



ELSEVIER

Contents lists available at ScienceDirect

Journal of Pragmatics

journal homepage: [www.elsevier.com/locate/pragma](http://www.elsevier.com/locate/pragma)

## Relevance and emotion

Tim Wharton<sup>a</sup>, Constant Bonard<sup>b, c, d</sup>, Daniel Dukes<sup>c, e</sup>, David Sander<sup>b, c</sup>,  
Steve Oswald<sup>e, \*</sup>

<sup>a</sup> University of Brighton, UK

<sup>b</sup> University of Geneva CH, Switzerland

<sup>c</sup> Swiss Center for Affective Sciences, University of Geneva, CH, Switzerland

<sup>d</sup> University of Antwerp, BE, Belgium

<sup>e</sup> University of Fribourg, CH, Switzerland



### ARTICLE INFO

#### Article history:

Available online 2 July 2021

#### Keywords:

Affective science  
Emotion  
Non-ostensive  
Ostension  
Non-propositional  
Relevance

### ABSTRACT

The ability to focus on relevant information is central to human cognition. It is therefore hardly unsurprising that the notion of relevance appears across a range of different disciplines. As well as its central role in relevance-theoretic pragmatics, for example, relevance is also a core concept in the affective sciences, where there is consensus that for a particular object or event to elicit an emotional state, that object or event needs to be relevant to the person in whom that state is elicited. Despite this, although some affective scientists have carefully considered what emotional relevance might mean, surprisingly little research has been dedicated to providing a definition. Since, by contrast, the relevance-theoretic notion of relevance is carefully defined, our primary aim is to compare relevance as it exists in affective science and in relevance theory. A further aim is to redress what we perceive to be an imbalance: Affective scientists have made great strides in understanding the processes of emotion elicitation/responses etc., but despite the fact that among humans the communication of information about emotional states is ubiquitous, pragmatists have tended to ignore it. We conclude, therefore, that affective science and relevance theory have much to learn from each other.

© 2021 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The function of emotions is to fill gaps left by 'pure reason' in the determination of action: [...] it is one of Nature's ways of dealing with the philosophers' frame problem.

de Sousa ((De Sousa, 1987), 195–196).

In logic and work in Artificial Intelligence, the **frame problem** is the name given to the task of producing a formula which describes the effects of any particular action without having to write a formula (or formulae) for the numerous trivially obvious **non-effects** of that action. The problem has clear epistemic consequences (see, for example, Damasio, 1994; Fodor,

\* Corresponding author.

E-mail address: [steve.oswald@unifr.ch](mailto:steve.oswald@unifr.ch) (S. Oswald).

1987). When processing a new fact, is there an alternative to sifting through the vast amount of irrelevant information we have at our disposal to decide what is relevant?

The ability to focus on relevant information is central to human cognition. Given this, it is hardly surprising that the concept of relevance appears in various forms, across a range of different disciplines. It has played a key role in information science, genetic psychology, phenomenological sociology and even theoretical physics. Readers of this journal will probably be most familiar with the notion of relevance as it exists in Grice's Maxim of Relation (Grice, 1975, 1989), which – in turn – provided the inspiration for Relevance Theory (Sperber and Wilson, 1986/1995). For relevance theorists, the epistemological question reduces to two sub-questions. Firstly, how do we choose which background information to use in processing a new fact? Secondly, how do we decide when to stop processing? (Or, as Fodor puts it: 'Hamlet's problem: when to stop thinking' (1987: 140)). In this way, relevance theory can be seen as a way of rising to the same major challenge described in the epigraph.

To those working in pragmatics, the role of emotion in solving the frame problem might come as something of a surprise. For despite differences in how precisely emotions are characterised, there does appear to be a broad consensus that in order for a particular object or event to elicit an emotion, that object or event needs to be, in some sense of the word, **relevant** to the person in whom that emotion is elicited (Ekman and Cordaro, 2011; Frijda, 2007; Smith and Lazarus, 1993; Russell, 2003; Scherer, 2009). With this in mind, one of the aims of this paper is to explore in precisely what sense of the word such objects or events might be said to be relevant and explore the parallels or divergences between relevance as it exists in affective science and in relevance theory.<sup>1</sup>

Our interest in doing so is substantive rather than terminological and reflects our principal long-term aim: to redress what we perceive to be an imbalance in theories of utterance interpretation. Affective scientists have made great strides in understanding the processes of emotion elicitation, emotional response, and the recognition of emotions in others. But despite the fact that among humans the communication of information about emotional states is ubiquitous, work on speaker meaning within pragmatics has tended to persist with the view that the mental processes behind cognition and affect exist in largely separate domains. Most work in relevance theory, for example, focuses on what might be called 'higher', epistemic dimensions to cognitive processes (indeed, much of Dan Sperber's most recent work explores reason and rationality, see Mercier and Sperber, 2017). The effect has been that the emotional dimension to linguistic communication – the less epistemic, or 'lower' cognitive side – has tended to play a secondary role to the cognitive one. Indeed, in many accounts of pragmatics, it plays no role at all.

However, as Wharton and de Saussure (forthcoming) put it: "The expression and communication of emotions needs to be put right back at the centre of research into pragmatics". And there is now a growing pragmatics literature on affective meaning and so-called non-propositional effects.<sup>2</sup> These include work on: i) so-called descriptively ineffable contents – contents that are passed from a communicator to an audience but which cannot be broken down into representational meanings or propositions (Blakemore, 2011; Piskorska, 2012, 2016; de Saussure and Schulz, 2009; Wharton, 2015; Wilson and Carston, 2019; Yus, 2016); ii) impressions (Sperber and Wilson, 2015) – treated as undetermined, weakly manifest meanings; iii) literary effects (Carston, 2018; Cave and Wilson, 2018; Kolaiti, 2019). All these issues concern non-propositional meaning and expressivity to some extent.<sup>3</sup>

In the next section we introduce the central tenets of relevance theory and define the two principles of relevance which form the backbone of the theory. We then introduce the technical notion of relevance which the theory adopts and demonstrate how cognition and communication are driven by the search for relevance. In Section 3, we consider cases of communication, or information transfer at least, which relevance theory in particular has overlooked. This discussion is important when we compare the different construals of relevance in Section 5 and demonstrate that work in relevance theory and the affective sciences have more in common than aspects of the current literature reflect. In Section 4, we characterise relevance as it is used in work in the affective sciences. Rather than arguing that individuals scan the environment treating each stimulus as equal (which presumably would lead to an overload of the cognitive system), affective scientists posit the term relevance to describe a key criterion people use to focus on particular stimuli (see Ellsworth and Scherer, 2003). In Section 5 we ask whether the fact that two notions are both called 'relevance' is a mere terminological coincidence or whether there are meaningful similarities to explore which might be used to inform research in both disciplines (For more detailed exposition of this see author et al., in prep.).

## 2. Pragmatics and relevance

As applied to human cognition, the frame problem reduces to two questions:

<sup>1</sup> The current paper is one of a pair we, the authors, have written in an attempt to build bridges between the disciplines of pragmatics and affective science. In the other paper, *Emotion and relevance* (in prep), we present our ideas from a different perspective, designed for a more affective-science oriented audience.

<sup>2</sup> See in particular Wharton (2003); 2009; Wharton and Strey, 2019; Sperber and Wilson (2015); de Saussure and Wharton (2020); Wharton and de Saussure (2021); de Saussure and Schulz (2009), among others.

<sup>3</sup> There is a vast literature on so-called expressivity or expressive meaning (see, for example, Kaplan, 1999; Potts, 2007; Gutzmann, 2015) but we focus here on work in cognitive pragmatics.

