

Humor Recognition in Psychiatric Patients and Artificial Intelligence

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Abstract

Patients with schizophrenia are characterized by humor recognition deficit which is connected with their cognitive disorder such as inability to filter out irrelevant stimuli. As soon as patients with schizotypal and affective disorders easily recognize humor, this may be used as a strong diagnostic criterion in clinical practice. On the other hand humor recognition by artificial intellect became a hot question in computer science in a flow of attempts to bring human-computer communication closer to social. It is argued that schizophrenic and computer thinking have common features. Both have lack of social and emotional context understanding. To compare failures in humor recognition made by patients with schizophrenia vs computer may move forward theory and practice of both clinical psychology and computer science.

Many clinicians suggest sense of humor disorder to be an important diagnostic criterion in clinical practice (for ex. Arieti 1950; Forabosco 2007; Haig 1988; Ivanova, Enikolopov, Mitina 2008ab; Kuhlman 1984; Kuiper et al. 1998; Levin 1957; Moody 1978; Senf et al. 1956; Werth, Perkins, Boucher 2001). Sense of humor is such a unique psychic phenomenon that reveals the unit of intellect and affect. Luk (1977) argues that in some cases sense of humor disorder may be even the earliest sign of intellectual and emotional psychopathology (Luk 1977). If to confirm this, the possibility of early diagnostics appears.

Patients' jokes preferences and style of joking may reflect different mental disorders and are useful for clinical practice (Forabosco 2007). Observing a patient's sense of humor and witticism may be helpful in regard with maintaining therapeutic relations and deep personality diagnostics, but this qualitative work is mostly subjective and demands a lot of time to obtain representative sample of patient's jokes and reactions.

On the other hand humor recognition disorder may give more simple, short and formalized method for differential diagnostics (Polimeni, Reiss 2006; Ivanova 2005; 2006). No matter if one likes a joke or not, usually he is possible to recognize what is supposed to be humor and what is not (at least in case of intentional canned jokes). It is clear though that inability to recognize humor is connected mostly with severe disorders like schizophrenia or organic brain syndrome.

“Schizophrenic” thinking and humor

Patients with schizophrenia spectrum disorders are characterized by special cognitive disorder which is called differently: inability to filter out irrelevant stimuli; “distortion of thinking” (Zeigarnik 1986), “paleological thinking” (Arieti 1950), confusion of form and substance, lack of differentiation between symbol and object, abstract and concrete, figurative and literal, relevant and pseudo-relevant (Forabosco 2007). Whatever it is called, these conceptions have the same idea: it is difficult for schizophrenics to differentiate important attributes of object from not such important, accidental, lateral. One of the standard methods to reveal such a disorder is “objects classification” (Zeigarnik 1986). A big set of cards with different objects drawn is given to a subject to classify them “what matches what”. After several groups are obtained the subject is asked to name them and to continue uniting the groups. At the end two or three groups should remain. In case of healthy people they are mostly “animate”/“inanimate”. Patients with schizophrenia often use different latent attributes like “black-and-

white”/“colored” or “what I like”/“don’t like”. Latent and essential attributes often coexist in their classifications as if they were of equal importance, for ex. “animate”/“inanimate”/“black”.

Many authors paid attention to the similarity between this kind of schizophrenic thinking and humor logic (Arieti 1950; Levin 1957). Sometimes patients with schizophrenia may be perceived as even wittier than healthy people. Nonetheless empirical studies showed that in general they are not (Derks et al. 1975; Rosin, Cerbus 1984).

Despite all the similarities, “schizophrenic” witticism and humor have differences. Peters (1979 – cf Forabosco 2007) argued that what seems to be humor of schizophrenics is based on an alteration of the semantic field, whereas in genuine word play it is based on the surprising similarity of word pairs (homonyms and homophones).

Humor is based on the coexistence of common, formal logic and humorous, playful logic whereas for schizophrenic thinking it is hard to distinguish between the two. Humor understanding usually is based on the process of reinterpretation, shifting from salient meaning to subtle (Attardo 1994; Suls 1983). As far as no meaning or logic is dominating in schizophrenic perception it must be hard for these patients to discover a humorous incongruity thus to recognize humor. Nonetheless patients with schizophrenia prefer jokes based on incongruity-resolution (compared to nonsense) significantly more than healthy people (Ivanova, Enikolopov, Mitina 2008a). Apparently this humor is still easier for them to recognize in comparison with humor of nonsense, and elicits less anxiety.

Empirical studies of humor recognition

Despite of the problem’s importance, quite a few empirical studies of humor recognition were done in psychiatric patients. Polimeni et al. (Polimeni, Reiss 2006; Polimeni et al. 2010) showed that patients with schizophrenia are characterized by humor recognition disorder. In their early study (Polimeni, Reiss 2006) they administered a humor perception test to 23 outpatients with schizophrenia and 20 controls. The test included 128 single-caption cartoons of popular artists. Half of them were presented in their original form. The captions of the other 64 cartoons were randomly replaced from the others in order to eliminate the humorous content. The subjects were to reveal the cartoons with replaced captions (nonhumorous). The results showed that patients with schizophrenia made significantly more mistakes than the controls. The degree of humor recognition disorder correlated positively with cognitive component of PANSS and was not related to the degree of psychopathological symptoms.

