

Understanding of comical texts in people with different types of attitudes towards humour: Evidence from Internet memes

Daniil Rivin

St. Petersburg State University, Russia
daniil.rivin@gmail.com

Olga Shcherbakova

St. Petersburg State University, Russia
o.shcherbakova@spbu.ru

Abstract

*This study aimed to test a hypothesis about the correlation between levels of gelotophobia, gelotophilia, and katagelasticism and understanding of Internet memes as a specific form of humour. Participants were 45 native speakers of Russian (aged 18 – 30; 73,3 % female). The levels of Internet memes understanding were assessed independently by two judges with the use of criteria based on the results of a series of semi-structured in-depth interviews. Gelotophobia, gelotophilia, and katagelasticism were assessed with PhoPhiKat <30> questionnaire. J. Raven's "Standard Progressive Matrices" test was used to control the level of psychometric intelligence. Concordance of judges' scores for the understanding of memes was assessed with Kendall's *W* and ranged from 0.71 to 0.84. Spearman's rank correlation coefficient was used to test the main hypothesis. We found no correlation between the scores for gelotophobia, gelotophilia, and katagelasticism and understanding of Internet memes. Presumably, the type of attitude towards humour does not play a significant role in the understanding of comical texts. The qualitative content analysis of the interview protocols revealed some specific features of cognitive mechanisms of Internet memes understanding. Namely, successful participants with higher levels of understanding of Internet memes reflected more on their thinking process than those with lower levels of understanding of Internet memes, easily switched from an abstract level of reasoning to a concrete one, and tended to consistently develop detailed mental representations of the memes.*

Keywords: Internet memes, humour understanding, gelotophobia, gelotophilia, katagelasticism

1. Introduction

Over the last twenty years, many novel theoretical constructs in psychology have been introduced, describing the role that humour plays in social interactions. These include special types of attitudes towards humour outlined by German and Swiss psychologists, namely, gelotophobia, the fear of being laughed at, gelotophilia, the joy of being laughed at, and katagelasticism, the joy of laughing at others (Titze 1996: 1-11; Ruch & Proyer 2009a: 165-182). Gelotophobia was originally described as a specific form of a clinical social phobia and, therefore, was mostly associated with pathological conditions (Titze 1996: 1-11). Nevertheless, in psychology research, gelotophobia, along with gelotophilia and katagelasticism, is often used as a theoretical construct for describing a particular attitude towards humour in healthy people. Proyer showed that gelotophobia can be found across different countries and cultures (2009: 253-279). In contrast to gelotophobia, gelotophilia and katagelasticism remain poorly investigated (Ivanova et al. 2016: 164).

It is worth noting that to date, most research has predominantly focused either on correlations between the types of attitudes towards humour and other psychological constructs or on sociodemographic correlates of gelotophobia, gelotophilia, and katagelasticism. Thus, gelotophobia has been shown to be more pronounced in psychiatric patients than in healthy controls (Ivanova & Enikolopov 2009: 23). No correlations were found between gelotophobia, on the one hand, and aggressiveness, use of aggressive humour and level of ambition, on the other (Ivanova & Enikolopov 2009: 23). Some evidence links gelotophobia with introversion, neuroticism, and psychoticism, and people with higher levels of gelotophobia are less likely to be open to new experiences (Ruch & Proyer 2008a, 2008b, 2009b; Radomska & Tomczak 2010; Rawlings et al. 2010). A high correlation between gelotophobia, on the one hand, and social anxiety and fear of negative assessment, on the other, has also been demonstrated (Carretero-Dios 2010).

As mentioned above, gelotophobia has received more attention than both gelotophilia and katagelasticism. Furthermore, the relationship between the types of attitudes towards humour and cognitive aspects of humour perception has remained under-investigated. There is evidence of negative correlation between gelotophobia and creative thinking styles that require higher cognitive complexity, and a positive correlation between gelotophobia and conservative and normative thinking styles (Chen & Liu 2012: 25-34). Therefore, one may suggest that gelotophobia is linked to other cognitive abilities. However, a study by Proyer and Ruch (2009: 165) demonstrates that gelotophobia has no statistically significant correlation with psychometric intelligence, but gelotophobes tend to have a lower value for their intellectual abilities. Remarkable results are also presented in the study of the relationship between the types of attitudes towards humour and creative abilities (Chan et al. 2013: 609-628). It shows that gelotophobia is negatively related to predisposition to creative activity and can also have an indirect negative impact on the very results of creative performance. Gelotophilia, on the contrary, demonstrates positive correlation with predisposition to creative activity. Statistically significant correlations between katagelasticism and creativity were not detected.

