

The role of stereotypes in irony comprehension in autism spectrum disorders

Scientific Report – First Visit (5-9/12/2010)

1. Purpose of the visit

In this project, we investigate the interaction between social stereotypes and irony comprehension in individuals with autism spectrum disorders (ASD). Studies dedicated to social stereotypical categorization and irony perception in normal subjects demonstrated that speaker's gender (Link and Kreuz 2005; Colston and Lee 2010), ethnic group (Heredia and Blumentritt 2002) and occupation (Pexman and Olineck 2002) are highly influential social constraints on interpretation of ironic utterances. The objective of the first visit was to design norming studies aiming at establishing (i) stereotypes triggers and (ii) means of activating them in online irony comprehension. A third objective of the visit was (iii) the development of the experimental stimuli, i.e. the set of stories for the main experimental study.

2. Description of the work carried out during the visit

We discussed previous results on the role of stereotypes in irony comprehension during a lecture given by F. Ervas at Adam Mickiewicz University, Poznań and entitled "A missing bridge between social knowledge and mind-reading". We discussed a forthcoming study investigating how irony is socially perceived and whether occupation stereotypes facilitate irony comprehension in a group of ASD adults (N=17). The results showed that individuals with ASD performed as well as the comparison group in recognizing ironical utterances. Moreover, both groups exhibit an overall similar image of irony: irony is generally perceived as more mocking, but also more polite and positive. Interestingly, the results also shows that when a character in the story has a job stereotypically considered as sarcastic, comprehension of ironical utterances improved only in comparison group. These results suggested that ASD individuals have difficulties in integrating social stereotypical knowledge with information coming from the understanding of ironical intention.

During the first visit, We decided to focus our attention on the role of **gender stereotypes** in attitudinal meaning in irony comprehension. We planned the experimental design of norming studies and main experimental study following the three main objectives above mentioned:

(i) Gender stereotypes triggers

Two norming studies were designed to construct stereotypic personality traits.

The aim of the **first norming study** is to identify gender traits that have stereotypical association with women and men. In order to develop priming stimuli, a group of 30 males and 30 females will be asked to list most salient male and female gender traits/attributes in terms of communicative styles. In this way, we could generate two lists of communicative behaviors/attributes most conspicuously associated with gender trait features, a first list "features of males" (e.g. patient, rude, direct, etc.) and a second list "features of females" (e.g. polite, gossipy, indirect, etc.).

The aim of the **second norming study** is to assess the valence and the gender typicality of trait adjectives, in order to have a range of negativity/positivity of male/female communicative traits. A (different) group of 30 males and 30 females will rate the adjectives obtained in the first norming study on 7-point scales in two dimensions (two separate groups of raters; equal number of female and male raters): (a) the negativity/positivity of each trait (1=very negative and 7=very positive) and (b) the gender typicality of each behavior, femininity/masculinity typicality (forced choice: female/male). The following features will be included and rated for valence (positivity/negativity) and the gender typicality in case they will not be in the list obtained in the first norming study: funny, humorous, ironic, polite, direct, indirect, critical, mocking, teasing, offensive, sarcastic, rude, impolite. At the end of the norming studies, we will have four sets of adjectives for communicative traits: 1) female/positive, 2) female/negative, 3) male/positive, 4) male/negative.

(ii) Means of activating gender stereotypes in online irony comprehension

Stereotype priming effect will be activated by an association test, which will precede irony comprehension task and will display both gender-stereotypic and gender-neutral prime attribute in four different conditions:

- 1) female positive (n. 30 adjectives) + gender neutral/non-traits (n. 10 adjectives);
- 2) female negative (n. 30 adjectives) + gender neutral/non-traits (n. 10 adjectives);
- 3) male positive (n. 30 adjectives) + gender neutral/non-traits (n. 10 adjectives);
- 4) male negative (n. 30 adjectives) + gender neutral/non-traits (n. 10 adjectives).

We planned a control group condition (at least 10 participants), having no priming effect at all, but just irony comprehension task.

Equal numbers of participants will be assigned to each conditions representing the factorial combination of stereotype prime condition 2x valence (positive vs. negative), 2x gender (male, female). At the individual test session, the association test task will be given first. Each participant is presented with a list trait features in two given conditions: female positive and female negative, or male positive and male negative. Presented to participants as a test of language association ability, the association test will require an implicit association task for each condition through the following question: "Does the target adjective associate with male or female? Press the button as quickly as possible". Subjects will be exposed, in two different sessions preceding irony comprehension tasks, to positive or negative traits that are semantically associated with gender stereotypic traits. To give an example, the order of tasks will be: association test (male, positive condition), irony comprehension task, (break), association test (male, negative condition), irony comprehension task.

