to a more fine-grained characterization of the ironical attitude. In particular, Yus (2016) distinguishes between the dissociative propositional attitude and the affective attitude, that is, the speaker's feelings and emotions associated with the thought echoed by the ironical statement. According to Yus, the correct appreciation of the affective attitude expressed by the speaker supports the interpretation of the ironical statement by qualifying it as intended to be perceived as critical, offensive, praising or humorous. Crucially for our purposes, though, whatever interactional function verbal irony is intended to achieve, this is always obtained by means of dissociation. We can thus clarify a widespread misunderstanding in the literature on irony, which has arguably conflated the ironical attitude, on the one hand, and the interactional function of the ironical statement (e.g., criticism vs. compliments), on the other hand. Indeed, it is often assumed that the ironical speaker "intend[s] to convey an attitude that is of opposite valence to the meaning of the words spoken" (Nicholson et al. 2013: 1). As a result, a distinction is drawn between ironical criticisms ("The food is really succulent!"), which would express a *negative* attitude by saying something positive, and ironical compliments ("The food is really tasteless!"), which would express a *positive* attitude by saying something negative.[1] This distinction – rooted in the valence of the linguistic statement – should not lead us to overlook the distinctiveness of the ironical attitude across all its manifestations: irony is essentially dissociative. Whether the speaker is dissociating herself from the thought or hope that the food would be delicious, thus criticizing the quality of the food (and the doubtful taste of whoever appreciates it), or whether the speaker is distancing herself from the thought or fear that it would be tasteless, thus praising the quality of the food (and the culinary skills

1 The Echoic account of verbal irony, and we tend to concur, conceives of "ironical praises" (e.g., "The food is really tasteless!") as genuine cases of irony only when the utterance can be interpreted as echoing a previous thought or expectation (e.g., in a situation in which the person that cooked the food had warned the guests about her poor culinary skills).

of the cook), in both cases the attitude expressed pertains to the dissociative range (see also Garmendia 2018: §5.2).

Given the centrality of this dissociative attitude in pragmatic theories of verbal irony, this paper aims to explore the question of what makes attitude recognition and irony understanding possible from a cognitive perspective. The paper is organized as follows. In Section 2, we outline the available experimental evidence in support of the view that irony is closely linked to attitude expression and recognition. In Section 3, we address the question of which cognitive abilities are required for understanding irony and discuss the established correlation between success in second-order Theory of Mind tasks and irony understanding. Finally, in Section 4, we develop Wilson's (2009) proposal that irony understanding ultimately depends on the exercise of a capacity for epistemic vigilance and provide a full-fledged account of the distinctive contributions of first- and second-order vigilance to distinguish verbal irony from lies or mistakes, as well as to recognize the dissociative stance conveyed by the ironical speaker.

2 The ironical attitude: Experimental evidence

The claim that irony understanding involves attitude ascription has received indirect support from several experimental studies. The first set of relevant studies concerns the investigation of the role of speaker characteristics in facilitating irony understanding (for a review, see Pexman 2005). If irony understanding depends on attitude recognition, one should expect that speaker characteristics that are stereotypically linked to the expression of dissociative (mocking or scornful) attitudes should make participants more inclined to interpret the speaker's utterance as ironical. Would you be more inclined to take Nausicaa's comment "The food is really succulent!" as ironical if you knew that she was a comedian or a scientist? Since the seminal work of Katz and Pexman (1997), a growing body of literature indicates that speaker attributes, presented as traits of the speaker (e.g., having a reputation for being frank/being a jokester) or inferred from social categories (e.g., speaker occupation), are used as cues to communicative intent. For instance, Katz and Pexman (1997) showed that participants consistently judged occupations as being linked to the tendency of using either ironical or metaphorical statements. Furthermore, they showed that target statements uttered by members of high-irony occupations (e.g., comedian) were perceived to be more sarcastic than the same statements produced by members of high-metaphor occupations (e.g., English professor) and that the former speakers were judged as more mocking than the latter. In line with this, Pexman and Olineck (2002) showed that the effect of speaker occupation is stronger when the context is not biasing towards a literal or ironical interpretation of

the target statements, thus suggesting that social information plays a crucial role in the absence of other cues of speaker intent (e.g., contextual incongruity). Furthermore, the attribution of specific traits, such as personality traits, appears to modulate the understanding and processing of irony. For instance, Pexman et al. (2006) showed that 5- to 8-year-olds' understanding of irony was influenced by whether the speaker was described as "nice" or "mean". Specifically, in the case of so-called ironical criticisms, comprehension accuracy was higher for "mean" speakers than for "nice" ones, but the opposite was true in the case of ironical compliments. Interestingly, several studies employing online comprehension measures revealed that the processing of irony is affected by speaker characteristics well beyond childhood (for a discussion, see Katz et al. 2004). For instance, the ERP study by Regel et al. (2010) showed that the speaker communicative style (operationalized as their past use of distinct proportions of ironical vs. literal statements) can affect language processing as early as 200 ms. Moreover, there is evidence that factors such as speaker gender and age modulate the reading times of ironical statements. In Jared and Pandolfo (2021), for instance, first-pass reading times of ironical statements in young adults were faster when the speaker was a peer than when the speaker was an older adult. This body of work indicates that social information plays an important role in understanding and processing verbal irony, thus pointing to the relevance of speaker identity to infer ironical intent. This conclusion fits well with the idea that irony cannot be reduced to saying the opposite of what one means, but fundamentally involves the expression of the speaker's attitude. The extent to which socio-cultural stereotypes align with the expression of a dissociative attitude in a given context should thus facilitate (or impede) irony understanding.

The second set of studies providing indirect support to the thesis that irony involves a dissociative attitude includes those experiments that manipulated the presence/absence of an antecedent whose content the ironical speaker dissociates from (e.g., a previous statement, an explicit norm, etc.). The seminal work of Jorgensen et al. (1984) showed that participants were more likely to perceive a statement that is incongruent with the context as ironical if this was preceded by an antecedent. For instance, they were more likely to perceive the statement "We are definitely lost!" uttered by a speaker who found her way around if this was preceded by the statement "We are getting lost!" earlier in the story. In line with this finding, Gibbs (1986) demonstrated that the ease of processing and recall for ironical statements depends on the presence of an antecedent in the story contexts (see also Kreuz and Glucksberg 1989; Turcan and Filik 2017). Similarly, the presence of the antecedent appears to enhance irony comprehension in children, especially in the absence of other cues, such as prosody (Keenan and Quigley 1999). Drawing on these results, it can be argued that irony understanding is supported whenever the context makes the thought or the source with which the ironical speaker disagrees more

salient. This, in turn, is likely to facilitate the recognition that the speaker intends to convey some kind of disapproval via their statement.