- How do we choose which background information to use in processing a new fact?
- How do we decide when to stop processing?

Relevance, Sperber and Wilson suggest, is a property of inputs to cognitive processes.

According to 'The Cognitive Principle of Relevance' (Sperber and Wilson, 1986/1995), human cognition is geared to look out for those inputs that are relevant insofar as they provide an individual with some form of benefit at an acceptable processing cost. Technically, these benefits are termed positive cognitive effects and include true implications, strengthenings or contradictions of existing thoughts. Let us note at this point that the positive cognitive effects given as examples by Sperber and Wilson (1986/1995) have tended to be positive epistemic effects, i.e. effects which are positive with respect to the goal of improving knowledge (in quantity or in quality). This will be important to remember below. The cognitive cost associated with the derivation of these effects is termed **processing effort**.

Communicative stimuli will attract listeners' attention only if they appear to be at least relevant enough, so speakers tend to produce such stimuli, subject to their abilities and preferences. 'The Communicative Principle of Relevance', then, states that by making clear an intention to inform – through what relevance theory terms 'ostensive behaviour' – a communicator creates a presumption that the stimulus is at least relevant enough to be worth processing. A stimulus is deemed ostensive if it is produced with a communicative intention, that is, the intention that the stimulus be recognised (or informative intention) as being meant to be recognised. In other words, ostensive stimuli are those that people recognise as being intentionally directed at them.

Consider this linguistic illustration of the communicative principle in action: an utterance of (1), made by someone opening a door to a room full of people.

(1) Ladies and gentlemen, **the building's** on fire.

To which building should the hearers take the speaker to be referring? Definite descriptions such as the emboldened phrase above are highly context-dependent. The speaker of (1) could, in principle, be using the description to refer to any building in the world. But it is crucially important for the hearers to infer which building the speaker is referring to. Which building would best satisfy their expectations of relevance? Which building would be the most salient and accessible to them and give them the most cognitive effects for minimal processing effort? Fairly obviously, the building they are in. That is the first interpretation – that is, the first cost-effective interpretation – that would be relevant to the individuals in the room in the expected way.

It is important to note that relevance theory is not just a theory of communication, but, rather, a theory of communication and cognition. So, while a linguistic utterance such as (1) is, of course, an excellent example of the kind of input that relevance theory is designed to account for, the set of possible inputs to cognitive processes is far from limited to linguistic utterances (indeed, even Grice did not limit instances of his notion of non-natural meaning to linguistic utterances). Relevance is a property of inputs to cognitive processes, whether ostensively communicated or not. Anything can be relevant: inputs from perception – sights, sounds, smells – inputs from thought processes – implications, deductions, memories – or, of course, inputs from other people. The search for relevance then, is not only a search that underpins verbal interaction or even communicative interaction: it is a search that underpins human cognition.

And while it is true that sights, smells or other perceptual stimuli do not carry presumptions of their own relevance in the same way as ostensive acts, it does not follow from this that they cannot be highly relevant to the individual who becomes aware of them. The sight of smoke seeping between a door and doorframe, or the acrid smell of burning emanating from an unknown source, are as likely (possibly, even more likely) to provide the occupants of the room in the above example with the same kind of cognitive effects as the utterance in (1). Of course, as with all aspects of pragmatics, context is everything, and unsurprisingly, relevance theory adopts a resolutely cognitive conception of context, which it structures around the notion of **cognitive environment**. An individual's cognitive environment includes not only all the facts or assumptions of which she is currently aware, but also all the facts or assumptions of which she is capable of becoming aware, given her cognitive abilities and her physical environment – in relevance-theoretic terms, the set of facts or assumptions that are manifest to her (i.e. that she is capable of perceiving or inferring) (Sperber and Wilson, 1986/1995: 38–46). The context of an utterance is represented by the intersection between the cognitive environments of the speaker and the hearer and the fact that this is information is mutually manifest coordinates communicative acts. So, if a speaker wants to inform a hearer of a particular message, then the speaker needs (a) to produce a piece of behaviour consistent with that message and, crucially, (b) to get the hearer to realise that she has produced that behaviour with the overt intention of making the hearer do precisely that.

It takes very little to make a given act ostensive. As Deirdre Wilson remarked in a talk at a recent conference,<sup>4</sup> we live our lives 'on the edge of ostension', primed either to act ostensively or to recognise an act as ostensive. Consider, as an example, two friends walking through a forest on a searing hot summer's day. One of them thinks they detect the faintest smell of smoke in the air. They are not certain, but there has recently been a spate of dangerous forest fires and she feels it important to share this information, just in case she is right. What should she do? One alternative would be to tell her friend. But given her lack of certainty it might be more appropriate to adopt another, subtler, method. She simply stops walking and sniffs the air ostensively. This behaviour licenses the expectation that the speaker thinks the message will be relevant to her companion. It

<sup>4</sup> 1st International *Beyond Meaning* Conference, National and Kapodistrian University of Athens, September 13–15, 2017.

will give rise to new thoughts and assumptions, subtly affect her friend's cognitive environment, and – as a result – aspects of the cognitive environment they share.

Of course, to the lone walker in the forest, the smell of smoke is equally relevant. Relevance, as we have stated above, is about much more than ostensive communication.

### 3. Non-ostensive, non-propositional information transfer

#### 3.1. Ostensive and non-ostensive acts of communication

Ever since the foundational work of Grice, laid out in his 1967 William James lectures, the bulk of pragmatic research has been concerned with **intentional** communication. Very early on, many researchers excluded from their body of inquiry phenomena that could not be captured through a framework based on intention-recognition. For Grice himself, mutual understanding between conversational participants lies in the recognition of reflexive intentions. On his account, speaker meaning is identified once the addressee recognises two intentions made manifest by the speaker: the speaker's intention to produce a particular response in the addressee and the further intention that the addressee recognises that the speaker intends the first. In other terms, meaning something, in the communicative – non-natural – sense, amounts to intending an utterance “to produce some effect in an audience by means of the recognition of this intention” (Grice, 1957: 385).

There are nevertheless several (at least partly) non-ostensive communicative phenomena in which information is intentionally passed on. Consider, for example, insinuation. Classically defined as an implicit non-overtly negative and unwanted ascription that can be plausibly denied (see e.g., Bell, 1997; Bertucelli-Papi, 2014; Fricker, 2012), insinuation requires its intentional nature *not* to be recognised in order to succeed. Yet, it does succeed in conveying information – that is, addressees of insinuations are able to work out their contextual relevance, despite the non-ostensive nature of the associated intention. Dogwhistles (see Saul, 2018) are another example of pragmatic phenomena which flirt with the ostensive-non ostensive border. While these coded utterances do convey a message to those members of the audience who are in-the-know and share a relevant part of their cognitive environment with the speaker, the message itself is not fully ostensive, as part of the audience is unaware that it was in fact intended, which, in turn, makes dog-whistles plausibly deniable. Finally, deceptive and manipulative messages, whose success equally requires their associated intentions to remain covert (see e.g., Oswald, 2010; Oswald et al., 2016), also count as instances of communication. Despite the misleading nature of the message, addressees do end up entertaining assumptions they have found contextually relevant. In some cases, these can even be factually true,<sup>5</sup> which indicates that deceptive messages are indeed true pragmatic communicative artefacts.