(iii) Experimental stimuli for Irony comprehension task

The experimental stimuli for the main study on irony comprehension will be a set of 16 stories, developed according to three conditions (+ distraction):

- 1) 16 stories (8/she; 8/he stories) with critical irony/indirect criticism: [-/+] negative context, positive comment;
- 2) 16 stories (8/she; 8/he stories) with literal criticism: [-/-] negative context, negative comment;
- 3) 16 stories (8/she; 8/he stories) with literal praise: [+ /+] positive context, positive comment;
- 4) 40 distractors, fillers.

The set of 16 stories will be displayed in two parts: 8 stories (4/she; 4/he stories) for each condition and 20 distractors will be presented after a first association test and 8 stories (4/she; 4/he stories) for each condition and 20 distractors will be presented after a second association test. The first irony comprehension task will be preceded by a training session (6 stories). Irony comprehension task will simply consist in answering the following question: “Is the comment sentence critical? Press the button as quickly as possible”.

The stories have to be matched according to the following features:

- 1) **Target words of the stories:** word length and frequency; word valence; word familiarity.
- 2) **Contexts of the stories:** context length and valence; expectancy for the last word in the context.

We checked for the words length (number of characters) and contexts length (number of words). The national corpus for French language “FranText” (www.frantext.fr) was used in order to find out words frequency.

The main experiment on irony comprehension will be preceded by two norming studies. In the first norming study a group of 30 participants (15 males and 15 females) will be asked to judge valence and familiarity for target word and valence for contexts. In the second norming study a group of 30 participants (15 males and 15 females) will be asked to complete each story with one word that first comes to their mind (cloze test).

3. Description of the main results obtained

(i) Gender stereotypes triggers

According to the norming studies designed, we prepared two tests to be filled by two different groups of 60 participants (30 females and 30 males), French native speakers.

First norming study: Test composed by two sheets. In the first sheet there will be the following instructions: Please, note down the most striking features of **FEMALE** communicative style (adjectives preferably, ex: direct, indirect, polite, rude). In the second sheet there will be the following instructions: Please, note down the most striking features of **MALE** communicative style (adjectives preferably, ex: direct, indirect, polite, rude).

Second norming study: After having collected a list of adjectives in the first norming studies, we will ask 60 participants: “Please, rate each adjective according to the criteria below”

- 1) *Emotional meaning:* where 1 stands for very negative and 7 very positive

1	2	3	4	5	6	7
Very negative	negative	rather negative	neutral	rather positive	positive	very positive

- 2) *Gender typicality:* M stands for male and F stands for female

Example:

- | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|
| 1) ironic: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | M | F |
|------------|---|---|---|---|---|---|---|---|---|

(ii) Means of activating gender stereotypes in online irony comprehension

Subjects will participate in two ostensibly unrelated studies. During the “first study”, subjects will do an implicit association test (Banaji test) featuring male/female stereotypical traits. There will be 4 groups (for 4 priming conditions) and a control group (no priming task). All features will be presented in the middle of the screen. On the top left corner there will be written “FEMALE” and on top right corner “MALE”. Participants will be asked to decide whether the target associates with male or female attributes, by answering to the question: “Does the word belong to the left or to the right category?”.

In the “second study”, subjects will do an online comprehension task, reading mini-stories featuring a male or female target in communicative interactions ending with a comment. Comments will be either directly critical (-/-); indirectly critical (-/+); non-critical/praising (+/+). Subjects will evaluate the target comments expressed as to whether it conveyed favorable/unfavorable comment.