In sum, consistently with linguistic accounts, the available empirical data point to the centrality of attitude expression and recognition in verbal irony. In what follows, we argue that an adequate account of the cognitive requirements for irony understanding should address the question of which socio-cognitive skills are involved in attributing *implicitly dissociative* attitudes.

3 The cognitive requirements for verbal irony

The last two decades have seen flourishing literature on the question of which cognitive capacities make irony understanding possible. This question has been tackled via distinct, and complementary, perspectives: clinical, neuropsychological, as well as developmental. This broad literature converges on some cognitive requirements, among which Theory of Mind appears to play a crucial role. Theory of Mind (ToM) is the capacity to predict and explain behaviours by attributing relevant mental states (beliefs, intentions, desires). Since Happé (1993), research in clinical pragmatics has repeatedly shown that individuals with impairments in higher-order ToM (such as, understanding beliefs about beliefs) display systematic difficulties in understanding irony (but, see, e.g., Panzeri et al. 2020). This holds notably for individuals with autism spectrum disorder (Martin and McDonald 2004), schizophrenia (Langdon et al. 2002; Li et al. 2017), and acquired brain injuries (for a review, see Rowley et al. 2017). Furthermore, neuropsychological data reveal that the ToM neural network, which includes the right and left temporal parietal junction, the medial prefrontal cortex and the precuneus, is activated during the processing of irony (Spotorno et al. 2012).[2] Finally, from a developmental perspective, several studies confirm that the development of irony understanding goes hand in hand with the emergence of higher-order ToM skills. For instance, Filippova and Astington's (2008) study with 5-, 7- and 9-year-olds reported a large correlation between success in a second-order false belief task and irony understanding, and second-order false belief task was found to be a significant predictor even when age, memory, attunement to prosody and receptive vocabulary were controlled for.

2 While Spotorno et al. (2012) revealed an extensive activation of the ToM neural network during irony processing, previous literature reported mixed findings (see, e.g., Rapp et al. 2010; Shibata et al. 2010; Uchiyama et al. 2006, 2012; Wakusawa et al. 2007). As Spotorno and colleagues discuss at length, this is arguably due to some methodological limitations of previous fMRI studies, including (i) lack of contextual support for the ironical interpretation, (ii) high predictability of the ironical statements (which may have led to short-circuited mentalizing), and (iii) absence of a direct comparison between ironical and literal statements (for a discussion, see Spotorno et al. 2012: 26–27).

As with any correlational data, the established correlation between irony understanding and second-order ToM requires interpretation: why would success on a given ToM task (often, second-order false-belief attribution) be correlated with irony understanding? As Matthews et al. (2018: 7) have pointed out, "[t]o date, the vast majority of research has focused on false-belief understanding. Yet, for many pragmatic tasks it is not always clear why this would be called upon". When it comes to irony and success in second-order false belief attribution, a few alternative explanations have been presented.

Early accounts, such as Winner and Leekam (1991), argued for an explanation based on the structural similarity in terms of metarepresentational requirements. That is, they suggested that second-order intentions and second-order beliefs are structurally similar as they concern intentions or beliefs about someone else's beliefs. Understanding second-order intentions involves judging the speaker's intention to affect someone's belief, and irony requires understanding that the speaker intends the addressee to know that the proposition literally expressed is false (e.g., understanding that when Nausicaa utters "The food is really succulent!" she wants Richard to know that the food is tasteless). According to Winner and Leekam (1991), the capacity to attribute second-order intentions allows the addressee to discriminate irony from (white) lies, the latter requiring the understanding that the speaker does not want the addressee to know that the proposition literally expressed is false. For instance, if Nausicaa was trying to be polite with Diana, she could insincerely utter "The food was really succulent!", intending Diana not to know that the food was actually tasteless.

In a similar vein, Sullivan et al. (1995) suggested that understanding irony requires the attribution of second-order knowledge since it involves recognizing that the speaker knows that the listener knows the truth. When telling Richard that "The food is really succulent!", Nausicaa knows that he knows that the food is tasteless.[3] In contrast with this, to recognize a (failed) lie, one needs to attribute second-order ignorance to the speaker: the speaker does not know that the listener knows, thus explaining her intention to deceive.

Crucially, these proposals focus on the role of second-order attributions of intentions or knowledge as a requirement to distinguish between verbal irony and deception, as both typically involve the intentional expression of a literal falsehood. This opens up the question, though, of why other figurative uses of language that also

3 It is worth noting that while many instances of verbal irony involve the speaker's second-order knowledge, this does not seem to be a necessary requirement. Verbal irony can be expressed, and recognized, even in the absence of second-order knowledge. Nausicaa could ironically utter "The food was really succulent!" to Diana, who strongly believes that the food served at the restaurant is very good. If helped by further extra linguistic cues (tone of voice, facial expression), Diana could recognize the dissociative attitude implicitly expressed via the statement.

involve expressing a literal falsehood do not correlate with second-order ToM (Happé 1993). Like verbal irony, metaphor often relies on literally false statements. In a broadly Gricean view, for instance, irony and metaphor involve flouting of the maxim of Quality ("Do not say what you believe to be false"). In both cases, the overt violation triggers the recovery of the intended figurative meaning. Nausicaa could utter a blatantly false metaphorical statement like "The restaurant was a trap," knowing that Richard knows that the restaurant is not an enclosure designed to catch animals, and without wanting him to form such a belief. Thus, the reason why irony understanding, but not metaphor comprehension, should correlate with success in second-order ToM tasks is not clear.[4]

Further accounts have tried to explain the correlation between irony understanding and success in second-order ToM tasks by appealing to features of verbal irony that make it distinct from other figurative uses of language. For instance, drawing on the Echoic account of verbal irony, Happé (1993) suggested that it is the attributive nature of verbal irony – that is, the fact that it involves a thought about an attributed thought (Nausicaa's thought about the thought that the food is really succulent, which is attributed to Diana) – that allows us to make sense of it going hand in hand with success in second-order false belief tasks. This feature, which irony shares with attributive uses of language, such as free indirect reports, crucially distinguishes it from other figurative uses of language, such as metaphor, as the former but not the latter convey a thought that is implicitly attributed to someone else rather than the speaker at the present time. As a result, it is to be expected that irony, but not metaphor, correlates with second-order false belief attribution.

