

Affective Twist in Irony Processing

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ABSTRACT

Traditionally irony has been researched as a verbal mode of communicating non-literal meaning. Yet, the extant literal/non-literal meaning oriented research provided conflicting evidence and failed to explain how irony vs. non-irony is processed. The dominant literal/non-literal meaning approach hasn't accounted for the role of attitudinal non-propositional contents so crucially involved in irony communication and comprehension. Employed to communicate indirectly, on top of non-literal meaning, irony serves to convey implicit attitudes: emotional load non-propositionally attached to the propositional contents. The role of emotional contents implicitly communicated by irony has not been acknowledged in irony research so far. This paper reviews irony and attitude research, focusing on the non-propositional, emotional contents, aiming to bridge the propositional-non-propositional meaning gap in irony research. Neuroimaging and behavioral evidence showing that emotional load profoundly influences communicative contents processing, priming its computation and determining its processing patterns, is presented, and its role for irony processing is highlighted.

Keywords: attitude; non-propositional meaning; emotional contents; affective load; valence.

Introduction

It seems obvious that everyday human communication is imbued with emotions. On top of what we say, we smuggle how we feel, what are our attitudes, preferences, biases. There are numerous ways to convey emotional

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contents. Most effective and efficient are the nonverbal means: facial mimicry, smile-to-frown range of (micro)expressions, emotional prosody, rich repertoire of gestures, and body postures. These ‘tell’ more than words. Emotion-wise that is. They communicate feelings and attitudes. Emotional contours always tinge verbal interactions, yet remain as pervasive as unexplored. Accumulative experimental evidence shows that emotional contents attached to a message, beyond verbal code (smiling-frowning range of facial work, affective prosody) plays a significant key role in message comprehension, facilitating or delaying the intended meaning grasp. Though deeply interrelated with communication, nonverbal emotional contents, and its impact on verbal contents processing, remains largely unexplored. Language researchers have not developed effective methods to capture the pervasive, yet elusive (nonverbal) affective “matter” attached to the verbal “matter”. Even the language repertoire for communicating attitude and affect by a spectrum of explicit and implicit means, is not well understood. It seems highly commendable to change this inauspicious state of affairs. Language-emotion interface offers to elucidate a range of communicative phenomena. Irony is but one of the intriguing phenomena that might benefit from being explored in language-emotion interdisciplinary framework. How does irony, so far explored by linguistic methods as a linguistic phenomenon, belong to emotion research? This paper attempts at showing that irony is a verbal, though implicit means of conveying attitude. Attitude conveyed by ironic comments, has been recognized as substantial for irony comprehension (e.g. Sperber & Wilson, 1981; 1986; 1991; Wilson & Sperber, 1992; Clark & Gerrig, 1984; Kreuz & Glucksberg, 1989; Barbe, 1995; Kumon-Nakamura et al., 1995; Kotthoff, 2003; Partington, 2007). Yet, despite this recognition, implicit affective evaluation communicated by irony, has not been explicitly explored. Factoring attitude in the experimental research, favors a recognition that emotions are on board. They are on board anyway, however their presence remains unaccounted for. Recognizing emotional contents in irony, might only be beneficial for irony research. It might also help in explaining the inconclusive results obtained so far in the extant irony processing studies.

1. What does language research tell us about irony processing?

Philosophers have attempted to grasp and explain the nature of irony for the last two thousand years(Socrates, Plato, Arystoteles, Sophocles, Quintilian

Grice). With limited success. The predominant rhetorical account centered around indirect criticism function of irony (Cutler, 1974; Muecke, 1970; Booth, 1974; Grice, 1989). Irony was seen as a power tool, affording one with the liberty to criticize publicly, without being committed to the literal value of the words. Precious deniability, on the one hand. A verbal means legitimizing polite impoliteness, on the other hand. Ascribing to this tradition, language oriented philosophers (e.g. Grice, 1975; Searle, 1979) pictured irony, as an anomalous, deviant use of code, convenient to smuggle in (implicitly) unwelcome messages, veiled meanings. Irony was ‘explained’ by substitution where the explicit (polite) needs to be substituted with the implicit (impolite), the literal with the non-literal. What the speaker literally says should be taken to mean ‘something else’, conveniently assumed to be the exact, or relative opposite of what is said. Yet, except for few conventionalized cases, irony communicates no readymade, one-to-one substitutable meaning. Irony, does not work on one-to-one basis: says ‘x’ hence means ‘~x’. Rational as it seemed, substitution approach put paid to ‘explaining’ irony and unmasking the inferential infrastructure involved in its comprehension.