(iii) Experimental stimuli for Irony comprehension task

We provided a list of target words in French matched for frequency and word length. We will choose target words for experimental stimuli in irony comprehension tasks among the following 40 couple of adjectives:

- 1) Concise f. 101 // Prolixe f. 156
- 2) Frais m. 14719 // Chaud m. 10358
- 3) Loyale f. 576 // Fourbe f. 959
- 4) Laid m. 2456 // Joli m. 8344
- 5) Désinvolte 336 // Maladroite f. 590
- 6) Élégante f. 1954 // Vulgaire f. 4950
- 7) Superflu m. 1389 // Efficace m. 3637
- 8) Patient m. 2114 // Nerveux m. 5456
- 9) Ennuyeux m. 2315 // charmant m. 8158
- 10) Superbe m. 6725 // Affreux m. 9405
- 11) Positif 2542 // Négatif m. 1468
- 12) Repoussante f. 166 // Fascinante f. 148
- 13) Adorable(m./f.) 2827 // Horrible (m./f.) 8671
- 14) Bizarre f. 5850 // Normale f. 3504
- 15) Éteint m. 4130 // Ardent m. 3813
- 16) Léger m. 10343 // Grave m. 13838
- 17) Douce f. 18427 // Ferme f. 17835
- 18) Sincère f. 5260, Franc m. 4603 // Injuste (m./f.) 5521
- 19) Hautain m. 798 // Affable m. 555
- 20) Brillant m. 4749 // Médiocre m. 3915
- 21) Forte f. 18880 // Faible f. 13872
- 22) Habituel m. 2151 // Étonnant m. 3999
- 23) Gentil m. 5436, Galant m. 2516 // Brutal m.2508
- 24) Veule f. 170 // Fièrè f. 610
- 25) Basse f. 13297 // Haute f. 21573
- 26) Robuste f./m. 2183 // Fragile f./m. 2944
- 27) Délicat m. 3852 // Barbare m. 4606
- 28) Paresseux m. 1889 // Laborieux m. 1341
- 29) Petit m. 50000+ // Grand m. 50000+
- 30) Large m. 17835 // Court m. 17166
- 31) Arrogant m. 314 // Courtois m. 923

- 32) Clair m. 16687 // Vague m. 11540
 33) Célèbre (m./f.) 6798 // Anonyme (m./f.) 1733
 34) Courant m. 16308 // Inconnu m. 10596
 35) Distrain m. 2331 // Attentif m. 3016
 38) Prudent m. 2969 // Étourdi m. 1353
 39) Épais m. 5203 // Mince m. 6199
 40) Courageux m. 2309 // Téméraire m. 1549

In the first norming study preceding irony comprehension task, a group of 30 participants (15 males and 15 females) will be asked to rate each adjective, according the criteria below:

- 3) *Emotional meaning*: where 1 stands for very negative and 7 very positive

1	2	3	4	5	6	7
Very negative	negative	rather negative	neutral	rather positive	positive	very positive

- 4) *Familiarity*: where 1 stands for not familiar at all and 7 very familiar

1	2	3	4	5	6	7
Unfamiliar at all	unfamiliar	rather unfamiliar	neutral	quite familiar	familiar	very familiar

Example:

	EMOTIONAL VALUE: NEGATIVE/POSITIVE							FAMILIARITY						
1) Douce:	1	2	3	4	5	6	7	1	2	3	4	5	6	7

On the basis of chosen adjectives, we will provide a set of 16 contexts in both positive and negative versions, having as a model the following example:

[-]Tom and Ken took part in a race, and Ken crossed the finishing line last. (15 words)

[+]Tom and Ken took part in a race, and Ken crossed the finishing line first.

Ken's friend commented on this later. (6 words)

[+]He said: "You're so fast" (2+4 words)

[-]He said: "You're so slow"

In the first norming study preceding irony comprehension task, participants will also be asked to rate each context according to the following criterion:

- 1) *Emotional meaning*: where 1 stands for very negative and 7 very positive

1	2	3	4	5	6	7
Very negative	negative	rather negative	neutral	rather positive	positive	very positive

In the second norming study preceding irony comprehension task, participants will also be asked to complete the story with one word that first comes to their mind.

Example:

Tom and Ken took part in a race, and Ken crossed the finishing line

(iv) Experiment planning

The first experiment session for the first norming study in a group of 60 participants (30 males and 30 females) is planned on January 6, 2010. We discussed experiments timetable and subjects recruitment, above all in relation to a set of features to be matched in both comparison and ASD group: age, gender, education, Verbal IQ, Performance IQ, Total IQ. All participants will sign informed consent before volunteering for this study, in accordance with the local ethical committee and the Declaration of Helsinki. Adults with a clinical diagnosis of Asperger Syndrome (AS) according to DSM-IV R (American Psychiatric Association, 2000) and ASDI (Asperger Syndrome Diagnostic Interview, Gillberg, Gillberg, Råstam, & Wentz, 2001) will be recruited from Albert Chenevier Hospital in Créteil.