A third category of contents which are arguably acts of communication despite not being intended as such are those that involve information relating to idiosyncratic features of speakers that are not necessarily consciously controlled, such as phonetic and phonological (accent, pitch, prosody, etc.), multimodal (gestures, postures), even semantic (e.g., preference for the use of some lexemes over others, use of connotated terms, recurrent mistakes, etc.) and syntactic idiosyncrasies (e.g., preference for phrasal verb splitting, avoidance of final prepositions, etc.). Imagine Laszlo knows that Winston routinely confuses the lexemes ‘white’ and ‘yellow’. Upon being asked by Winston ‘Can you please pass the white mug?’ and seeing that there are only yellow and black mugs on the table Laszlo will likely infer that Winston actually means the yellow mug and (rightly) pass it over. Winston does not mean to inform Laszlo, in any communicative sense, that he has trouble with the colour terms ‘yellow’ and ‘white’, but this highly contextually relevant piece of background information allows Laszlo to infer Winston's meaning and avoid the misunderstanding.

#### 3.2. Non-propositional meaning

Another hallmark of Neo- and Post-Gricean pragmatic inquiry is its focus on propositional meaning. Propositions are routinely defined as the basic unit of meaning that utterances express and are regarded as the contents speakers position themselves towards. In relevance theory, the notion of cognitive effect is defined in epistemic terms,<sup>6</sup> and cognitive effects are thus typically discussed in terms of the propositions they can contribute to the cognitive environment of interlocutors.

A significant portion of pragmatic research is nowadays pushing to incorporate non-propositional meaning into the scope of the discipline. Some of these attempts come from within the relevance-theoretic community. For instance, Sperber and Wilson's (2015) notion of **impression**, defined as a content which cannot be paraphrased without loss, already hints at the idea that some aspects of meaning escape propositional form (although, according to relevance theory, impressions have always been equated with ‘arrays’ of propositions). de Saussure and Schulz (2009) discuss the non-propositional aspects of knowledge that ironical utterances rely on and convey, and which are importantly related to attitudinal and subjective dispositions. Moreover, for them, irony conveys contents which would lose their ironical nature should they be paraphrased – this is, they note, a common feature of many figures of speech which typically trigger the derivation of meanings which are hardly propositional, or ‘propositionable’. Other phenomena involve non-propositional features, such as interjections

<sup>5</sup> See Meibauer (2014) for a discussion of the status of lying with respect to explicit and implicit content.

<sup>6</sup> An assumption is said to be relevant when it yields positive cognitive effects, that is, if it allows the cognitive system to incorporate information that is true, to strengthen information that was uncertain, and to delete information that turned out to be false.

(Wharton, 2003, 2019; Padilla Cruz, 2009), onomatopoeia (Sasamoto, 2019), perceptual effects (Kolaiti, 2019; 2020a,b), expressive meaning (see e.g. Blakemore, 2011) and, of course, emotional and affective content (see e.g., de Saussure and Wharton, 2020; Strey, 2016; Wharton and Strey, 2019, Wharton and de Saussure, forthcoming).<sup>7</sup> To mention a last area of inquiry that probably best represents pragmatic interests beyond the propositional level is the field of non-verbal communication (Wharton, 2009), in which contents exchanged typically fall outside of the domain of propositions – even if they can be reconstructed to some extent.

These examples testify to the growing interest that phenomena which cannot be propositionally captured have attracted and are still currently attracting in pragmatic research. In turn, these are strong signals that what lies beneath propositions is in dire need of attention. The question that remains to be discussed, at this point, is the kind of pragmatic account that can be used to account for non-propositional meaning.

### 3.3. Relevance beyond ostension

We develop here the argument that relevance theory is ideally equipped to account for non-propositional and non-ostensive meaning, and that it has been since its early developments, even if, throughout the years, non-ostensive and non-propositional meaning has hardly received the attention its ostensive and propositional counterpart has.

Relevance theory, through the formulation of the cognitive principle of relevance, whereby “[h]uman cognition tends to be geared to the maximisation of relevance” (Sperber and Wilson, 1995: 260), is built on the idea that our cognitive system, regardless of the task it has to perform, will tend to process information following a cost-effective procedure. Thus, the same procedure will apply to the processing of stimuli of different kinds, regardless of their nature. Crucially, this means that both ostensive and non-ostensive stimuli are likely to be processed in a way that makes their contextual relevance apparent to the individual who is processing them. In principle, relevance theory provides the tools to account for cognitive relevance seeking procedures of **any** kind of stimulus. We propose here that the link between relevance theory and ostension can be severed, and that relevance theory is therefore able to account for non-ostensive stimuli as well (Assimakopoulos, forthcoming; Bonard, submitted).

This proposal can be supported by shifting our focus from, on the one hand, the set of phenomena that relevance theory has traditionally tried to account for to, on the other, the nature of inferential mechanisms offered by the theory.<sup>8</sup> All in all, relevance theory can be construed as an account of information selection. The extent conditions of relevance identified by Sperber and Wilson (1986/1995: 125) apply to information *tout court*. As such, they define the conditions under which information (or assumptions) ends up being accessed and selected for the cognitive task that the system is performing at any given point – and regardless of the nature of the task or the nature of the input stimuli. In other words, relevance theory offers a procedural account of information selection and management, and for that reason it is by default able to account for a wide range of stimuli – from ostensive to non-ostensive ones, and from propositional to non-propositional ones. In turn, this makes the architecture of the theory able to cover not just pragmatic inference, but any kind of inference – including those that bear on the processing of emotions. Thus, the historically epistemic construal of cognitive effects need not constitute a rigid limitation to exclude any other type of effect from pragmatic inquiry. Elsewhere, we plead for the inclusion of affective or emotional effects in the set of phenomena relevance theory can account for (see also Dukes et al. in prep.; de Saussure and Wharton, 2020); in the next section we turn to the notion of relevance as used in the affective sciences.

## 4. Relevance in theories of emotion

Everyone knows what an emotion is, until asked to give a definition.

Fehr and Russell (Fehr and Russell, 1984: 464).

In the affective sciences there are three principal theories of emotion. In the first, basic emotion theorists posit a certain limited number (between seven and fourteen) of basic emotions. They typically propose that each has a particular expressive pattern, is universal across humankind and has specialized neurobiological origins (Ekman, 1992). Secondly, psychological-constructivists believe the main ingredient of a specific emotional experience can be found in a free-floating core-affect – a blend of (positive and negative) valence and arousal – and how this core affect is contextually categorized using our language-culture (Russell, 2003). Finally, appraisal theorists consider that emotions are elicited and unfold as subjective evaluations are made concerning the object in question: a joke that I consider offensive might, for example, amuse someone else, and elicit anger for me but joy for the other person (see Scherer and Moors, 2019).

As well as distinguishing traits between theoretical models, however, there are clear points of overlap. Among these is the fact that, whichever theory you adhere to, **relevance** (or a similar term with respect to emotion elicitation, such as

<sup>7</sup> For an up to date list of relevance-theoretic research in the domain, readers may refer to Section 4.6 of Francisco Yus' Relevance bibliography, available here: <https://personal.ua.es/francisco.yus/rt.html>.

<sup>8</sup> In the interests of parity, relevance theory originally did foresee this possibility. Wilson and Sperber (1985: 51) distinguish comprehension ('the process by which a speaker's intended message is recovered') from interpretation ('recovery not only of the intended message, but also of any further information, not necessarily intended by the speaker, which the hearer may derive from the utterance on his own account'). Over the years, however, work in relevance-theoretic pragmatics has chosen to focus mostly on *comprehension*.

significance, importance or value) is likely to be found at its core: all emotion theorists agree that for an object to elicit an emotion, that object must in some way be relevant to the person experiencing the emotion (for discussion, see Sander, 2013; author et al., in prep.).