Despite their important differences, all the proposals described so far have something in common: they attempt to explain the correlation between irony understanding and second-order belief or ignorance tasks by appealing to the intuitive idea that they both rely, in one way or another, on the exercise of second-order ToM. This classical mindreading explanation is widely accepted in the pragmatics and psychology literature. However, this explanation is unsatisfactory for two main reasons. First, it includes no more than hand-waving to a structural similarity based on orders of metarepresentation involving epistemic and/or intentional mental states. Second, it does not provide us with any insights on the actual interpretative process through which addressees get to the ironical interpretation.

In her 2009 paper "Irony and metarepresentation," Deirdre Wilson put forth a new proposal on how to think of the correlation between irony understanding and

4 This difference is predicted by post-Gricean pragmatic accounts, like Relevance theory, which conceive of metaphor as a case of loose use of language, involving a process of lexical modulation (see e.g., Wilson and Carston 2007).

success in second-order false belief tasks. According to Wilson (2009), they both involve not only a mindreading component (entertaining a thought about a thought), but also an epistemic component (evaluating the veracity and evidential status of a thought about a thought). The latter component, rather than the former, would be responsible for the established correlation. Specifically, Wilson suggests that irony understanding, as well as standard second-order false-belief tasks, involve orders of the *metalogical ability* to metarepresent propositions in the abstract and assess their truth or falsity, evidential status and relations to other propositions.

In a standard first-order false belief task,[5] like the classical Sally-Anne task (Baron-Cohen et al. 1985), success is measured as a function of participants' ability to predict the agent's behaviour (e.g., *Where will Sally look for her marble?*) based on her false belief (e.g., the false belief that the marble is in the basket, held in a context in which, unbeknownst to Sally, the marble has been displaced into a box). Crucially, according to Wilson (2009), this task involves not only the ability to attribute a thought to Sally about the location of her marble (first-order ToM), but also the ability to assess the truth or falsity of this thought about a state of affairs and draw appropriate inferences (e.g., Sally *wrongly* beliefs that the marble is in the basket, and will thus look for it in the wrong location). In a similar vein, classical second-order false belief tasks, such as the ice-cream task (Perner and Wimmer 1985) require both a second-order ToM ability to attribute a thought about a thought and the metalogical ability to assess its truth or falsity and draw appropriate inferences (e.g., John *wrongly* thinks that Mary thinks that the ice-cream van is at the park, and will thus wrongly look for Mary there).

But why would metalogical abilities be relevant to verbal irony? Wilson (2009) suggests that irony understanding involves both a mindreading and an epistemic component. As for all attributive uses of language, it involves representing a thought about a thought (thus, relying on second-order ToM). Furthermore, the recognition of the ironical attitude requires grasping its dissociative nature, which amounts to realizing that the speaker thinks that the attributed thought is false or grossly irrelevant and intends to communicate this epistemic stance. To interpret the ironical statement "The food is really succulent!", Richard would need to understand that Nausicaa is expressing a thought about Diana's thought that the food is really succulent, and intends to convey a dissociative attitude towards it: "Irony comprehension […] not only exploits the epistemic or metalogical abilities required for

5 'First-order false belief tasks' are called this way as they target the ability to judge X's beliefs, which requires entertaining a first-order metarepresentation of the form 'X (falsely) believes that *p*'. Following the same logic, 'second-order false belief tasks' involve judging X's beliefs about Y's beliefs, which requires entertaining a second-order metarepresentation of the form 'X (falsely) believes that Y believes that *p*' (see Perner and Wimmer 1985).

filtering out false or misleading information, but brings them within the scope of the communicator's intentions" (Wilson 2009: 38).

There are two important implications of this proposal. First, the idea that the study of the cognitive requirements for irony understanding cannot ignore the centrality of the dissociative attitude in verbal irony and that a full-fledged account of what it takes to understand irony should provide an answer to the question of how one recognizes the attitude expressed by the ironical speaker. Second, the suggestion that irony understanding involves the interplay of several cognitive capacities, including those related to the assessment of the epistemic status of relevant propositions, that are typically involved in assessing the risk of misinformation: "[i]rony comprehension should therefore involve an interaction among all three metarepresentational abilities: the pragmatic ability, the mindreading ability, and the capacity for epistemic vigilance" (Wilson 2009: 38).

In what follows, we build on these two elements to provide a detailed account of the role played in verbal irony by several mechanisms of epistemic vigilance, including – but not limited to – those underpinning the metalogical ability.

4 Epistemic vigilance and irony understanding

'Epistemic vigilance' is typically employed as an umbrella term to refer to a suite of cognitive mechanisms that are targeted towards the risk of accidental or intentional misinformation (Sperber et al. 2010). To minimize this risk, humans routinely assess the reliability of the source of information ('epistemic vigilance towards the source') and the believability of the communicated content ('epistemic vigilance towards the content' or 'metalogical ability'). Research so far has focused on what we call 'first-order' epistemic vigilance. First-order epistemic vigilance towards the source concerns the capacity to produce reliability judgment about a source of information based on a variety of cues (e.g., past accuracy, expertise, relevant perceptual access, epistemic autonomy, cooperative intent, and many others) and adjust one's trust choices and learning behaviours accordingly (for a review, see Harris et al. 2018). First-order epistemic vigilance towards the content involves the ability to evaluate the believability of a claim based on its internal coherence as well as its coherence with information coming through other channels, such as memory (e.g., previously held information) or perception (e.g., visual information) (for a discussion, see Mercier 2012). Arguably, though, epistemic vigilance goes beyond these first-order vigilance assessments of one's informant and their claims. We suggest that an advanced capacity to prevent misinformation comprises the ability to assess *others' epistemic vigilance* – that is, 'second-order' epistemic vigilance. The distinction between first- and second-order epistemic vigilance is orthogonal to that between

epistemic vigilance towards the source and epistemic vigilance towards the content. Indeed, each order of epistemic vigilance (first and second) can be directed toward either (or both) components (source and content).

Higher-order epistemic vigilance represents an unexplored domain of social cognition. However, this capacity appears to be adaptive to the social ecology of human communication, which is characterized by information transmission chains. For instance, as one cannot directly check the reliability of the sources of information all along the chain, one shall rely on others' ability to filter out misinformation at every stage. For this reason, the human capacity for epistemic vigilance should track others' ability to acquire and propagate reliable information.