The inclusion criteria will be based on retrospective parental information about the early language development of their child. All diagnoses will be made by experienced clinicians and will be based on clinical observations of the participants. Interviews with parents or caregivers using the ADI-R (Autism Diagnostic Interview, Lord, Rutter and Le Couteur, 1994) will be used to confirm the diagnoses. The cut-off points for the three classes of behaviour are reciprocal social interaction 10, communication 8, and stereotyped behaviours 3, respectively. As part of the checking process, the French translation of A-TAC (Autism, tics, AD-HD and other comorbidities; Hansson, Svanstrom Rojvall, Rastam, Gillberg, Gillberg and Anckarsater, 2005) will be completed by the parents. This screening questionnaire is focused on a number of abilities, conducts and behaviours in a child's functioning as compared to his or her peers. Parents are asked to report any problem or specific characteristic observed at any period of life, even when this is no longer present.

Prior to their recruitment, the comparison participants will be screened to exclude any with a history of psychiatric or neurological disorders. All participants will be native French speakers, and had normal/corrected to normal vision. All participants will receive basic neuropsychological screening, which included Verbal and Performance IQs (WAIS-III) (WAIS-III, Wechsler, 1999).

4. Future collaboration with host institution

We planned a workshop on irony comprehension in autism spectrum disorders to be held at Jean Nicod Institut on April 11, 2011, during K. Dyzman's visit in Paris (second visit, EURO X-PRAG Project). The purpose of the workshop is to discuss the major issues in contemporary irony theories and explore their relevance for the problem of irony comprehension in individuals with autism spectrum disorders. In this framework, we planned to discuss the experimental design above described and the first results of the study.

In the **first part of the workshop**, an explanation of ironic utterance comprehension as conveying the opposite meaning from what is said will be discussed from both the point of view of linguistics and experimental pragmatics. Other than recognizing a specific tone of voice and facial expression, irony requires a listener a very complex social and communicative ability to understand speaker's specific intention and her skeptical or mocking attitude (Attardo 1994; Lee and Katz 1998). Moreover, a full understanding of irony would entail some appreciation of why speakers choose this communicative strategy to express their thought in social contexts (Leggitt

and Gibbs 2000; Katz et al. 2004). Participants: Deirdre Wilson (University College London) and Kasia Dyzman (Adam Mickiewicz University, Poznań).

In the **second part of the workshop** we will address the problem of irony comprehension in individuals with autism spectrum disorders, which has been regarded as a consequence of the inability to recognize speaker's intention and go beyond the decoded sentence meaning of an utterance (Happé 1994; Joliffe and Baron-Cohen 1999). These difficulties have also been linked to their inability to use background or contextual information in on-line comprehension of others' behavior (Frith 1991), to understand the relevance of what has been said or what has been indirectly conveyed (Happé 1991, Mitchell et al. 1997). Particular attention will be paid to the influence of social and cultural factors on irony comprehension, often ignored in models of language (Colston and Katz 2005). Participants: Tiziana Zalla (Institut Jean Nicod, Paris), Francesca Ervas (Institut Jean Nicod, Paris) and Rachel Giora (Tel Aviv University).

5. Projected publications/articles resulting or to result from the grant

We aim to present, in a poster format, first results of the study on subjects typically developed at Barcelona conference in June 2011 and first results of the study on both comparison group and a group of participants with autism spectrum disorders at Pisa conference in October 2011. Two articles could therefore result from the study financed by the EURO X-PRAG grant.

F. Ervas submitted an editorial proposal to Humana.Mente, Journal of Philosophical Studies for a special issue entitled "The Experimental Turn in Philosophical Pragmatics". The proposal was accepted by Humana.Mente editorial committee and they proposed both an on-line version and a hard copy (ETS Editions, Pisa). The volume will contain contributions coming from both invited authors and contributed authors whose papers will be selected through double-blind review process. The language of the volume will be English. K. Dyzman is willing to write the paper concerning theories of irony. A brief outline of editorial project is the following one:

Modern pragmatics has been defined as "philosophical", not only because its main representative authors, such as Grice and Austin, were philosophers of ordinary language, but also because it has used linguistic and philosophical analysis as a method to give an explanation of communicative features of language. However, in the last years, plenty of studies have brought classical pragmatic theories in front of the tribunal of experience, to test their power of explanation and prediction. The result has been the growth of a flourishing interdisciplinary, called "Experimental Pragmatics", which claims that understanding an utterance requires access to the speaker's intention in specific contexts and uses experimental techniques coming from psycholinguistics, cognitive sciences and psychology to bring to light the comprehension mechanisms of non-literal and figurative language. The objective of this issue is to discuss the main empirical results of Experimental Pragmatics and to explore its theoretical influence on "philosophical" pragmatics in its most important research subjects, such as figures of speech, implicatures, ecc. How and to what extent do experimental method and conceptual analysis interact in pragmatics? Which consequences does this experimental turn have for theorizing in pragmatics? (Deadline for submissions: June 30th, 2012; Notification of acceptance: September 30th, 2012; Final version due: October 15th, 2012).