What, then, do emotion theorists mean by ‘relevance’? Typically, they mean ‘concern relevance’, ‘goal relevance’ or ‘motivational relevance’. While it is true that most (perhaps all) theories of emotions claim that only relevant events elicit emotions (Sander, 2013; Lange et al., 2020), it is appraisal theorists who have done most to develop the notion itself. Let’s consider three major appraisal theorists: Richard Lazarus, Nico Frijda and Klaus Scherer.

Before proposing his general model of emotions, Lazarus attempted better to understand individual differences in stress. Even in the 1950s, he developed the notion of motivational relevance to argue that ‘[S]tress depends upon the relevance of the stressor condition to the motive pattern ...’ (Vogel et al., 1959: 230). In formalizing and developing his theory of emotion he continued, with the notion of primary appraisal, to consider motivational significance as key to understanding elicitation conditions of stress and emotion.

This approach is similar to the appraisal perspective developed in Frijda (Frijda, 1986), in particular the focus on emotions as elicited by events that are relevant to one or more concerns of an individual. A ‘concern’ is a disposition to desire the occurrence or non-occurrence of a given kind of situation. In other words, the notion of concern in emotion theory covers the dispositional sources of emotions: the motives, interests, and affective sensitivities of an individual. According to Frijda (2009: 96): ‘No concern, no emotion: only when an event is appraised as favouring or threatening satisfaction of at least one of an individual’s concerns will an emotion arise’. Pleasant versus unpleasant emotions are typically elicited when events are appraised as concern-conducive versus concern-obstructive.

Since his 1980s model, Scherer has also included a similar idea in his model of emotion: the appraisal of goal relevance as a key mechanism for emotion elicitation. Scherer (1982: 559) defines the evaluation of the goal relevance of a stimulus as ‘the appraisal of the extent to which the introduction of that particular stimulus or event will further or hinder the attainment of a goal high in priority at that particular point’. This definition, which is very similar to Lazarus’ motivational relevance or Frijda’s concern relevance, highlights the role of goals in emotion, advocating that cognitive processes are critical in the elicitation of emotions (see also Oatley and Johnson-Laird, 1987).

Relevance can be conceptually linked to other constructs in motivation research – for example, the wanting component in reward processing (Pool et al., 2016a) – and operationalized to study the effects of relevance, not only on the emotional response (Scherer, 2013), but also on cognitive mechanisms such as attention (Pool et al., 2016b; Maratos and Pessoa, 2019), learning (Stussi et al., 2018) and memory (Montagrin et al., 2018). As an operational definition of relevance, Sander (2013: 22) suggests that an “object or situation is appraised as relevant for an individual if it increases the probability of satisfaction or dissatisfaction toward a major concern of the individual”. This is consistent with recent work that links relevance to how much a stimulus is informative (Olteanu et al., 2019).

Thus, while the idea of ‘relevance’ is common and central to very different theories of emotion, whether or not it is possible to develop it in terms of how it has been developed in pragmatics has, until another paper we the authors are currently working on, been left completely unexplored (see Dukes et al. in prep.). In that paper, we take a very different angle, asking, not what pragmatics can do for the affective sciences, but rather, what the affective sciences can do for pragmatics.

## 5. Two notions of relevance?

There is a point where too much information and too much information processing can hurt. Cognition is the art of focusing on the relevant and deliberately ignoring the rest.

(Gigerenzer and Todd, 1999: 21).

In the epigraph to this section, Gigerenzer and Todd might be describing the Cognitive Principle of Relevance. It seems to us that the quote is also so redolent of the epigraph that began this whole paper, that we would be justified in taking it that the two notions of relevance under discussion have a lot in common. After all, the function of emotion described in the de Sousa quote seems to be identical to the one ascribed to cognition by Gigerenzer and Todd. Nonetheless, on the face of it, based on common ideas about what distinguishes emotion and cognition and having read our earlier descriptions of the two types of relevance (relevance theory pragmatics – relevance<sub>PRAG</sub> and relevance as used in the affective sciences – relevance<sub>AFF</sub>) readers may have identified four main putative differences between the two.

1. Relevance<sub>AFF</sub> is defined in relation to one or several goals or concerns while relevance<sub>PRAG</sub> is not.
2. While the definition of relevance<sub>PRAG</sub> appeals directly to cognitive effects and processing efforts, the definition of relevance<sub>AFF</sub> does not.
3. While in relevance theory the reactions tend to be argumentation and warranted (but non-demonstrative) inferences about propositional, often linguistic, contents, in appraisal theory, the reactions are emotional episodes, which may in turn lead to further courses of emotional action.
4. Relevance theory focuses on (so-called) ‘higher’, epistemic processes – e.g. linguistic interpretation – while appraisal theory focuses on ‘lower’ processes – e.g. emotions such as fear or joy that may be shared with infants and nonhuman animals.

We claim that these putative differences are only apparent and highlight below what we believe to be profound similarities between the two notions of relevance. We will conclude, on the one hand, that differences (1) and (2) do not indicate incompatibilities about the definitions of  $\text{relevance}_{\text{PRAG}}$  and  $\text{relevance}_{\text{AFF}}$  but may, in fact, be interpreted as indicating overlapping properties. On the other hand, we conclude that putative differences (3) and (4) may actually concern processes other than the detection of relevance. In sum, on closer scrutiny, rather than come more clearly into focus, all four differences seem to blur. The affective sciences and pragmatics may well be involved in studying the same phenomena, but simply from different perspectives.<sup>9</sup>

The first putative difference is that  $\text{relevance}_{\text{AFF}}$  is defined in terms of goals, concerns, or motivations, but, as we have seen earlier, inputs to cognitive processes are  $\text{relevant}_{\text{PRAG}}$  in the sense that they provide an individual with some form of benefit at an acceptable processing cost. We have indeed seen above that what is called ‘relevance’ in the affective sciences is the relevance of a particular stimulus to the goals of the person in whom the emotion is being elicited, the stimuli being either obstructive or conducive to these goals. These representations can be very primitive and are shared by all animals which can have emotions. For instance, when the emotion of fear is elicited, what is appraised as relevant is typically a threat to the goal of being safe. In pride, it is typically an event that is conducive to the goal of being successful. In indignation, an obstruction to the goal of instantiating justice. By contrast, no goals are mentioned in the definition of  $\text{relevance}_{\text{PRAG}}$ .

However, contrary to appearances, we believe that while the term ‘goal’ is not explicitly used in the definition of  $\text{relevance}_{\text{PRAG}}$ , the search for relevance may well be interpreted as involving two goals: (i) the goal of maximizing cognitive effects and (ii) the goal of minimizing processing efforts. These two factors can plausibly be understood as goals defined as states of affairs that motivate (consciously or unconsciously) the organism to act (Millikan, 1995; Moors, 2017). We thus use ‘goal’ here as an umbrella term encompassing concerns, urges, plans, ideals, what is desired, needed, or is the object of any other motivating mental state. *Ceteris paribus*, a stimulus is more  $\text{relevant}_{\text{PRAG}}$  if it is more conducive to the goal of acquiring positive cognitive effects – or, in other terms, if it is conducive to the goal of acquiring knowledge or improving an individual’s representation of the world. Indeed, Sperber and Wilson (1985/1996: 46) are quite clear that the efficiency of human beings as information devices ‘can only be defined with respect to a goal’ (our emphasis). So, the first factor in the definition of  $\text{relevance}_{\text{PRAG}}$  can plausibly be understood as a goal. And the second can too: a stimulus is more  $\text{relevant}_{\text{PRAG}}$  if it is more conducive to the goal of minimizing efforts (Inzlicht et al., 2018; Walton and Bouret, 2018). This second factor can also be understood as a special case of a widespread goal in the animal kingdom: that of avoiding wasting one’s energy.<sup>10</sup> Indeed, minimizing processing efforts seems to be a special case of this widespread goal. If what is claimed in this paragraph is correct, the main difference between the two notions of relevance when it comes to goals is that  $\text{relevance}_{\text{AFF}}$  relates to any kind of goal that may lead to an emotional reaction (with different emotions typically linked to different goals) – from basic goals, such as being safe or reproducing, to elaborate ones, such as pursuing gender equality – while  $\text{relevance}_{\text{PRAG}}$  is restricted to two goals: maximizing cognitive effects and minimizing processing efforts.