While it is well established that the emergence of first- and second-order Theory of Mind has important implications on the child's pragmatic development, and that deficits in Theory of Mind can affect the pragmatic profile of clinical populations, the role of first- and second-order vigilance in pragmatic interpretation is still underinvestigated (but see Mazzarella and Pouscoulous 2020). In what follows, we explore its contribution to irony understanding. We argue that irony understanding relies on the exercise of full-fledged epistemic vigilance and spell out the distinctive role of each component.

4.1 First-order epistemic vigilance towards the source

As suggested by Sperber et al. (2010), misinformation can be either accidental or intentional. In the first case, false or irrelevant information is transmitted unintentionally, or *in bona fide*. For instance, a mistaken individual can communicate an inaccurate piece of information while believing it to be true. In the second case, misinformation is deliberate: the speaker communicates information that is believed to be false (or whose epistemic status is disregarded, as in 'bullshit', see Frankfurt 2005). As a result, first-order vigilance involves the evaluation of two reliability components: an epistemic one (is the informant competent?) and a moral one (is the informant honest?).

Epistemic and moral reliability judgements appear to play an important role in understanding irony. The ironical speaker expresses a proposition that is false or irrelevant, without believing it to be true (contrary to a mistaken informant) and without intending the audience to believe it (contrary to a dishonest informant). For this reason, in order to distinguish irony from mistakes and lies, the addressee may need to assess the speaker's epistemic status (thus establishing that she does not believe the literally expressed proposition to be true) and intentional states (thus ruling out the possibility of deception).

Does this imply that, in order to understand irony, the addressee needs to first exclude possible literal interpretations of the ironical statement as mistakes or lies? We want to resist such a conclusion, which appears to endorse a "two-stage" model of utterance interpretation, involving a first mandatory literal stage and no possibility to retrieve the ironical interpretation directly (for a discussion, see Gibbs 2002). It is plausible to assume that when the trustworthiness of the speaker is well established, or when some extra-linguistic cues to the ironical interpretation are particularly salient (facial expression, tone of voice, etc.), irony can be directly recognized. However, it is worth noting that, from a developmental perspective, the acquisition of first-order epistemic vigilance typically precedes the emergence of irony understanding (which is a later achievement) and appears to explain the way in which younger children misinterpret ironical statements. A few studies in the developmental literature suggest a systematic pattern of miscomprehension: children first mistake irony for an error, then for a lie, and only subsequently do they learn to recognize the ironical intention of the speaker. Faced with ironical utterances, younger children tend to interpret them as errors or mistakes. When the utterance is incongruent with the situational facts, they tend to override their awareness of the speaker's competence about the facts and interpret the utterance as wrong but sincere (Ackerman 1981; Demorest et al. 1983). Older children are able to understand deliberate falsehoods as such and to make sense of the incongruity between utterances and facts. Yet, Demorest et al. (1984) showed that even 9 years old tend to interpret ironical utterances as lies and that the capacity to distinguish irony from cases of deceptive communication is not reliable until 13 years of age. The emergence of first-order epistemic vigilance towards deception starting from the age of 4 (Mascaro and Morin 2014; Mascaro et al. 2017) provides children with an easier way to interpret a deliberate falsehood. As suggested by Matsui (2019), "it is easier to interpret the speaker who communicates false information as lying than to interpret that speaker as wanting the hearer to acknowledge the falsity of the information" (Matsui 2019: 236).

This intriguing developmental trajectory suggests that children need to be able to actively assess the honesty of the ironical speaker and rule out the possibility of deception in order to understand the relevance of deliberately expressing a false or irrelevant proposition, without any intention to induce a false belief in the addressee, as in verbal irony (Mazzarella and Pouscoulous 2020). First-order epistemic vigilance towards the source thus contributes to irony understanding by providing reliability judgment about the competence and the honesty of the communicator. An ironical speaker can be both competent and honest, while stating an intentional falsehood. In order to understand the ironical intent, though, addressees need to grasp the speaker's dissociative attitude. As we will argue below, this extra step requires going beyond first-order reliability judgements, and is made

possible by second-order vigilance. Before turning to this, however, let us explore the contribution of first-order vigilance towards the content to irony understanding.

4.2 First-order epistemic vigilance towards the content

Epistemic vigilance towards the content, or the 'metalogical ability', involves the capacity to assess the believability of a piece of information, independently of its source. This requires assessing the quality of the information – notably, its truthfulness and relevance (Altay and Mercier 2020). This kind of epistemic vigilance typically involves a process of coherence checking, to establish whether the incoming information is consistent with one's beliefs (Mercier 2012; Sperber et al. 2010) or argument evaluation, to assess the force of the arguments that support a given conclusion (Mercier and Sperber 2017).

Ironical speakers typically express a blatantly false or irrelevant proposition in order to communicate their epistemic stance towards it (their ironical, dissociative, attitude). As a result, it is plausible to assume that recognizing the falsehood or irrelevance of the proposition literally expressed should contribute to irony understanding. This assumption appears to be supported by much experimental evidence showing that 'contextual incongruity' is a strong cue for irony understanding. That is, when the target statement is inconsistent with the contextual information available to the participants, verbal irony is more easily detected (see, e.g., Deliens et al. 2018a; Rivière et al. 2018, among others).

It follows that first-order epistemic vigilance towards the content can enhance the understanding of verbal irony whenever the epistemic status of the proposition literally expressed is directly evaluable by the addressee. It is worth noting, though, that irony can be expressed and recognized even in situations in which the addressee has no information about the actual context (i.e., does not hold any previous belief that is contradicted by the proposition literally expressed by the ironical speaker). Thus, first-order epistemic vigilance may not always be required. Moreover, interlocutors may have conflicting beliefs about the truth of a proposition. Diana may believe that *The food at restaurant$_x$ is succulent* is true, and Nausicaa may believe it to be false (i.e. a case of so-called 'faultless disagreement', typical of evaluative discourse). This disagreement could be expressed via an ironical statement. For instance, Nausicaa could ironically state "The food was really succulent!" to Diana, and intend her to recognize that she is expressing a dissociative attitude. If further cues are available (facial expression, ironical tone of voice, etc.), Diana would recognize Nausicaa's ironical intent, without previously sharing her epistemic stance towards the proposition literally expressed (and without ending up

updating her belief about it).[6] In this case, while first-order epistemic vigilance may fail to detect a contextual incongruency, this should not lead Diana to interpret Nausicaa's statement literally. Alternatively, if Diana uttered "The food was really succulent!" to Nausicaa, the perceived contextual incongruity should not lead Nausicaa to interpret Diana's statement as ironical.