Processing oriented irony research chose not to abandon the literal/non-literal meaning substitution as the overarching distinction, and aimed at finding out whether irony comprehension takes longer, shorter, or as long as non-irony comprehension. Crucially, the goal was to test if irony is comprehended in two stages, as opposed to literal meaning, which is a one-stage attempt. Two major accounts to irony processing took the experimental stage: (i) two-stage account (e.g. Grice, 1975, 1989; Giora, 1997, 2002, 2003), (ii) one-stage account (e.g. Gibbs, 1986, 1994; Sperber & Wilson, 1986/1995). Both chose different ways and employed different mechanisms to explain irony. These accounts differ significantly in how they assess the role of literal (salient or coded) meaning and the role of context in irony processing. Both supply empirical data to corroborate their claims. The experimental results are as incompatible as the theoretical claims.

Two-stage account assumes that literal (salient or coded) meaning is interpreted in the first stage. If the interpretation makes no sense in the current context, it is rejected. Contextually congruent interpretation is pursued in the second stage. This account, strongly anchored in rhetorical tradition, pictures figurative meaning (as in the case of irony) as a derivative of literal meaning, considered as the default standard meaning. Non-literal meaning is pictured as a deviation from the norm, an “anomaly” that can only

be grasped and explained by some special mechanism (i.e. implicature) (Grice, 1975). The two-stage account argues that irony processing always takes longer than literal meaning processing. The comprehender arrives at the figurative, context-fit reading only after processing and rejecting the literal meaning as out-of-synch. Extra time involved in irony processing-rejecting and re-processing is not needed for literal/coded meaning comprehension. Hence, irony takes longer to grasp when compared to the code-based, literal interpretation. Standard Pragmatic Model (Grice, 1975; Searle, 1979), and Graded Salience Hypothesis (Giora, 1995, 1997, 1999; 2003) are the two main models advocating the privileged status of code-based (literal, salient) meaning interpretation. A number of experimental irony studies support two-stage processing assumptions and demonstrate that irony processing takes longer than non-irony processing does (e.g. Giora et al., 1998; Giora & Fein, 1999, Giora, et al. 1998; Dews & Winner, 1999; Schwoebel et al., 2000).

One-stage account advocates context-dependent interpretation in the first and only stage. It holds that comprehenders are not bogged by the literality or the non-literality of message meaning. They care about the intended, context-embedded meaning. This attempt makes no processing distinctions for the literal or non-literal meaning. No special, privileged status is ascribed to the literal meaning. Literal meaning is a constituent of pragmatic meaning, next to other contextually cued meaning constituents. No special or extra mechanism is postulated to govern non-literal meaning processing (Sperber & Wilson, 1986). Both literal and non-literal meanings are processed in parallel manner (Gibbs, 1986; 1994). What matters in this account is the (degree of) context supportiveness. Supportive context facilitates the intended ironic interpretation. Unsupportive (or non-supportive enough) context slows the comprehension down. Irony processing takes no longer than the literal equivalents processing does, provided irony-supportive context (e.g. Gibbs, 1986, 1994, 2001, 2002; Sperber & Wilson, 1986/1995). These claims have been empirically supported by a number of empirical studies showing that irony comprehension is not more time consuming than literal meaning comprehension (e.g. Gibbs, 1986; 1994; Colston, 2002; Colston & O'Brien, 2000; Gerrig & Goldvarg, 2000; Ivanko & Pexman, 2003).

These two accounts providing conflicting results on irony processing, legitimize questions about the nature of irony and the essence of ironicity. If it is not the literal/non-literal meaning that generates the processing time difference, then literality/non-literality does not constitute the essence of

ironicity, as it has been stipulated. What then makes the essence of irony? What cues, features, properties make irony up and influence its processing speed? Across a range of domains, irony communicates more than it says, apparently by exploiting one feature: dichotomy. Barbe (1995) singles out dichotomy as “the” constitutive feature of irony. Irony is used to serve various communicative functions (e.g. funniness, implicit emotion display, exaggeration, politeness, etc.) and may employ various verbal and non-verbal means to do the “doublespeak”: communicate two dichotomous levels of meaning. Barbe (1995) distinguishes three potential levels of dichotomy in irony: (i) semantic and pragmatic incongruity – literal and intended meaning dichotomy (cf. Colston, 2002; Coston & O’Brien, 2000; Gerrig & Goldvarg, 2000; Ivanko & Pexman, 2003); (ii) linguistic meaning and behavior incongruity (cf. Gibbs, 1986; Jorgensen et al., 1984; Kreuz & Glucksberg, 1989; Kumon-Nakamura et al., 1995; Sperber & Wilson, 1981, 1986/1995); (iii) linguistic meaning and affective evaluative incongruity (cf. Sperber & Wilson, 1981, Kreuz & Glucksberg, 1989). Literal meaning vs. affective meaning dichotomy, sounds a worthwhile line of investigation, especially that irony markers, all of them, conspire to manifest affective load, to boost ironic reading.