However, this difference does not amount to the claim that the two notions are entirely different. In fact, the two goals defining  $\text{relevance}_{\text{PRAG}}$  may well be  $\text{relevant}_{\text{AFF}}$ . For instance, when it comes to so-called **epistemic emotions** such as interest, curiosity, or ‘hot doubts’,<sup>11</sup> the goal to which one is reacting emotionally plausibly is the goal acquiring certain pieces of knowledge: i.e. maximizing cognitive effects (and in particular those that are relevant). For instance, it is plausible that in an episode of interest, we appraise a stimulus as relevant to our goal of learning something novel (Silvia, 2006), especially if this piece of knowledge is relevant to our current concerns. Similarly, the goal of minimizing one’s processing efforts may be instantiated in certain affective episodes, such as affective feelings of weariness, laziness, or boredom. Imagine for instance that, on a Friday evening after a long week of work, you finally arrive home and are more than ready to open a beer and start resting. Suddenly, you realize that it is actually the last day to return your tax files, or that you forgot that you need to revise a paper this evening, or do some other demanding task requiring an unexpected effort. At this point, you may undergo a negative affect such as weariness. We find it plausible that this is an affective reaction to a stimulus appraised as obstructive to the goal of minimizing energy. And when this stimulus is a cognitive task, then we plausibly appraise it as obstructive to the goal of minimizing processing efforts.

The last paragraph shows that, at least in principle, the two goals that are used to define  $\text{relevance}_{\text{PRAG}}$  may be goals thanks to which we react emotionally. If that is correct, then the first difference mentioned above does not show that the two notions of relevance define two different phenomena. So, at least theoretically, the first difference may be discarded.<sup>12</sup>

These reflections lead us to propose the following diagram (Fig. 1) in which we hypothesize that  $\text{relevance}_{\text{AFF}}$  and  $\text{relevance}_{\text{PRAG}}$  both are subtypes of a more general kind of relevance (goal relevance) and that they form an intersection where we find epistemic emotions, i.e. phenomena that are both the emotional reactions (and so presumably instantiate  $\text{relevance}_{\text{AFF}}$ )

<sup>9</sup> We thus concur with the idea, already present in the work of Aristotle, that a barrier should not be erected between cognition and emotion. This idea has been present in the cognitive sciences since their inception (Arnold, 1960) and has become more and more accepted in psychology since the 1980s thanks especially to appraisal theory (see Section 4). It has also been famously popularized by Damasio (1994).

<sup>10</sup> Thanks to Agnes Moors for making this suggestion.

<sup>11</sup> Hot doubt is a kind of doubt accompanied by emotional features such as a negative valence, the physiological changes and action tendencies often seen in cases of obsessive-compulsive disorder (see Thagard 2008, ch. 9).

<sup>12</sup> The kinds of goals studied in both domains can be culturally universal – e.g., in the affective sciences, the avoidance of physical harm and, in pragmatics, the goal of acquiring knowledge – or context specific – e.g., in the affective sciences, the goal to publish this paper (which will lead to joy or disappointment) and, in pragmatics, the goal to understand what our friend has just said. In both domains, the goals can be conscious or unconscious.

but that also concern the goal of acquiring knowledge that is typical of  $\text{relevance}_{\text{PRAG}}$ .<sup>13</sup>  $\text{Relevance}_{\text{AFF}}$  is a proper subset of goal-relevance, because we may detect goal-relevant stimuli without reacting affectively (e.g., if the goal itself has a low value), and thus in ways that are typically left out of the scope of the affective sciences. For the same reason,  $\text{relevance}_{\text{PRAG}}$  is a proper subset of goal-relevance because we may react to goal-relevant stimuli in ways that are usually not studied by pragmatics (e.g. emotional reactions to non-communicative stimuli). As is apparent from these examples,  $\text{relevance}_{\text{AFF}}$  and  $\text{relevance}_{\text{PRAG}}$  are meant to correspond to the set of cases that have actually been studied in the affective sciences and pragmatics respectively. But before we can establish that the hypotheses illustrated in this diagram are sound, we need to turn to the other potential differences between  $\text{relevance}_{\text{AFF}}$  and  $\text{relevance}_{\text{PRAG}}$ .

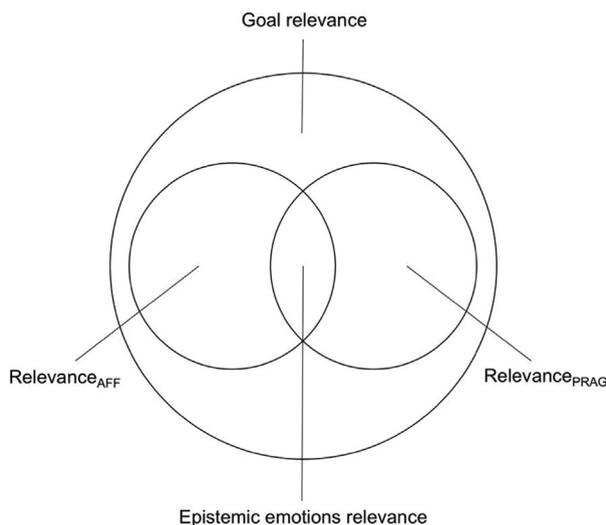


Fig. 1. Relevance in affective science and pragmatics.

The second putative difference is that while the definition of  $\text{relevance}_{\text{PRAG}}$  appeals directly to cognitive effects and processing efforts, the definition of  $\text{relevance}_{\text{AFF}}$  does not. However, what we have just seen is that in the case of epistemic emotions, the stimulus may well be appraised as  $\text{relevant}_{\text{AFF}}$  to the goal of maximizing cognitive effects. And when it comes to certain kinds of weariness (see above), the triggering stimulus may well be appraised as relevant to the goal of minimizing processing efforts and as being obstructive to it. If that is correct, then our second theoretical difference once again shows that the two notions overlap.

The third putative difference concerns the reaction to detected relevance: while relevance theory focuses on reactions which tend to be argumentation and warranted (but non-demonstrative) inferences about propositional, often linguistic, contents, in appraisal theory the responses are emotional episodes, which may, in turn, lead to further courses of emotional action. Note first that, as we have seen in Section 3 above, although the focus of relevance theory has been propositional contents that are ostensibly communicated, this is not essential to  $\text{relevance}_{\text{PRAG}}$ .  $\text{Relevance}_{\text{PRAG}}$  can not only apply to non-communicative cases, it can also apply to non-propositional contents. That is,  $\text{relevance}_{\text{PRAG}}$  can account for both comprehension *and* interpretation (Wilson and Sperber, 1985; Wilson, 2018). It is true that relevance theory has focused on processes that involve the comprehension of ostensibly communicated propositional contents, but this may be considered a historical contingency, a consequence of the fact that relevance theory originated from research in linguistics. If we consider once again an epistemic emotion such as interest, we see that the two notions of relevance seem to apply.