To sum up, the detection of contextual incongruency, which is underpinned by first-order epistemic vigilance towards the content, is neither sufficient nor necessary for irony understanding. While it can facilitate the recognition of the ironical intent under certain circumstances, irony understanding crucially involves the recognition of the attitude expressed by the speaker, which may – but need not – be shared or endorsed by the addressee. For this, we argue, one needs to exercise second-order epistemic vigilance.

4.3 Second-order epistemic vigilance

While first-order epistemic vigilance involves the assessment of the reliability of an informant and the believability of a piece of information, second-order epistemic vigilance refers to the capacity to *evaluate others' epistemic vigilance* towards the source and the content of the information and to behave accordingly. In other terms, second-order epistemic vigilance targets others' ability to assess the reliability of an informant and the believability of a piece of information. Let us illustrate this capacity with an example. Suppose that Diana's friend, Giulio, is a fervent reader of a tabloid famous for its sensationalist style and poor fact-checking. Diana and Giulio have regular discussions on several current issues, and on more than one occasion, Giulio reported sensationalistic stories and failed to recognize their blatant falsehood (thus failing to be epistemically vigilant towards the content of the information). Furthermore, when pressed by Diana, Giulio insisted on the accuracy of the stories by attributing them to the tabloid at issue (thus failing to be epistemically vigilant towards the source of information). As a result, Diana's second-order vigilance will lead her to question Giulio's vigilance towards misinformation and be less inclined to trust him in future conversations on other current issues discussed in the news. The capacity to assess the epistemic vigilance of one's interlocutor has not yet been investigated in the psychological literature. Arguably, though, this has important implications for the study of pragmatic interpretation. In what follows, we argue for its centrality in the study of verbal irony.

6 For a discussion of the distinction between 'interpretation' and 'epistemic acceptance' in pragmatic inference, see Mazzarella (2015).

In verbal irony, the expression of an attitude of the dissociative range (derogatory, scornful, mocking, etc.) makes manifest to the addressee the speaker's epistemic stance towards the proposition literally expressed (which is judged as blatantly false or irrelevant). According to the Echoic account, this attitude targets the thought echoed by the proposition literally expressed and attributed to someone other than the speaker at the present time (the ironical source). According to the Pretense account, the dissociative attitude targets the statement itself and the people who might express or accept it. Crucially, though, both theories call for an explanation of the cognitive requirements for understanding the expression of such a dissociative attitude.

Second-order epistemic vigilance appears to be the relevant kind of socio-cognitive capacity. To recognize a speaker's intention to implicitly communicate some dissociative stance, the addressee needs first and foremost to attribute to the speaker the capacity to be epistemically vigilant towards the content at issue and/or its source. This is because the expression of a dissociative attitude is typically warranted by the epistemic evaluation of a content that is found to be false or irrelevant or the assessment of a source that is judged unreliable. As a result, it is only by assuming that a speaker has gone through these types of epistemic assessment, and has taken their output as a reason to express a dissociative stance, that the addressee can interpret the speaker as ironical. Thus, it is this second-order vigilance that allows the addressee to infer that the relevance of the speaker's statement lies in the expression of the dissociative attitude, which is key to understanding irony.

Following Sperber (1984), it is worth noting that the "[a]bsurdity of propositions per se is irrelevant. The absurdity, or even the mere inappropriateness, of human thoughts, on the other hand, is often worth remarking on, making fun of, being ironic about" (Sperber 1984: 131). For this reason, ironical statements achieve relevance by communicating a dissociative attitude towards a thought that is attributed to someone, who has expressed or entertained (or *might* express or entertain) it. When this 'ironical source' is clearly identifiable and corresponds to a specific person (e.g., Diana, in the bad restaurant example), priors about the source unreliability, or contextual cues that make it salient, may facilitate irony understanding. For instance, if Diana had a reputation for appreciating poor quality restaurants, Nausicaa's statement "The food is really succulent!" may be more promptly interpreted as ironical by Richard (even before tasting any dish). In this circumstance, Richard's second-order vigilance towards Nausicaa's assessment of Diana's reliability as a source of information in this specific domain (restaurant recommendations) may play a crucial role. On the other hand, when the source does not correspond to a specific individual or group of people, as the ironical attitude targets thoughts, norms, hopes or expectations that are universally shared,

second-order vigilance towards their content will be decisive to recognize the speaker's dissociative attitude.

Whether it relies on the evaluation of the ironical speaker's vigilance towards a source of information or towards a certain content (or both), inferring the dissociative attitude implicitly communicated by any ironical speaker appears to require second-order epistemic vigilance. This capacity, together with first-order vigilance towards the source and the content, is arguably part of the cognitive repertoire that supports irony understanding. This cognitive repertoire is thus richer than the one implicated in the interpretation of most pragmatic phenomena, such as metaphor understanding or implicature derivation. On the one hand, by including second-order epistemic vigilance, it requires the mastering of additional orders of metarepresentations. On the other hand, by relying on multiple mechanisms of first- and second-order epistemic vigilance (towards the source and/or the content), it requires the ability to successfully integrate their outputs. These two requirements are thus likely to add some extra complexity and may result in enhanced comprehension and processing difficulties.

In light of this, our proposal can shed new light on the available experimental literature on irony understanding. Much evidence coming from developmental, clinical and neuropsychological studies on verbal irony points to the conclusion that irony is particularly challenging for distinct types of populations. First, irony emerges later than other figurative uses of language. While by the age of 3, children understand figurative uses of language, such as metaphor (Pouscoulous and Tomasello 2020), hyperbole (Deamer 2013) and metonymy (Falkum et al. 2017), irony understanding emerges only around the age of 6 and continues to develop during late childhood and adolescence (see, e.g., Falkum and Köder 2020).[7] In our view, this delay can be (at least partly) explained by the unique contribution of second-order vigilance to irony understanding. It is expected that children will not be able to understand irony before acquiring this relevant cognitive repertoire and mastering the metarepresentational complexity and integration issues it brings about.