A range of irony markers may be employed to signal literal meaning/affective meaning dichotomy (e.g. range of facial expressions, affective prosody). These markers signal affective dichotomy by extra-linguistic affective cues. They are not irony specific. Rather, they might be employed to manifest contrasts and mark incongruity between meaning levels in all forms of communication (e.g. Bryant & FoxTree, 2002; Bryant & FoxTree, 2005; Attardo et al., 2003). Markers facilitate irony recognition and comprehension. Yet, irony calls for subtle marking. Over-marking ironic intent is detrimental to the funniness, or poignancy of ironic message. Over-marked, irony loses its expressive impact (cf. Cutler, 1974, p. 117). Ironic markers of affective dichotomy such as non-anatomic, non-propositional structures, vary and depend on a range of subtly manifested extra-linguistic properties. These subtle, non-linguistic effects call for communicative granularity and finesse in ostensive manifestness on the one hand, and inferential granularity, on the other hand. Their elusive, non-propositional nature escaped propositional-meaning driven research so far.

Exclusive focus on the linguistic input, to the exclusion of extra-linguistic cues, co-manifested in ironic messages, failed to account for irony vs. non-

irony differential speed processing patterns. Visibly, there is more to irony than the literal/non-literal distinction. To account for this “more” and improve the limited, deficient picture of irony comprehension, a closer look at context and extra-linguistic cues manifesting ironic contents, might help. Irony cannot be grasped without context. Ironic non-propositional cues are contextually manifested. Yet, what makes irony context is not obvious. It seems beneficial to examine how the linguistic context: what is said, the socio-situational context: who-to-who, where, when, in what manner, blend with mental context, i.e. what the speakers/hearers assume, anticipate, feel about what they say/hear. The mental set up, and especially the feelings, attitudes implicitly manifested, may turn out as relevant a context for irony, as the linguistic context. This possibility though, has not been much tested.

In communicative interactions in general, people care a lot about emotional contents: feelings and attitudes they share. In irony people care about implicit modal contents: the critical or praising attitudinal load they communicate on top of what they explicitly say. Leggitt, Gibbs (2000) emphasize that empirical research has not so far accounted for the implicit emotional layer in irony, despite its crucial significance. This affective, modal, non-propositional communicative content that evidences how we feel about what we say, constitutes the backbone of human interpersonal interaction (e.g. Tomasello et al., 2005; Tomasello, 2008). Affective load in interpersonal communication is the core ingredient of social interaction. While one can easily imagine complex affective communication without words, it is difficult to image human-to-human communication devoid of affective load. Damasio (1994) observes that we are never (unless in a comma) devoid of affect (background affect constitutes the most basic affective milieu that prompts feelings and emotions). It underpins human action and thought. It permeates communication. Affective code is more ancient than language code. That might be the reason why the ever present affective load has so far escaped linguists’ attention (cf. Zajonc 1980). It has been taken for granted. If pragmatics is to account for the gap between what people say and what they mean, it needs to account for how they manifest their attitudes and how these shape communicative comprehension. According to Sperber & Wilson (1986/1995) we manifest meanings, rather than merely provide propositions, which trigger metarepresentational contents. When we communicate we embed the propositional meaning (linguistic evidence) within the non-propositional,

affective cover. These two combined, propositional and non-propositional contents, make the pragmatic meaning (cf. Moeschler, 2009).

2. What does attitude processing research tell and how is it relevant for irony?

Attitude is tightly intertwined with communication and language in ways not well understood. Attitude construct is central to social psychology (e.g. Eagly & Chaiken, 1993) due to its prime and crucial impact on social interactions. Interest in how attitude affects communication has not generated much research in language studies (with a notable exception of Hunston, Thompson, 2000; Martin & White 2005). Yet, language/attitude relations, and especially how attitude enters linguistic contents, and whether it preempts verbal contents processing (e.g. Zajonc, 1980, 1984; LeDoux, 1996) seems crucial for pragmatics.

Since Thurston's definition (1931, p. 261) of attitude as "affect for or against a psychological object", attitudes have been researched as favorable/unfavorable feelings about, evaluative characterizations of, and action predispositions toward stimuli. This approach reflects empirical evidence showing that attitudes are reducible to the net difference between the positive and negative value they convey (cf. Allport, 1935; Lewin, 1935; Ito et al., 1998; Ito, Cacioppo, 2000; Ito, Cacioppo, 2001; Ito, Cacioppo, 2005). Eagly & Chaiken (1993, p. 1) notice that evaluative tendency triggered by attitude stimuli is "expressed by evaluating a particular entity with some degree of favor or disfavor." Evaluation is a basic, core ingredient of any attitudinal disposition and refers to overt, covert, cognitive, or affective response to evaluative contents. Evaluative dispositions are "a type of bias that predisposes the individual toward evaluative responses that are positive or negative." (Eagly & Chaiken, 1993, p. 2). Attitudinal responses are evaluative, and evaluation is connected with the imputation of some degree of goodness or badness to an entity (e.g. Lewin, 1935; Osgood et al., 1957; Thompson & Hunston, 2000).