It is true that when an event is deemed  $\text{relevant}_{\text{PRAG}}$  it might not lead to an emotional response. And it is true that when an event is deemed  $\text{relevant}_{\text{AFF}}$  it may not lead to the typical process of inference studied by pragmatists – for instance, if we see a snake in an unknown jungle, our fear will tend to make us recoil from it rather than trying to start a sophisticated interpretation in order to gain more knowledge about the world (unless it is our **goal** to study this snake, say because we are a snake scientist). But these differences simply demonstrate that when stimuli are deemed relevant to different goals (being safe vs. acquiring knowledge), they lead to different reactions. It does not show that the notion of relevance itself is different in the two cases, rather that the two cases are relevant (in the *same* sense) to different things. Indeed, some emotion researchers claim that  $\text{relevance}_{\text{AFF}}$  can lead to cognitive effects, and it has been suggested that it is because emotional stimuli are affectively relevant that they have effects on several cognitive mechanisms such as attention (Pool et al., 2016b; Maratos and Pessoa, 2019) or memory (Montagrin et al., 2018).

<sup>13</sup> The goal of minimizing cognitive effort, the other goal typical of  $\text{relevance}_{\text{PRAG}}$  may arguably always accompany the goal of acquiring knowledge, but we lack space to develop this issue.

The fourth putative difference was about so-called ‘higher’ epistemic processes on which relevance theory focuses and the so-called ‘lower’ processes that are the subject of appraisal theory. While it is true that  $\text{relevance}_{\text{PRAG}}$  typically has been described as related to sophisticated cognitive tasks such as inferential comprehension, we have already seen that it should not be restricted to this territory. Presumably, in many cases where one interprets the situation by searching for  $\text{relevance}_{\text{PRAG}}$ , in particular in non-communicative, non-propositional cases, one does not need to use ‘higher’, recently evolved neocortical mechanisms. For instance, nowhere in relevance theory does it state that the mind needs to compute representations of either effect or effort. Rather the effort/effect ‘ratio’ of the cognitive processes involved in the search for relevance is comparable to those found in bodily processes where, for example, muscular effort is monitored according to effects gained (see Sperber, 2005). Presumably then,  $\text{relevance}_{\text{PRAG}}$  as it is theorized in relevance theory may well also operate at a ‘low-level’ process, one that is present in most animal species. Indeed, relevance theorists usually agree that  $\text{relevance}_{\text{PRAG}}$  can be found far down the evolutionary tree (see for instance Cornell and Wharton, forthcoming, and Sperber 2019). Furthermore, it would be false to think that  $\text{relevance}_{\text{AFF}}$  must be solely concerned with ‘low-level’ cognition since we react emotionally to stimuli that require sophisticated processing, such as linguistic stimuli. Indeed, appraisal theory has theorized about different levels of appraisal and has for instance put forward distinctions between a sensory-motor level, which involves only ‘low-level’ cognition, a conceptual level concerned with ‘higher’ cognition, and an intermediary schematic level (see Van Reekum and Scherer, 1997 for a detailed presentation). It seems, then, that both types of relevance may be concerned with both ‘lower-’ and ‘higher-level’ cognition.

## 6. Conclusion

In the absence of any great degree of interaction between the two disciplines, pragmatics and the affective sciences have each developed over the years with a notion of relevance at their core. Having presented a brief summary of both notions of relevance and attempted to clarify a common misunderstanding – that pragmatic relevance is only related to communication – we have answered the question we articulated at the end of our introduction: is the fact that the two notions share the same name a mere terminological coincidence, or are there meaningful similarities between them which might be used to inform research in both disciplines? It seems clear to us that there is no coincidence, and in the previous section to this paper we considered in turn four putative differences. Beneath each of these differences, we discovered, there is little of any substance.

In support of this we hypothesize that both  $\text{relevance}_{\text{AFF}}$  and  $\text{relevance}_{\text{PRAG}}$  are, in fact, subtypes of a more general kind of relevance which we might call **goal relevance**.  $\text{relevance}_{\text{AFF}}$  is a proper subset of goal-relevance because goal-relevant stimuli can be detected without eliciting an emotional response, and thus in ways that are not generally studied in the affective sciences. By the same token,  $\text{relevance}_{\text{PRAG}}$  is a proper subset of goal-relevance because we may react to goal-relevant stimuli in ways that are usually not generally studied by pragmatics (such as affective responses to non-communicative stimuli).

While affective scientists have made great strides in understanding the processes of emotion elicitation, emotional response, and the recognition of emotions in others, the notion of relevance used in that discipline has remained under-specified. We hope that the above discussion can contribute to a debate which will result in a more specific and operational definition, as well as to dedicated experimental research, for instance on the cognitive effects of  $\text{relevance}_{\text{AFF}}$ . As for relevance-theoretic pragmatics, while the notion of relevance is clearly defined, its relation to affect – and indeed the role of affect in communication generally – has been woefully underexplored. We hope this paper will go some way to redressing the balance. For while the notions of  $\text{relevance}_{\text{AFF}}$  and  $\text{relevance}_{\text{PRAG}}$  identified in Fig. 1 correspond to the set of cases that have actually been studied in the affective sciences and pragmatics respectively, if the objects of study of these two disciplines become closer to each other, as we think they should, the sets in question will begin to merge. In the same way the search for relevance is a search that underpins human cognition, it is also the search that underpins human emotion.

## Declaration of competing interest

The authors report no conflict of interest.

## Acknowledgement

During part of the writing, Constant Bonard benefitted from the Swiss National Science Foundation grant Early Post-doc.Mobility P2GEP1\_200057.

## References

- Arnold, M.B., 1960. *Emotion and Personality*. Columbia University Press, New York.
- Bell, D.M., 1997. Innuendo. *J. Pragmat.* 27 (1), 35–59. [https://doi.org/10.1016/S0378-2166\(97\)88001-0](https://doi.org/10.1016/S0378-2166(97)88001-0).
- Bertuccelli, P.M., 2014. The pragmatics of insinuation. *Intercult. Pragmat.* 11 (1), 1–29. <https://doi.org/10.1515/ip-2014-0001>.
- Blakemore, D., 2011. On the descriptive ineffability of expressive meaning. *J. Pragmat.* 43 (14), 3537–3550.
- Carston, R., 2018. Figurative language, mental imagery and pragmatics. *Metaphor Symb.* 33 (3), 198–217. <https://doi.org/10.1080/10926488.2018.1481257>.
- Cave, T., Wilson, D., 2018. *Reading Beyond the Code: Literature and Relevance Theory*. Oxford University Press, Oxford.
- Constant B., Beyond ostension. *J. Pragmat.* Submitted for publication.
- Cornell, L., Wharton, T., 2021. Before meaning: creature construction, sea-sponges, lizards and Humean projection. In: Ifantidou, E., de Saussure, L., Wharton, T. (Eds.), *Beyond Meaning*. John Benjamins, Amsterdam (forthcoming).