Second, these very same requirements may contribute to explaining why verbal irony is often impaired in clinical populations that can otherwise master well other types of pragmatic phenomena (e.g., display an understanding of scalar implicatures or metaphors in line with their general linguistic abilities: Bühler et al. 2018; Chevallier et al. 2010; Gernsbacher and Pripas-Kapit 2012; He 2021; Kalandadze et al. 2016; Katsos et al. 2011; Pijnacker et al. 2009). For instance, highly-verbal

7 Similarly, irony understanding comes later than the ability to interpret other types of non-literal uses of language, such as non-conventional indirect requests (Carrell 1981; Reeder 1980; Shatz 1978), which appears to have its roots in infancy (on the understanding of non-verbal requests, see Grosse et al. 2010).

individuals on the autistic spectrum display this type of selective pragmatic profile (see, e.g., Deliens et al. 2018b). In line with this, irony understanding appears to be compromised in populations with executive dysfunctions (such as children with ADHD, Caillies et al. 2014; or patients with schizophrenia, Li et al. 2017), and executive functions are expected to be called upon by the complexity of the (meta-)representations involved in first- and second-order vigilance and their integration. Finally, this proposal can shed light on why irony is typically effortful to process even for neurotypical adults (Spotorno and Noveck 2014), and why its processing cost can be modulated by social information (Pexman 2005), such as information about the speaker occupation, gender or age, that may be actively exploited in the assessment of the speaker's epistemic vigilance.

5 Conclusions

Verbal irony represents an interesting challenge for cognitively oriented pragmatic theories. The centrality of attitude expression and recognition in verbal irony makes it very different from other figurative and non-literal uses of language. This difference is well reflected by experimental data showing that the acquisition, comprehension and processing of irony come with additional demands: irony understanding is acquired later in development, it is often impaired in clinical populations and is effortful from a processing perspective. This opens up the question of which unique capacities are part of the cognitive repertoire for irony understanding. Drawing on Wilson (2009), we suggested going beyond the established mindreading explanation, as this fails to specify how second-order Theory of Mind *per se* would get the hearer to infer the dissociative attitude implicitly communicated by the speaker. We argued that epistemic vigilance plays a crucial role in recognizing the speaker's ironical intent and inferring her attitude. More specifically, we suggested that first- and second-order epistemic vigilance contribute to distinct aspects of irony understanding. First-order epistemic vigilance towards the source allows the hearer to assess the reliability of the ironical speaker and avoid interpreting the ironical statement as a mistake (due to the speaker's incompetence) or a lie (due to the speaker's dishonesty). First-order epistemic vigilance towards the content may facilitate irony understanding by detecting the incongruency (or irrelevance) of the literal content of the statement against the contextual assumptions held by the addressee. Finally, and most importantly, by assessing the speaker's capacity to be vigilant, the hearer displays second-order epistemic vigilance. This capacity makes it possible to recognize that the speaker is expressing a

dissociative attitude by distancing herself from a source that she judges unreliable and/or a content that she takes to be false or irrelevant. All in all, ironic speakers need vigilant hearers.

Research funding: This work was supported by a SNSF Eccellenza Grant awarded to DM (2020–2025, Project number: 186931).

References

Ackerman, Brian P. 1981. Young children's understanding of a speaker's intentional use of a false utterance. *Developmental Psychology* 17. 472–480.

Altay, Sacha & Hugo Mercier. 2020. Relevance is socially rewarded, but not at the price of accuracy. *Evolutionary Psychology* 18(1). 1–7.

Baron-Cohen, Simon, Alan M. Leslie & Utah Frith. 1985. Does the autistic child have a "theory of mind". *Cognition* 21(1). 37–46.

Bühler, Daniela, Alexandra Perovic & Nausicaa Pouscoulous. 2018. Comprehension of novel metaphor in young children with Developmental Language Disorder. *Autism & Developmental Language Impairments* 3. 1–11.

Caillies, Stéphanie, Vincine Bertot, Jacques Motte, Christine Raynaud & Michel Abely. 2014. Social cognition in ADHD: Irony understanding and recursive theory of mind. *Research in Developmental Disabilities* 35(11). 3191–3198.

Carrell, Patricia L. 1981. Children's understanding of indirect requests: Comparing child and adult comprehension. *Journal of Child Language* 8(2). 329–345.

Chevallier, Coralie, Deirdre Wilson, Francesca Happé & Ira Andrew Noveck. 2010. Scalar inferences in autism spectrum disorders. *Journal of Autism and Developmental Disorders* 40(9). 1104–1117.

Clark, Herbert H. & Richard J. Gerrig. 1984. On the pretense theory of irony. *Journal of Experimental Psychology: General* 113(1). 121–126.

Deamer, Felicity. 2013. *An investigation into the processes and mechanisms underlying the comprehension of metaphor and hyperbole*. London: UCL (University College London) Doctoral Dissertation.

Deliens, Gaétane, Kyriakos Antoniou, Elise Clin, Ekaterian Ostashchenko & Mikhail Kissine. 2018a. Context, facial expression and prosody in irony processing. *Journal of Memory and Language* 99. 35–48.

Deliens, Gaétane, Fanny Papastamou, Nicolas Ruytenbeek, Philippine Geelhand & Mikhail Kissine. 2018b. Selective pragmatic impairment in autism spectrum disorder: Indirect requests versus irony. *Journal of Autism and Developmental Disorders* 48(9). 2938–2952.

Demorest, Amy, Lisa Silberstein, Howard Gardner & Ellen Winner. 1983. Telling it as it isn't: Children's understanding of figurative language. *British Journal of Developmental Psychology* 1. 121–134.

Demorest, Amy, Christine Meyer, Erin Phelps, Howard Gardner & Ellen Winner. 1984. Words speak louder than actions: Understanding deliberately false remarks. *Child Development* 55. 1527–1534.

Falkum, Ingrid Lossius & Franziska Köder. 2020. The acquisition of figurative meanings. *Journal of Pragmatics* 164. 18–24.

Falkum, Ingrid Lossius, Mart Recasens & Eve Vivienne Clark. 2017. "The moustache sits down first": On the acquisition of metonymy. *Journal of Child Language* 44(1). 87–119.

Filippova, Eva & Janet Wilde Astington. 2008. Further development in social reasoning revealed in discourse irony understanding. *Child Development* 79(1). 126–138.

Frankfurt, Harry G. 2005. *On bullshit*. Princeton, New Jersey: Princeton University Press.