Cacioppo and Gardner (1999) emphasize that environmental stimuli are diverse, complex, multidimensional, and seemingly incomparable. Yet, perceptual systems evolved to be tuned to the most significant (survival oriented) environmental features that might be represented on a common metric: good vs. bad. Recent studies of the conceptual organization of emotion support the view that people's knowledge about emotions is hierarchically

organized to respect a super-ordinate division between positivity and negativity (e.g. Ortony et al., 1988; Lang et al., 1990; Cacioppo & Gardner, 1999). Cacioppo and Berntson (1994) add that attitudes as positive/negative affect towards stimuli, generate two basic dispositions: attraction and aversion (cf. Shizgal, 1999; Davidson et al., 1990). Attitudinal dispositions are underpinned by biological mechanisms, physiological biases and predispositions triggered by emotionally competent stimuli. Attitudes cannot be fully understood without considering their biological and neural substrates. The biological, biochemical, and neural substrates of emotion, as well as neuropsychological aspects of emotional expressions should constitute a constant point of reference for attitude research, and should be recognized as viable meaning components in irony processing research.

Processing oriented attitude research recognizes valence as a basic form of valuation: assessing whether something is good or bad, helpful or harmful, rewarding or threatening at a given instant in time (Barrett, 2006, p. 36). Valence is considered an elemental property of emotions (Barrett et al., 2007, p. 183), a semantic primitive (Osgood et al., 1957), a special semantic feature, accessed before activation of other semantic features (Zajonc, 1980, 1984), and a core ingredient of meaning (e.g. Barrett, 2006; Barrett, Bar, 2009). Valence refers to intrinsic attractiveness (positive valence) and aversiveness (negative valence) of an event, situation, object, or stimulus (cf. Lewin, 1935; Damasio, 1994). Van Berkum et al. (2009) notice that language researchers disregard valence as a semantic primitive and a core ingredient of meaning. Yet, if valence of a concept is encoded as part of its meaning (cf. Barrett, Bar, 2009), the affective valuation corresponding to goodness and badness, needs to be viewed as an integral part of meaning. All individuals “read” the environment in terms of valence, and sense it as a basic feature of their experience (Lewin, 1935; Barrett, 2006). These readings concerning goodness/badness of stimuli or events, shape the perception and interpretation of the incoming stimuli (communicative as well). The growing body of evidence demonstrates that valence is an invariant property of emotionally competent stimuli (e.g. Bargh, Chartrand, 1999; Bargh, Ferguson, 2000; Bargh, 2007). People continually and automatically evaluate situations and objects for their relevance and value, assessing whether or not they signify something relevant to well-being (e.g. Bargh, Ferguson, 2000; Ferguson, 2007; Brendl, Higgins, 1996; Tesser, Martin, 1996; Duckworth et al., 2002). Lang and colleagues (1990) propose that emotional valence is a

general information-processing category that permeates brain/mind organization and activity. If this is so, it seems only commendable to find out how attitudinal valence impacts irony processing.

3. Attitude priming: congruence/incongruence processing

Numerous attitude priming studies show that attitudes (affective valence) are processed rapidly and pre-consciously. The main finding of attitude priming paradigm is that attitude congruence facilitates evaluative processing, while attitude incongruence hinders it. The extant studies corroborate this robust finding in conscious processing condition, when subjects are asked to evaluate target stimulus as “good” or “bad”, as well as in unconscious processing condition, when affective stimuli are subliminally presented, or the task is to name/pronounce the target (e.g. Fazio et al., 1986; Bargh et al., 1992; Bargh et al., 1996; Chaiken & Bargh 1993). Bargh and colleagues demonstrated that all environmental stimuli are subject to a constant and automatic evaluation. The constant pressure to rapidly tell apart the threatening from the nonthreatening and respond immediately and appropriately, produced automaticity in evaluative processing (e.g. Bargh, 2007; Barrett, Bar, 2009). Attitude priming automaticity has been found for lexical stimuli (Bargh et al., 1992; Bargh et al., 1996; Fazio et al., 1986; Chaiken & Bargh, 1993; Hermans et al., 1994), pictures (Giner-Sorolla et al., 1999; Fazio et al., 1995; Hermans et al., 1994), odors (Hermans et al., 1998), faces (Murphy & Zajonc, 1993). The effect of affective priming has been found for explicit and implicit evaluative tasks (Bargh et al., 1996; Duckworth et al., 2002), and motor responses (Chen & Bargh, 1999; Duckworth et al., 2002; Wentura, 2000). The priming effect has also been obtained for subliminal priming (Greenwald et al., 1989; Greenwald et al., 1996; Murphy & Zajonc 1993; Ferguson et al., 2004). These results show that affect competent stimuli are processed rapidly. Attitude-congruity generates faster response times than does attitude-incongruity.