In their recent study (Polimeni et al. 2010) the authors confirmed the results. Three groups of subjects took part:

20 outpatients with schizophrenia, the clinical control group of 20 patients with primary depression or anxiety disorders, and the control group of 20 mentally healthy people. The subjects completed a big set of cognitive tasks and self-report questionnaires together with the humorous task. The later was shortened to 64 cartoons. Potentially ambiguous or offensive cartoons were removed. Similarly to the earlier study the humorous captions of the 32 cartoons were replaced by nonhumorous yet contextually relevant captions. The subjects were instructed not to judge humor but just to identify which cartoons were intended to be funny. After removing 4 ambiguous cartoons the final version of 60 cartoons yielded high internal consistence ($\alpha=.83$) of responses.

Better humor recognition correlated with less severe clinical symptomatology and was unrelated to depressive syndrome. Among schizophrenic patients humor recognition correlated with general intellectual functioning, social reasoning (ability to deal with abstract social conventions, for ex., metaphors, proverbs) and executive functioning (cognitive control). On the other hand humor recognition was unrelated to basic processing speed, working memory, inhibitory ability, inhibitory control, verbal memory, flexibility in abstract thought, speed of verbal processing or verbal fluency.

Humor recognition deficit in schizophrenic patients distinguished them from both patients with depression and anxiety, and the healthy controls who did not differ from each another. False positive mistakes (false alarm) in humor recognition were much more common among the patients than false negative mistakes (miss acceptance).

Better humor recognition was related also to higher social adjustment ratings and lower subjective anxiety in social interactions. No correlation was found between humor recognition and anhedonia.

Analogous data were obtained in our studies (Ivanova, Enikolopov, Maximova 2005; Ivanova 2006; Ivanova, Enikolopov, Mitina 2008a) in which humor recognition was studied in pure verbal form. The method included a set of humorous phrases, calembours, based on the same technique – substitution of logically expected words by unusual ones. For ex.: “Wake up, patient, it’s time to take your sleeping pills!” For each phrase a pair without the substitution was taken. For ex.: “Wake up, patient, it’s time to take your pills!”. The later version of the method consisted of 17 phrases including such paired but also single humorous/nonhumorous phrases and ambiguous aphorisms (Ivanova, Enikolopov, Mitina 2008a). The subjects were to distinguish humorous phrases independently on their assessments or impressions of the jokes. The deviation from the control group’s assessments was taken as humor recognition disorder.

Four groups of subjects took part in the later study (Ivanova, Enikolopov, Mitina 2008a) study: 18 patients

with affective disorders, 23 - with schizotypal disorder, 30 patients with schizophrenia and schizoaffective disorders, and 30 controls.

Pathopsychological methods were used to assess either intellectual or emotional deficits. Intellectual deficit such as inability to filter out irrelevant stimuli was revealed with such tests as “objects classification” and “excluding irrelevant object” (Zeigarnik 1986). The degree of intellectual disorder was assessed as 0—no disorder, 1—light disorder (single mistakes), 2—severe disorder (inability to filter out irrelevant stimuli). Depressive syndrome was measured by the Beck Depression Inventory.

The results demonstrated humor recognition disorder in patients with schizophrenia while the subjects of all other groups divided the phrases similarly. Although only some phrases provoked mistakes while the others did not. Like in the study of Polimeni et al. (2010) the deficit could be presented either as an inability to recognize humor or as a tendency to inject humorous sense into nonhumorous phrases.

Humor recognition deficit was highly correlated with schizophrenic intellectual disorder which mostly was severe in patients with schizophrenia and light in the schizotypal disorder group. It's important that light degree of intellectual disorder revealed as making single mistakes in diagnostic tests was not connected with humor recognition deficit. Like in the study of Polimeni et al. (2010) humor recognition was unrelated to depressive syndrome.

It was concluded that humor recognition task may be seen as a useful diagnostic tool to divide schizotypal disorder and schizophrenia in clinical practice.

Thus empirical studies reveal humor recognition deficit in patients with schizophrenia. This impairment distinguishes them from affective and schizotypal disorders patients. Humor recognition deficit is connected with cognitive disorders such as inability to filter out irrelevant stimuli and is unrelated to affective disorders.

“Schizophrenic” thinking, humor recognition, and artificial intelligence

Nowadays interaction with computer penetrated into all spheres of our activity and everyday life. That's why it's becoming called-for to make this dialogue easier, more natural, social – i.e. “human”. Sense of humor is an important attribute of social communication, so in order to remind human communication computer has to recognize and produce humor. Such research is going on (Taylor, Raskin 2011).

Humor recognition disorder in patients with schizophrenia reflects the more general inability to filter out irrelevant stimuli, to understand ambiguity and social context (the theory of mind). In this regard schizophrenic

thinking is similar to computer thinking. For ex., both of them hardly understand context, especially social emotional context. Both are unable to filter out irrelevant stimuli - because for computer relevance is specified only by the given program. On the other hand, though having cognitive and emotional deficits, patients with schizophrenia still are human beings and their perception differs from artificial intelligence.

The history of schizophrenia research includes the basic argument on the priority of emotional and personality vs intellectual disorders in these patients. Humor recognition includes both. Computer modeling of humor recognition may help to distinguish between “emotional” and “cognitive” types of possible mistakes.

To resume, computer modeling of the process of “correct” humor recognition as well as possible types of mistakes becomes actual for humor theory, artificial intelligence of humor, and better understanding of clinical syndromes, as well as differential diagnostics in clinical practice.

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