Garmendia, Joana. 2018. *Irony*. Cambridge: Cambridge University Press.
Gernsbacher, Morton Ann & Sarah R. Pripas-Kapit. 2012. Who's missing the point? A commentary on claims that autistic persons have a specific deficit in figurative language comprehension. *Metaphor and Symbol* 27(1). 93–105.
Gibbs, Raymond W. 1986. On the psycholinguistics of sarcasm. *Journal of Experimental Psychology: General* 115(1). 3–15.
Gibbs, Raymond W. 2002. A new look at literal meaning in understanding what is said and implicated. *Journal of Pragmatics* 34(4). 457–486.
Grice, Herbert Paul. 1978/89. Further notes on logic and conversation. In Peter Cole (ed.), *Syntax and semantics 9: Pragmatics*, 113–127. New York: Academic Press. Reprinted in Grice. 1989. 41–57.
Grice, Herbert Paul. 1989. *Studies in the way of words*. Cambridge, MA: Harvard University Press.
Grosse, Gerlind, Henrike Moll & Michael Tomasello. 2010. 21-month-olds understand the cooperative logic of requests. *Journal of Pragmatics* 42(12). 3377–3383.
Happé, Francesca. 1993. Communicative competence and theory of mind in autism: A test of relevance theory. *Cognition* 48(2). 101–119.
Harris, Paul L., Melissa A. Koenig, Kathleen H. Corriveau & Vikram K. Jaswal. 2018. Cognitive foundations of learning from testimony. *Annual Review of Psychology* 69. 251–273.
He, Sui. 2021. Cognitive metaphor theories in translation studies: Toward a dual-model parametric approach. *Intercultural Pragmatics* 18(1). 25–52.
Jared, Debra & Alyssa Pandolfo. 2021. The effect of speaker age on the perception of ironic insults. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale* 75(2). 146–154.
Jorgensen, Julia, George A. Miller & Dan Sperber. 1984. Test of the mention theory of irony. *Journal of Experimental Psychology: General* 113(1). 112.
Kalandadze, Tamar, Courtenay Norbury, Terje Nærland & Kari-Anne B. Næss. 2016. Figurative language comprehension in individuals with autism spectrum disorder: A meta-analytic review. *Autism* 22(2). 99–117.
Katsos, Napoleon, Clara Andrés Roqueta, Rosa Ana Clemente Estevan & Chris Cummins. 2011. Are children with specific language impairment competent with the pragmatics and logic of quantification? *Cognition* 119(1). 43–57.
Katz, Albert N. & Penny M. Pexman. 1997. Interpreting figurative statements: Speaker occupation can change metaphor to irony. *Metaphor and Symbol* 12(1). 19–41.
Katz, Albert N., Dawn G. Blasko & Victoria A. Kazmerski. 2004. Saying what you don't mean: Social influences on sarcastic language processing. *Current Directions in Psychological Science* 13(5). 186–189.
Keenan, Thomas Richard & Kathleen Quigley. 1999. Do young children use echoic information in their comprehension of sarcastic speech? A test of echoic mention theory. *British Journal of Developmental Psychology* 17(1). 83–96.
Kreuz, Roger J. & Sam. Glucksberg. 1989. How to be sarcastic: The echoic reminder theory of verbal irony. *Journal of Experimental Psychology: General* 118(4). 374–386.
Langdon, Robyn, Martin Davies & Max Coltheart. 2002. Understanding minds and understanding communicated meanings in schizophrenia. *Mind & Language* 17(1–2). 68–104.
Li, Xiaoming, Die Hu, Wenrui Deng, Tao Qian, Ying Hu, Xiaoxue Yang, Zheng Wang, Rui Tao, Lizhuang Yang & Xiaochu Zhang. 2017. Pragmatic ability deficit in schizophrenia and associated theory of mind and executive function. *Frontiers in Psychology* 8. 2164.
Martin, Ingerigh & Skye McDonald. 2004. An exploration of causes of non-literal language problems in individuals with Asperger syndrome. *Journal of Autism and Developmental Disorders* 34(3). 311–328.

Mascaro, Olivier & Olivier Morin. 2014. Gullible's travel: How honest and trustful children become vigilant communicators. In Elizabeth J. Robinson & Shiri Einav (eds.), *Trust and skepticism: Children's selective learning from testimony*, 69–83. Hove, East Sussex and New York: Psychology Press.

Mascaro, Olivier, Olivier Morin & Dan Sperber. 2017. Optimistic expectations about communication explain children's difficulties in hiding, lying, and mistrusting liars. *Journal of Child Language* 44(5). 1041–1064.

Matsui, Tomoko. 2019. Component processes of irony comprehension in children: Epistemic vigilance, mind-reading and the search for relevance. In Kate Scott, Billy Clark & Robyn Carston (eds.), *Relevance, pragmatics and interpretation*, 231–239. Cambridge: Cambridge University Press.

Matthews, Danielle, Hannah Biney & Kirsten Abbot-Smith. 2018. Individual differences in children's pragmatic ability: A review of associations with formal language, social cognition, and executive functions. *Language Learning and Development* 14(3). 186–223.

Mazzarella, Diana. 2015. Politeness, relevance and scalar inferences. *Journal of Pragmatics* 79. 93–106.

Mazzarella, Diana & Nausicaa Pouscoulous. 2020. Pragmatics and epistemic vigilance: A developmental perspective. *Mind & Language* 36(3). 355–376.

Mercier, Hugo. 2012. The social functions of explicit coherence evaluation. *Mind & Society* 11(1). 81–92.

Mercier, Hugo & Dan Sperber. 2017. *The enigma of reason*. Cambridge, MA: Harvard University Press

Nicholson, Andrew, Juanita M. Whalen & Penny M. Pexman. 2013. Children's processing of emotion in ironic language. *Frontiers in Psychology* 4. 691.

Panzeri, Francesca, Beatrice Giustolisi & Laura Zampini. 2020. The comprehension of ironic criticisms and ironic compliments in individuals with Down syndrome: Adding another piece to the puzzle. *Journal of Pragmatics* 156. 223–234.

Perner, Josef & Heinz Wimmer. 1985. John thinks that Mary thinks that attribution of second-order beliefs by 5-to 10-year-old children. *Journal of Experimental Child Psychology* 39(3). 437–471.

Pexman, Penny M. 2005. Social factors in the interpretation of verbal irony: The roles of speaker and listener characteristics. In Herbert L. Colston & Albert N. Katz (eds.), *Figurative language comprehension: Social and cultural influences*, 209–232. New York and Hove: Psychology Press.

Pexman, Penny M. & Kara M. Olineck. 2002. Understanding irony: How do stereotypes cue speaker intent? *Journal of Language and Social Psychology* 21(3). 245–274.