4. Positivity offset, negativity bias

The consistency of experimental results obtained in attitude priming paradigm evidences but one aspect of valence processing the facilitated processing of valence-congruent stimuli, and inhibited processing of valence-incongruent stimuli. The observed facilitated valence congruence and impeded valence

incongruence processing does not exhaust affective valence processing mechanics. Quite distinct valence processing effects have been observed for positive versus negative valence processing paradigm, researched as positivity offset and negativity bias (e.g. Cacioppo & Berntson, 1994; Cacioppo et al., 1997). Positivity offset refers to enhanced positive valence processing. Negativity bias indexes inhibited negative valence processing (Ito et al., 1998; Ito & Cacioppo, 2000; Ito & Cacioppo, 2005). Positivity offset/negativity bias paradigm attests to the working of default affective infrastructure responsible for the differential processing of positive and negative valence (Lang et al., 1990; Cacioppo & Berntson, 1994; Cacioppo et al., 1997; Cacioppo et al., 1999; Cacioppo, 2004; Berntson & Cacioppo, 2008). Positivity offset and negativity bias effects have been evidenced in differential chronometry, physiology and neuroarchitecture of evaluative processing. Valence chronometry is impressive. Within the range of mere 100-150 milliseconds, the brain already knows whether the activated stimulus “translates” into benefit or harm (e.g. Kawasaki et al., 2001; Pizzagalli et al., 2002; Schupp et al., 2004; Smith et al. 2003; Grandjean & Scherer, 2008). This astoundingly swift discrimination between affect competent and affect neutral stimuli is reflected in further processing stages. Positive and negative valence are processed by separate, or non-overlapping neural systems (Davidson, 1994, Cacioppo et al., 1999; Barrett, Bar, 2009) with varied speed (Smith et al., 2003; Kawasaki et al., 2001; Ito et al., 1998) and intensity (Ito & Cacioppo, 2000, 2005; Kawasaki et al., 2001). Positivity offset and negativity bias effects have been observed at the biological (Cacioppo et al., 1997; Davidson, 1994), structural (Damasio, 2010), functional (LeDoux, 1996; Panksepp, 1998), physiological (Davidson, 1992) and neural level (Cacioppo, Gardner 1999; LeDoux 1995; Damasio 1994; Cacioppo & Berntson 1994). These effects seem to wield too strong an impact on brain/mind dynamics to be ignored in irony communication and comprehension research.

4.1. Why positivity is faster?

Positively valenced stimuli are processed swiftly and smoothly. Why so? First of all, positive valence translates into benefit. No threat – no need to respond, and mobilize to action. Disposition to approach elicits leisurely response (e.g. Shizgal, 1999; Davidson, 1994). Peeters et al. (1971, 1989, 1990) notice

that positively valenced stimuli are processed swiftly and less intensely than the negative ones because of sheer frequency. Positive stimuli predominate. They are more ubiquitous. To account for the privileged processing of positive information, Unkelbach et al. (2008) proposed the density hypothesis. According to the density hypothesis, positive information is processed faster due to its high associative density in memory network. Positive information is more alike in general, and therefore intensely interconnected. Negative information, on the other hand, is not even relatively alike. Therefore, much less interconnected. Lack of highly interconnected associative network elongates processing, and demands higher processing cost. The density hypothesis holds that the more dense the associative network the faster and smoother the processing. Negative information associative density is lower than positive, hence slower processing. Ashby et al. (1999) proposed to explain the enhanced processing of positively valenced stimuli by dopamine hypothesis, positing that positive affect is connected with increased brain level of dopamine. Increased dopamine level (in the anterior cingulate cortex) has been found to impact increased speed and efficiency of processing. Positive affect induced by positive valence augments dopamine level, which impacts directly the processing fluency and creativity (e.g. Estrada et al., 1994; Isen et al., 1985), and facilitates access to positive information network (Isen et al., 1978). This systematically enhances the speed and quality of decision making (Isen et al., 1988; Isen et al., 1991). The insights this neurophysiological theory offers show the importance of positive affect (boosted dopamine level) in facilitated verbal contents processing, hence the mechanisms it captures and evidence it offers, seem directly relevant for theories dedicated to explaining the role of attitudinal contents in contextualized meaning comprehension.