- Damasio, A., 1994. *Descartes' Error*. Grosset/Putnam, New York, New York.
- Daniel D., Tim W., Steve O., Constant B., David S., Emotion and Relevance, *Psychol. Inq.* In preparation.
- De Sousa, R., 1987. *The Rationality of Emotion*. Cambridge University Press, Cambridge, MA.
- Ekman, P., 1992. An argument for basic emotions. *Cogn. Emot.* 6 (3–4), 169–200. <https://doi.org/10.1080/02699939208411068>.
- Ekman, P., Cordaro, D., 2011. What is meant by calling emotions basic. *Emot. Rev.* 3 (4), 364–370. <https://doi.org/10.1177/1754073911410740>.
- Ellsworth, P.C., Scherer, K.R., 2003. Appraisal processes in emotion. In: Davidson, R.J., Scherer, K.R., Goldsmith, H.H. (Eds.), *Handbook of affective sciences*. Oxford University Press, Oxford, pp. 572–595.
- Fehr, B., Russell, J.A., 1984. Concept of emotion viewed from a prototype perspective. *J. Exp. Psychol. Gen.* 113, 464–486. <https://doi.org/10.1037/0096-3445.113.3.464>.
- Fodor, J., 1987. Modules, frames, fridgeons, sleeping dogs and the music of the spheres. In: Pylyshyn, Z. (Ed.), *The robot's dilemma: The frame problem in artificial intelligence*. Ablex, Norwood, NJ, pp. 139–149.
- Fricke, E., 2012. Stating and insinuating. *Aristot. Soc. - Suppl. Vol.* 86 (1), 61–94. <https://doi.org/10.1111/j.1467-8349.2012.00208>.
- Frijda, N.H., 1986. *The emotions*. Cambridge University Press, Cambridge.
- Frijda, N.H., 2007. *The Laws of Emotion*. Erlbaum, Mahwah, NJ.
- Frijda, N.H., 2009. Emotion experience and its varieties. *Emot. Rev.* 1 (3), 264–271. <https://doi.org/10.1177/1754073909103595>.
- Gigerenzer, G., Todd, P., 1999. Fast and frugal heuristics: the adaptive toolbox. In: Gigerenzer, G., Todd, P., ABC Research Group (Eds.), *Simple Heuristics that Make Us Smart*. Oxford University Press, Oxford.
- Grice, H.P., 1957. Meaning. *Phil. Rev.* 66 (3), 377–388.
- Grice, H.P., 1975. Logic and Conversation. In: Cole, P., Morgan, J. (Eds.), *Speech Acts, Syntax and Semantics*, 3. Academic Press, New York, pp. 41–58.
- Grice, H.P., 1989. *Studies in the Way of Words*. Harvard University Press, Cambridge, MA.
- Gutzmann, D., 2015. Use-conditional meaning. *Studies in Multidimensional Semantics*. Oxford Studies in Semantics and Pragmatics, 6. Oxford University Press, Oxford.
- Inzlicht, M., Shenhav, A., Olivola, C., 2018. The effort paradox: effort is both costly and valued. *Trends Cognit. Sci.* 22 (4), 337–349. Apr.
- Kaplan, D., 1999. What is Meaning? Explorations in the Theory of *Meaning as Use*. Brief Version – Draft 1 Ms, UCLA.
- Kolaiti, P., 2019. *The Limits of Expression: Language, Literature, Mind*. Cambridge University Press.
- Kolaiti, P., 2020a. From a Poetics of Language to a Poetics of Action: Literature and Art as a Cognitive Object. Cambridge University Press in press.
- Kolaiti, P., 2020b. Perceptual relevance and art: some tentative suggestions. *J. Lit. Semant.* 49, 2 in press.
- Lange, J., Dalege, J., Borsboom, D., van Kleef, G.A., Fischer, A.H., 2020. Toward an integrative psychometric model of emotions. *Perspect. Psychol. Sci.* 15 (2), 444–468. <https://doi.org/10.1177/1745691619895057>.
- Maratos, F., Pessoa, L., 2019. What drives prioritized visual processing? A motivational relevance account. *Prog. Brain Res.* 247, 111–148.
- Meibauer, J., 2014. Lying at the semantics-pragmatics interface, vol. 14. Walter de Gruyter, Boston/Berlin.
- Mercier, H., Sperber, D., 2017. *The Enigma of Reason*. Harvard University Press, Cambridge, Massachusetts.
- Millikan, R.G., 1995. Pushmi-pullyu representations. *Phil. Perspect.* 9, 185–200.
- Montagrin, A., Sterpenich, V., Brosch, T., Grandjean, D., Armony, J., Ceravolo, L., Sander, D., 2018. Goal-relevant situations facilitate memory of neutral faces. *Cognit. Affect Behav. Neurosci.* 18, 1269–1282.
- Moors, A., 2017. Integration of two skeptical emotion theories: dimensional appraisal theory and Russell's psychological construction theory. *Psychol. Inq.* 28 (1), 1–19.
- Oatley, K., Johnson-Laird, P.N., 1987. Towards a cognitive theory of emotions. *Cogn. Emot.* 1, 29–50. <https://doi.org/10.1080/02699938708408362>.
- Olteanu, L., Golani, S., Eitam, B., Kron, A., 2019. The effect of relevance appraisal on the emotional response. *Emotion* 19 (4), 715–725. <https://doi.org/10.1037/emo0000473>.
- Oswald, S., 2010. *Pragmatics of Uncooperative and Manipulative Communication*. PhD thesis. Université de Neuchâtel.
- Oswald, S., Maillat, D., de Saussure, L., 2016. Deceptive and uncooperative verbal communication. In: *Verbal Communication*. Mouton de Gruyter, pp. 509–534.
- Padilla Cruz, M., 2009. Might interjections encode concepts? More questions than answers. *Lodz Pap. Pragmat.* 5 (2), 241–270.
- Piskorska, A., 2012. Cognition and emotions -A joint effort at obtaining positive cognitive effects?. In: *Relevance Studies in Poland Essays on Language and Communication*, vol. 4. WUW, Warsaw (Poland), pp. 102–111.
- Piskorska, A., 2016. Perlocutionary effects and relevance theory. In: Padilla Cruz, M. (Ed.), *Relevance Theory: Recent Developments, Current Challenges and Future Directions*. John Benjamin, Amsterdam and Philadelphia, pp. 287–305.
- Pool, E., Brosch, T., Delplanque, S., Sander, D., 2016a. Attentional bias for positive emotional stimuli: A meta-analytic investigation. *Psychol. Bull.* 142 (1), 79–106. <https://doi.org/10.1037/bul0000026>.
- Pool, E., Sennwald, V., Delplanque, S., Brosch, T., Sander, D., 2016b. Measuring wanting and liking from animals to humans: A systematic review. *Neurosci. Biobehav. Rev.* 63, 124–142. <https://doi.org/10.1016/j.neubiorev.2016.01.006>.
- Potts, C., 2007. The expressive dimension. *Theor. Ling.* 33 (2), 165–197.
- Russell, J.A., 2003. Core affect and the psychological construction of emotion. *Psychol. Rev.* 110 (1), 145–172. <https://doi.org/10.1037/0033-295X.110.1.145>.
- Sander, D., 2013. Models of Emotion: The Affective Neuroscience Approach. In: Armony, J., Vuilleumier, P. (Eds.), *The Cambridge Handbook of Human Affective Neuroscience*. Cambridge University Press, pp. 5–53.
- Sasamoto, R., 2019. *Onomatopoeia and Relevance: Communication of Impressions via Sound*. Springer Nature.
- Saul, J., 2018. Dogwhistles, Political Manipulation, and Philosophy of Language. In: Fogal, D., Harris, D.W., Moss, M. (Eds.), *New Works on Speech Acts*. Oxford University Press, pp. 360–383.
- de Saussure, L., Schulz, P., 2009. Subjectivity out of irony. *Semiotica* 2009 (173), 397–416.
- de Saussure, L., Wharton, T., 2020. Relevance, effects and affect. *Int. Rev. Pragmat.* 12 (2), 183–205.
- Scherer, K.R., 1982. Emotion as a process: Function, origin and regulation. *Soc. Sci. Inform.* 21, 555–570. <https://doi.org/10.1177/053901882021004004>.
- Scherer, K.R., 2009. The dynamic architecture of emotion: evidence for the component process model. *Cognit. Emot.* 23, 1307–1351.
- Scherer, K.R., 2013. The nature and dynamics of relevance and valence appraisals: Theoretical advances and recent evidence. *Emot. Rev.* 5 (2), 150–162. <https://doi.org/10.1177/1754073912468166>.
- Silvia, P.J., 2006. *Psychology of Human Motivation: Exploring the Psychology of Interest*. Oxford University Press.
- Smith, C.A., Lazarus, R.S., 1993. Appraisal components, core relational themes, and the emotions. *Cogn. Emot.* 7 (3–4), 233–269. <https://doi.org/10.1080/02699939308409189>.
- Sperber, D., 2005. Modularity and relevance: how can a massively modular mind be flexible and context-sensitive? In: Carruthers, P., Stephen, L., Stich, S. (Eds.), *The Innate Mind: Structure and Content*, pp. 53–68.
- Sperber, D., 2019. Personal notes on a shared trajectory. In: Scott, K., Clark, B., Carston, R. (Eds.), *Relevance, Pragmatics and Interpretation*. Cambridge University Press, Cambridge.
- Sperber, D., Wilson, D., 1986/1995. *Relevance: Communication and Cognition*. Blackwell, Oxford.
- Sperber, D., Wilson, D., 2015. Beyond speaker's meaning. *Croat. J. Philos.* XV (44), 117–149.
- Strey, C., 2016. *The Language of Emotions: an Ostensive-Inferential Study*. PhD thesis. Pontificia Universidade Católica do Rio Grande do Sul.
- Stussi, Y., Delplanque, S., Coraj, S., Pourtois, G., Sander, D., 2018. Measuring Pavlovian appetitive conditioning in humans with the postauricular reflex. *Psychophysiology* 55 (8), e13073. <https://doi.org/10.1111/psyp.13073>.
- Thagard, P., 2008. *Hot Thought: Mechanisms and Applications of Emotional Cognition*. MIT press, Cambridge (MA).