Pexman, Penny M., Melanie Glenwright, Suzanne Hala, Stacey L. Kowbel & Sara Jungen. 2006. Children's use of trait information in understanding verbal irony. *Metaphor and Symbol* 21(1). 39–60.

Pijnacker, Judith, Peter Hagoort, Jan Buitelaar, Jan-Pieter Teunisse & Bart Geurts. 2009. Pragmatic inferences in high-functioning adults with autism and Asperger syndrome. *Journal of Autism and Developmental Disorders* 39(4). 607–618.

Pouscoulous, Nausicaa & Michael Tomasello. 2020. Early birds: Metaphor understanding in 3-year-olds. *Journal of Pragmatics* 156. 160–167.

Rapp, Alexander M., Dorothee Mutschler, Barbara Wild, Michael Erb, Ines Lengsfeld, Ralf Saur & Wolfgang Grodd. 2010. Neural correlates of irony comprehension: The role of schizotypal personality traits. *Brain and Language* 113(1). 1–12.

Reeder, Kenneth. 1980. The emergence of illocutionary skills. *Journal of Child Language* 7(1). 13–28.

Regel, Stefanie, Seana Coulson & Thomas C. Gunter. 2010. The communicative style of the speaker can affect language comprehension? ERP evidence from the comprehension of irony. *Brain Research* 1311. 121–135.

Rivière, Elora, Madelyne Klein & Maud Champagne-Lavau. 2018. Using context and prosody in understanding irony: Variability amongst individuals. *Journal of Pragmatics* 138. 165172.

Rowley, Dane A., Miles Rogish, Timothy Alexander & Kevin J. Riggs. 2017. Cognitive correlates of pragmatic language comprehension in adult traumatic brain injury: A systematic review and meta-analyses. *Brain Injury* 31. 1564–1574.

Shatz, Marilyn. 1978. On the development of communicative understandings: An early strategy for interpreting and responding to messages. *Cognitive Psychology* 10(3). 271–301.

Shibata, Midori, Akira Toyomura, Hiroaki Itoh & Jun-ichi Abe. 2010. Neural substrates of irony comprehension: A functional MRI study. *Brain Research* 1308. 114–123.

Sperber, Dan. 1984. Verbal irony: Pretense or echoic mention? *Journal of Experimental Psychology: General* 113(1). 130–136.

Sperber, Dan & Deirdre Wilson. 1981. Irony and the use-mention distinction. *Philosophy* 3. 143–184.

Sperber, Dan & Deirdre Wilson. 1986/1995. *Relevance. Cognition and communication*. Oxford: Blackwell Publishers Ltd.

Sperber, Dan, Fabrice Clément, Christophe Heintz, Olivier Mascaro, Hugo Mercier, Gloria Origgi & Deirdre Wilson. 2010. Epistemic vigilance. *Mind & Language* 25(4). 359–393.

Spotorno, Nicola & Ira Andrew Noveck. 2014. When is irony effortful? *Journal of Experimental Psychology: General* 143(4). 1649–1665.

Spotorno, Nicola, Eric Koun, Jérôme Prado, Jean-Baptiste Van Der Henst & Ira Andrew Noveck. 2012. Neural evidence that utterance-processing entails mentalizing: The case of irony. *NeuroImage* 63(1). 25–39.

Sullivan, Kate, Ellen Winner & Natalie Hopfield. 1995. How children tell a lie from a joke: The role of second-order mental state attributions. *British Journal of Developmental Psychology* 13(2). 191–204.

Țurcan, Alexandra & Ruth Filik. 2017. Investigating sarcasm comprehension using eye-tracking during reading. What are the roles of literality, familiarity, and echoic mention? In Angeliki Athanasiadou & Herbert L. Colston (eds.), *Irony in language use and communication*, 255–276. Amsterdam/ Philadelphia: John Benjamins Publishing Company.

Uchiyama, Hitoshi, Ayumi Seki, Hiroko Kageyama, Daisuke N. Saito, Tatsuya Koeda, Kousaku Ohno & Norihiro Sadato. 2006. Neural substrates of sarcasm: A functional magnetic-resonance imaging study. *Brain Research* 1124(1). 100–110.

Uchiyama, Hitoshi, Daisuke N. Saito, Hiroki C. Tanabe, Tokiko Harada, Ayumi Seki, Kousaku Ohno, Tatsuya Koeda & Norihiro Sadato. 2012. Distinction between the literal and intended meanings of sentences: A functional magnetic resonance imaging study of metaphor and sarcasm. *Cortex* 48(5). 563–583.

Wakusawa, Keisuke, Motoaki Sugiura, Yuko Sassa, Hyeonjeong Jeong, Kaoru Horie, Shigeru Sato, Hiroyuki Yokoyama, Shigeru Tsuchiya, Kazuie Inuma & Ryuta Kawashima. 2007. Comprehension of implicit meanings in social situations involving irony: A functional MRI study. *NeuroImage* 37(4). 1417–426.

Wilson, Deirdre. 2009. Irony and metarepresentation. *UCL Working Papers in Linguistics* 21. 183–226.

Wilson, Deirdre & Robyn Carston. 2007. A unitary approach to lexical pragmatics: Relevance, inference and ad hoc concepts. In Noel Burton-Roberts (ed.), *Pragmatics*, 230–260. Basingstoke: Palgrave Macmillan.

Wilson, Deirdre & Dan Sperber. 2012. *Meaning and relevance*. Cambridge: Cambridge University Press.

Winner, Ellen & Sue Leekam. 1991. Distinguishing irony from deception: Understanding the speaker's second-order intention. *British Journal of Developmental Psychology* 9(2). 257–270.

Yus, Francisco. 2016. Propositional attitude, affective attitude and irony comprehension. *Pragmatics and Cognition* 23(1). 92–116.

Bionotes

Diana Mazzarella
University of Neuchâtel, Neuchâtel, Switzerland
diana.mazzarella@unine.ch

Diana Mazzarella is Professor at the Cognitive Science Centre of the University of Neuchâtel, Switzerland. Her main research interests are in theoretical and experimental pragmatics, particularly the interface between linguistic communication and other cognitive systems, such as Theory of Mind and epistemic vigilance.

Nausicaa Pouscoulous
University College London, London, UK

Nausicaa Pouscoulous is Associate Professor at the Linguistics Department of University College London, UK. Her research combines experimental and theoretical approaches and focuses on linguistic phenomena at the interface between semantics and pragmatics, such as scalar implicature, presupposition, and figurative uses of language. She is interested in the acquisition of pragmatic abilities in typically and atypically developing children.