4.2. Why negativity is longer?

Negatively valenced stimuli generate asymmetric processing patterns (negativity bias) reflected in longer and more intense processing. This effect is manifested in behavioral, psychological and physiological patterns. The high processing intensity is connected with the physiological mobilization to rapid and concentrated response to adverse stimuli. It pays to attend to and rapidly respond to potential threats (Baumeister et al., 2001; Rozin & Royzman, 2001; Taylor, 1991; Pratto & John 1991). Negative, threatening stimuli claim more intense processing than positive, non-threatening stimuli, because

negative stimuli signify immediacy of responding. Threat works as an alarm that activates physiological know-how to respond (e.g. Taylor, 1991). This ancient mechanism has evolved to secure survival and wellbeing, by focusing processing resources on salient stimuli (LeDoux, 1996; Damasio, 1994). From the evolutionary perspective negatively valenced input, irrespective of modality (audio, visual, olfactory, tactile), constitutes the highest priority. The mechanism at work has been perfected for millennia of evolution to manage adversity and support decision making, and to do it with flawless automaticity (LeDoux, 1996; Panksepp, 1998; Damasio, 2010; Shizgal, 1999). The alarm is activated by all sorts of emotionally competent stimuli, perceptual, cognitive and linguistic (Baumeister et al., 2001; Barrett & Bar, 2009). Ito and Cacioppo (2000) emphasize that negative stimuli processing is more intense because the immediacy and necessity to respond absorbs more processing resources (e.g. Cacioppo et al., 1994; Ito et al., 1998; Ito et al., 2000). A range of physiological, all body involving responses get activated. Kawasaki and colleagues (2001) observed a characteristic for aversive stimuli neural pattern: a short-latency, transient inhibition followed by a prolonged excitation. Neutral and pleasant stimuli exhibit a strikingly different processing pattern. Baumeister and colleagues (2001) emphasize that negative valence plays a fundamental role in calibrating emotional system. Its main purpose is to mobilize one to the challenges of the environment. Positive valence, to the contrary, serves to stay the course and to explore the environment. These positive and negative valence processing patterns have been observed for explicit and implicit attitudinal meaning processing in studies on irony processing (Bromberek-Dyzman, 2010; Bromberek-Dyzman forthcoming; Ivanko & Pexman 2003). Therefore, valence processing mechanism and patterns so widely evidenced in attitude research, deserve a more thorough investigation and recognition in irony research.

5. Anticipatory processing

Recent neuroimaging research points to proactive anticipatory processing of the brain infrastructure as an explanation of speed and efficiency of even cognitively complex pieces of information processing. Recent accumulating evidence shows that the brain specializes in generating context-tailored predictions cued by the incoming even most rudimentary, gist evidence (Bar, 2007, 2009, 2011; Bar & Neta, 2008). This evidence seems relevant for

irony research as it provides insight into how linguistic and extra-linguistic cues interact in affect-loaded meaning processing. Research has demonstrated that we routinely, if unconsciously use the predictive skills to predict what other people might do (Frith & Frith, 2003, 2010) or say (Sperber & Wilson, 2002). There is a growing support for the realization that brain is proactive, and evolved to predict and respond to the environment (Bar, 2007; 2009; Van Berkum, 2010). Communication processing in general and irony comprehension in specific, seem to thrive on this evolutionarily evolved prediction mechanics. Any bit of manifested evidence, i.e. a word, tone of voice, facial expression, posture displayed while speaking, contributes to contextualized meaning making. This default predictive mode of verbal input processing, alters significantly irony processing picture. If the affect driven anticipatory default network plays a significant, if implicit, role in verbal irony processing, determining the speed and intensity of its processing, it should enjoy more explicit research interest. For one, it would mean moving beyond the literal/non-literal meaning dictum to more explicit focus on extra-linguistic cues.

Recently Regel and colleagues (2010) set to test when/how listeners integrate extra-linguistic and linguistic information to compute the intended meaning. They wanted to find out whether/how the implicit knowledge about the speaker's communicative style (ironic vs. non-ironic communicative style) activates predictions and, how these reverberate in brainwave patterns. In two sessions they manipulated the speakers' use of irony (70% vs. 30% irony frequency) to see how irony frequency implicitly cues anticipation for irony. The study showed that unexpected irony produced by the non-ironic speaker, resulted in an increased P600, and both ironic and literal statements made by the ironic speaker, elicited similar P600 amplitudes. Session two, conducted one day later, featured balanced irony use, yet the ERPs showed an irony-related P600 for the ironic speaker (thwarted anticipation), but not for the non-ironic speaker. This finding indicates that implicit knowledge about speaker's preference for explicit/implicit attitude communication, does affect language comprehension in early processing (200 ms after the onset of a critical word), as well as in the later stages of comprehension (500-900 ms post-onset). Bits of pragmatic, extra-linguistic information about the speaker's communicative style preferences (attitude display), have a direct bearing on the neurophysiology (brainwaves) of inferential processing. The study shows that predictive processing triggered by the style of attitude communication,

determines brainwaves patterns in anticipated vs. unanticipated communicative contents processing. The implicit, extra-linguistic cue manifested by the frequency of ironic/non-ironic comments, shows to play a significant role in modulating brainwaves and processing patterns. This finding attests to the predictive default brain activity. Implicit cues about a speaker's communicative style modulate expectations and alter brainwaves patterns. Regal and colleagues' findings show that ironic and literal meanings were processed differently, depending on whether anticipation for irony or literal comment was implicitly triggered. Electric activity brain patterns differed as a function of implicit anticipation, and not literality/non-literality.