- Van Reekum, C., Scherer, K., 1997. Levels of processing in emotion-antecedent appraisal. In: Matthews, G. (Ed.), *Cognitive Science Perspective on Personality and Emotion*. North-Holland, Amsterdam, pp. 259–300. [https://doi.org/10.1016/S0166-4115\(97\)80123-9](https://doi.org/10.1016/S0166-4115(97)80123-9).
- Vogel, W., Raymond, S., Lazarus, R.S., 1959. Intrinsic motivation and psychological stress. *J. Abnorm. Soc. Psychol.* 58 (2), 225–233. <https://doi.org/10.1037/h0043112>.
- Walton, M., Bouret, S., 2018. What is the relation between Dopamine and effort? *Trends Neurosci.* <https://doi.org/10.1016/j.tins.2018.10.001>.
- Wharton, T., 2003. Interjections, language, and the 'showing/saying' continuum. *Pragmat. Cognit.* 11 (1), 39–91.
- Wharton, T., 2009. *Pragmatics and Non-verbal Communication*. Cambridge University Press, Cambridge.
- Wharton, T., 2015. That bloody so-and-so has retired: expressives revisited. *Lingua.* <https://doi.org/10.1016/j.lingua.2015.08.004>.
- Wharton, T., de Saussure, L., 2021. The pragmatics of emotion: love, argument, conflict. In: Scheiwer, G., Altarriba, J., Chin Ng, B. (Eds.), *The Handbook on Language and Emotion*. De Gruyter Mouton, Berlin (forthcoming).
- Wharton, T., Strey, C., 2019. Slave to the Passions: Making Emotions Relevant. In: Carston, R., Clark, B., Scott, K. (Eds.), *Relevance, Pragmatics and Interpretation*. Cambridge University Press, Cambridge, pp. 253–267.
- Wilson, D., 2018. Relevance theory and literary interpretation. In: Cave, T., Wilson, D. (Eds.), *Reading beyond the Code: Literature and Relevance Theory*. Oxford University Press, Oxford, pp. 185–204.
- Wilson, D., Carston, R., 2019. Pragmatics and the challenge of non-propositional effects. *J. Pragmat.* 145, 31–38. <https://doi.org/10.1016/j.pragma.2019.01.005>.
- Wilson, D., Sperber, D., 1985. On choosing the context for utterance interpretation. In: Allwood, J., Hjelmqvist, E. (Eds.), *Foregrounding Background*. Coronet Books, London, pp. 51–64.
- Yus, F., 2016. Propositional attitude, affective attitude and irony comprehension. *Pragmat. Cognit.* 23 (1), 92–116.

**Tim Wharton** is Principal Lecturer in Linguistics at the University of Brighton. His research explores how 'natural', non-linguistic behaviours – tone of voice, facial expressions, gesture – interact with the linguistic properties of utterances. His 2009 book – *Pragmatics and Non-Verbal Communication* – provides the analytical basis to answer some important questions: How are such behaviours interpreted? What do they convey and how can they be accommodated within a theory of utterance interpretation? His work increasingly focusses on the study of affect and he is co-authoring with Louis de Saussure a monograph entitled 'Pragmatics and Emotion'.

**Constant Bonard** is a philosopher working mainly on the relation between meaning and emotion. He recently received a postdoctoral grant from the Swiss National Science Foundation to work on the meaning of slurs. His PhD dissertation (University of Geneva and of Antwerp, 2021) was about how people understand the emotional states of others and how theories in the philosophy of language need to adapt in the light of findings from the affective sciences. He has also conducted research in music psychology and in aesthetics.

**Daniel Dukes** is a postdoctoral researcher at the University of Fribourg and is also affiliated to the Swiss Center for Affective Sciences at the University of Geneva (both Switzerland). He completed his doctoral studies at the University of Neuchâtel (Switzerland) and, thanks to support from the Swiss National Science Foundation, has enjoyed research stays at UC Berkeley (USA), the University of Amsterdam (Netherlands) and the University of Oxford (UK). His research principally focuses on affective social learning, special education, and more generally, on developmental socio-emotional processes - particularly how those processes motivate, and are motivated by, behavioural and cognitive mechanisms.

**David Sander's** main focus is the investigation of emotional processes. He studied mathematics and psychology at University René Descartes (Paris, France), and received a PhD in Cognitive Sciences from University Louis Lumière (France). In 2002, he joined the Department of Psychology at the University of Geneva. He is now full professor in this department and directs the Laboratory for the study of Emotion Elicitation and Expression. In 2012, he has been appointed Director of the Swiss Center for Affective Sciences. His main interests are the mechanisms involved in emotion elicitation, and how these mechanisms modulate attention, memory, and decision-making.

**Steve Oswald** is Senior Lecturer at the University of Fribourg, Switzerland. His research interests lie at the interface between discourse, language and cognition and he has worked extensively on the role of influence in communication (e.g. when communication is non-cooperative, deceptive, persuasive or argumentative). His current research and publications are devoted to the role of pragmatic meaning in the processes of argumentation, which he approaches from both theoretical and empirical perspectives.