6. Other comments (*if any*)

During the visit, we discussed about some critical aspects to be taken care of in experiment building. Recent research has adapted the semantic priming procedure to study gender and race

stereotypes on the assumption that stereotypes are a particular class of semantic associations (see Banaji and Hardin, in press; Dovidio, Evans and Tyler 1986; Gaertner and McLaughlin 1983; Perdue and Gurtman 1990). Semantically related concepts automatically facilitate responses as compared with semantically unrelated concepts (e.g. sleep-snore vs. sleep-pencil), stereotypically related concepts ought to automatically facilitate responses to a greater extent than concepts inconsistent with stereotypes (e.g. gentle-she vs. gentle-he).

A study by Dovidio et al. (1986) provided one of the first demonstrations using RT measures of stereotype priming. In that experiment, participants were presented with a sequence of two words, a prime category followed by a target trait (e.g. Black-musical, White-ambitious). Participants were asked to perform a simple judgment on the target trait, and their response time was taken as a measure of the strength of association between the category and the trait. The activation of race stereotypes was shown through participants' faster responses to traits that were stereotypic of the prime category (e.g. White-ambitious) than to traits that were counterstereotypic of the prime category (e.g. White-musical).

Banaji and Hardin (1996) did not control for the valence of their stimuli, a factor that has been shown to influence automatic responding (see Bargh et al. 1992; Fazio et al. 1986). In addition, their research examined only the automatic priming of non-trait stereotypes (i.e., gender-typed occupations and roles), whereas early attempts to study stereotype priming, indeed much of stereotyping research, focused entirely on personality traits (e.g. Dovidio et al. 1986; Gaertner and McLaughlin 1983; Perdue and Gurtman 1990). Clearly, a full analysis of stereotype priming must include both positive and negative personality traits and non-traits (Anderson and Klatzky 1987; Anderson, Klatzky and Murray 1990; Ashmore and Del Boca 1981; Brewer, Dull and Lui 1981; Deaux and Kite 1985; Deaux and Lewis 1984; Eagly and Steffen 1984). Therefore, need to further establish a procedure through which automatic gender stereotype priming could be assessed by using a more representative stimulus set of both positive and negative personality traits and non-traits.

Stereotypes are a specific type of expectancy (Hamilton, Sherman and Ruvolo 1990), and like expectancies more generally, stereotypes may influence information processing by focusing attention on and facilitating the processing of information that is consistent with the stereotype (or inhibiting the processing of inconsistent information; Becker 1980; Bruner 1957; Olson, Roese and Zanna 1996; cf. Gollwitzer 1993). One important function of social schemas and related forms of knowledge structures is to fill in missing information about a person or event and to generate expectancies about what is going to happen next (e.g., Fiske and Taylor 1992; Hamilton and Trolier 1986; Higgins 1989, 1996; Olson, Roese and Zanna 1996). These expectancies can then serve as a guide to behavior during social interactions, enabling one to anticipate how the other is likely to act and be ready to respond appropriately.

Work in information processing distinguishes between automatic (mostly involuntary) and controlled (mostly voluntary) processes (e.g. Posner and Snyder 1975; Schneider and Shiffrin 1977; Shiffrin and Schneider 1977). Automatic processes involve the unintentional or spontaneous activation of some well-learned set of associations or responses that have been developed through repeated activation in memory. They do not require conscious effort and appear to be initiated by the presence of stimulus cues in the environment (Shiffrin and Dumais 1981). A crucial component of automatic processes is their inescapability; they occur despite deliberate attempts to bypass or ignore them (Neely 1977; Shiffrin and Dumais 1981). In contrast, controlled processes are intentional and require the active attention of the individual. Controlled processes, although limited by capacity, are more flexible than automatic processes. Their intentionality and flexibility makes them particularly useful for decision making, problem solving, and the initiation of new behaviors.