The impact of extra-linguistic cues on communicative contents processing has also been posited by Higgins (1998). According to Higgins individuals by default rely on feelings, experiences, memory, or any non-specific bit of information that gets evoked while specific contents is being processed. Higgins emphasized that the influence of incidental, extra-linguistic, experiential information, reflects the operation of a tacit aboutness principle. Accordingly, while we process a cue, all the memory deposited contents associated with the cue (about the cue) gets activated and is co-processed. Research seems to belittle the role and impact of non-propositional, extra-linguistic cues on the propositional contents processing. There is a widespread assumption that the mental contents: thoughts and feelings that appear while we process messages, get evoked by the propositional contents. The extra-linguistic cues are subtle, vague and usually taken for granted. So much so that they remain "invisible" to conscious experience, and experimental research. Yet, their impact on message processing is as much inestimable as unexplored.

Winkielman and colleagues (2002, 2003) put forward hedonic fluency hypothesis to account for a wide range of preference phenomena in terms of their processing dynamics. They propose that a range of non-specific features (e.g. extra-linguistic cues), next to the traditionally researched propositional contents of the message, impact fluency of processing. According to hedonic fluency hypothesis, perceptual and cognitive input processing depends as much on the specific, target related, as the nonspecific cues, which often influence processing dynamics before the specific features are extracted from the stimulus. Winkielman and colleagues emphasize that evaluative contents processing, hinges on two basic sources of information: (i) declarative information, such as features of the target, and (ii) non-feature based experiential information, such as the interpreter's affective state, accompanying

feelings, biological, physiological markers consciously or subconsciously experienced at the moment of processing, and a wide range of situational non-specific factors. Traditionally, only the declarative (propositional) information about the target has been explored as relevant for the target processing. According to Winkielman and colleagues, current research is in no position to decide how the propositional (stimulus specific) and the non-propositional (stimulus non-specific) merge to influence the processing patterns. Extralinguistic, “incidental” cues might render the target specific cues more salient, more accessible, and hence might directly impact the processing dynamics. Various biological markers, such as neurotransmitter levels, electrical brain activity, body posture or facial expressions underpin affective states expression as non-specific cues, and “invisibly” affect the propositional contents processing. These non-feature-based cues are routinely evoked by affect competent stimuli to be indiscriminately interpreted as “about” the target (cf. Higgins, 1998). Winkielman and colleagues (2003) provide evidence that affective, non-specific cues are accessed before individuals fully process stimulus features (cf. Zajonc, 1980, 1984; Murphy & Zajonc, 1993), and hence impact further target processing (cf. Bar & Neta, 2008; Bar & Barret, 2009). Winkielman & Huber (2009) emphasize that processing fluency concerns not only perceptual fluency reflected in the ease of low-level, perceptual operations driven primarily by stimuli surface features. Parallel effects have been observed in conceptual fluency, reflected in high level stages of processing, concerned with identifying the meaning of the stimulus. Hedonic fluency hypothesis emphasizing equal significance of non-specific (non-propositional) and stimulus feature specific (propositional) cues, might be taken to promote the balance between propositional and non-propositional contents in irony processing research.

Recent neuroimaging research shows that affective load is recognized very early on in the comprehension process (e.g. Kawasaki et al., 2001; Smith et al., 2003; Barrett & Bar, 2009). There is evidence showing that affective contents of verbal input is processed pre-consciously, unlike the semantic contents, which requires conscious access to stimulus information (e.g. Zajonc, 1980; Murphy & Zajonc, 1993; Bargh et al., 1996; Greenwald et al., 1989; Greenwald et al., 1996). Murphy and Zajonc (1993), testing the affective primacy hypothesis (Zajonc, 1980, 1984), found that positive and negative affective reactions can be evoked with minimal stimulus input and virtually no cognitive processing involved. Barrett and Bar (2009) proposed

the affective prediction hypothesis, in which they demonstrate that recognition of affective valence of a stimulus is not a separate, subsequent processing stage, initiated only after the stimulus has been recognized, but runs parallel to its identification and significance recognition. Barrett and Bar (2009) provide empirical data showing that the brain routinely anticipates the affective value of the incoming stimuli, and affective load (stimuli positivity or negativity) influences the processing style (speed, intensity), and chronometry. Affective load of perceptual and cognitive stimuli has been found to impact directly perception, identification, recognition and valuation in a top-down manner. Affect-dedicated neural circuitry has evolved to handle valence in the brain. It comprises a network that includes primarily (stimuli and task depending) amygdala, prefrontal cortex, insula, cingulate cortex, hypothalamus, nucleus accumbens, and the brainstem (cf. Cacioppo et al., 2004; Dalgleish, 2004; Damasio, 1994; Davidson & Irwin, 1999; Dolan, 2002; Ledoux, 2000). This affect network is central to attitudinal contents processing, and evaluation-embedded decision making (Damasio, 1994). Language sciences cannot ignore accumulating evidence showing that valence network recognizes affective contents within a mere 100-150 ms (e.g. Grandjean & Scherer 2008; Pizzagalli et al., 2002; Schupp et al., 2004; Smith et al., 2003; Kawasaki et al., 2001). If affective load is so preferentially accessed and processed, valenced cues need to be acknowledged as basic ingredients of meaning whenever affective meaning is communicated.

Recent irony neuroimaging research shows that affective valence circuit overlaps in some critical areas with theory of mind (ToM) circuit which handles irony comprehension. How affective valence network cooperates with theory of mind circuit in handling irony, needs to be further researched. Yet, recent neuroimaging and lesion irony processing studies show that irony comprehension is impossible when ToM is deficient. Fully fledged theory of mind faculty allows to comprehend others: their attitudes, intentions, affective (what they feel) and cognitive (what they think) states. It also enables irony comprehension (Frith & Frith, 2003, 2010; Wang et al., 2006; Wakusawa et al., 2007; Uchiyama et al., 2006; Shamay-Tsoory et al., 2005a, 2005b; Shibata et al., 2010). Shamay-Tsoory et al., (2005a) emphasize that emotions and affective states are as crucial for irony communication-comprehension as the cognitive states are. In a series of studies Shamay-Tsoory et al. (2005a, 2005b), Uchiyama et al. (2006), Wakusawa et al. (2007) examined how ToM circuit navigates irony comprehension, and how cognitive and affective systems

are involved. These studies confirm the role of theory of mind in irony comprehension and point to the role of affective ToM, to be as crucial for irony comprehension as cognitive ToM (Shamay-Tsoory et al., 2005 a,b).

6. What does attitude (valence) research tell us about irony?

Rhetoric tradition pictured irony as a figurative, non-literal meaning, a substitute to literal meaning. This paradigm harnessed to empirical testing produced inconclusive, conflicting results showing that irony can be processed slower, as fast as, or faster than literal equivalents. The contradictory results might be a side effect of not tapping the essence of irony and unaccounting for it in research designs. Approaches striving to account for irony comprehension, by relying exclusively on the traditional philosophical and linguistic (language autonomy approach) methods, no longer suffice to explain the emerging intricacies of mental and neural infrastructure employed for pragmatic inferential tasks. New mounting evidence challenges the traditional language-autonomy based accounts, and sets new research agendas striving to master interdisciplinary goals by means of experimental methods in multidimensional perspectives. Recent accumulative research shows that on top of propositional meaning so far exclusively researched, irony communicates non-propositional, implicit, attitude contents. This implicit, evaluative load appears of key significance, processing-wise. Communication serves to exchange the contents of our minds: what matters most. On top of what we say, we piggyback attitudes, feelings, moods. Affective contents seems to be the engine of human interaction. The linguistic meaning does not exhaust the communicative potential of non-propositional contents. The propositional contents of the “said” is but one level of the ironic message. What we say matters, but how we say it, manifested by extra-linguistic cues, is at least equally important.

Research needs to find out more specifically what extra-linguistic cues manifested non-propositionally in communicative context, impact irony comprehension and how this happens. Experimental pragmatics, with its processing, variable-oriented experimental design, seems fit to tap the propositional and non-propositional processing mechanics involved. It needs to pin down the extra-linguistic, affective factors and mechanisms underpinning irony communication and comprehension. Neuropragmatics inspired by new research methods on mind and brain dynamics, offers quite

new insights into the mental and neural infrastructure of communicative comprehension. Irony research has already been slightly redefined by the insights offered by recent neuroimaging research (Shamay-Tsoory et al., 2005a,b; Uchiyama et al., 2006; Wakusawa et al., 2007; Shibata et al., 2010; Regel et al., 2010). Intriguing results observed for evaluative valence processing seem to have a direct bearing on how irony is handled mind/brain-wise. The significance of valence circuit and ToM circuit overlapping, needs to be explored at length. Language research cannot afford to ignore affective valence, which boasts as rapid an activation time window as 100-150 ms. Hence, traditional models on irony comprehension need to be revised to accommodate for the attitudinal contents. Attitude is onboard. Specific predictions as to the role of implicit attitude in irony processing, need to be worked out and tested explicitly.

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