These studies, though contribute to better understanding of cognitive aspects of various attitudes towards humour, do not address the issue of how people with gelotophobia, gelotophilia, and katagelasticism understand humour of various types. Our study aimed to fill this gap. We suggested that gelotophobia, gelotophilia, and katagelasticism might play a mediating role in process of humour understanding, as emotional attitudes towards comical situations may have a significant impact on how a person understands the meaning of a comical

text¹. Here, a ‘comical text’ is understood as a special kind of an intellectual task that demands certain mental operations. When successful, they result in a comical effect (Shcherbakova 2009: 46-47). In this study, we examined (1) whether there are correlations between gelotophobia, gelotophilia, and katagelasticism, on the one hand, and the level of understanding of comical texts, on the other, and (2) and what intellectual strategies people use to understand this type of comical texts.

2. Internet memes: what is funny?

Previously, verbal “canned” jokes were used as stimulus material in studies of humour understanding. As the original Russian term for this type of jokes, which represent a special speech genre typical for Soviet and post-Soviet discourse, is *anekdoty*, some researchers of Russian culture and folklore label them as “Russian anecdotes” or just “anecdotes” (Adams 2005). In this discourse, this term refers to a comical generalized folklore narrative with a fixed plot that is verbally transmitted from person to person. Here, the term “anecdote” will be used in the latter meaning. The linguistic research of anecdotes emphasises that their popularity has been decreasing over time, and the frequency of anecdotes in everyday communication has significantly lowered (Shmeleva & Shmelev 2005: 292). Thus, it was demonstrated that young adults (aged 18 to 30) poorly understand and, in general, negatively assess anecdotes as a speech genre, associating them with communicative practices of the older generation and rarely use them in everyday communication. In the same study, it was shown that young adults prefer Internet memes to anecdotes (Shcherbakova 2019: 165).

The term “meme” was originally introduced by Dawkins and first appeared in his book “The Selfish Gene” in 1976 (Dawkins 1989). He suggested that elementary cultural units are organised in the same way as genes and may be replicated in a similar fashion. Over time, the term “meme” has become much more popular on the Internet: “Internet memes” have been used to refer to certain information units that are quickly gaining popularity on the Internet and are replicated by users multiple times.

Some previous studies have suggested that the increasing use of technologies, including smartphones and digital innovations, has significantly affected colloquial language and communication habits (Chiaro 2017: 7). Through the Internet environment, certain types of humour such as Internet memes became viral. Researchers note that memes are separate genre of humour which has become rather widespread, and that transformation of a certain piece of information into an Internet meme is a staged process (Wiggins & Bowers 2014: 1892). At the first stage, there is a particular spreadable media that is becoming increasingly popular. Subsequently, it is remixed or parodied by other users, thus becoming an emergent meme. It turns into complete Internet meme when it is iterated and spread online by the members of participatory digital culture (Wiggins & Bowers 2014: 1892).

Internet memes are texts which make it possible to analyse their cognitive structure. Typically, these are texts, consisting of (relatively strictly arranged) verbal and pictorial parts unfolding their meaning through collective semiosis (Osterroth 2018: 448).

Most Internet memes share certain characteristics². Internet memes have (1) a fixed format that is a textual-graphic pattern typical for many image macro memes. In digital space, verbal humour is most often conveyed in visual modality, and there are a number of popular templates

¹ Although the notions of “comic” and “humour” can be used in different meanings, in this paper these terms are used as synonyms.

² For the purposes of this study, we examine only image macro memes, as the memetic subgenres are extremely diverse and may include hashtags, choruses from popular songs, YouTube videos, etc. Therefore, the following characteristic traits are only applicable to image macro memes.

(Chiaro 2017: 55). Some studies have noted that Internet memes, in addition to this structural component, also have (2) a genre component (Shifman 2013: 99), and it is often necessary to be familiar with particular contexts to understand a meme. Some authors note that memes may have an ideological aspect when they are related to social, political, cultural, or economic discourse (Wiggins 2019: 30). This largely determines topics and issues raised by the memes of a particular semantic field.

Intertextuality (3) is another feature of Internet memes (Decker-Maurer 2012: 26), which describes a large number of semantic and structural interconnections between them. Due to intertextuality, different memes can refer to each other in various ways, either explicitly or implicitly. Moreover, some authors consider intertextuality an unavoidable and ubiquitous attribute of all texts, especially memes (Wiggins 2019: 35). Thus, intertextuality is not a mere reference to other texts in order to introduce additional meaning, but an inherent attribute of a text that has natural semantic links with other texts. This is particularly relevant for memes, where semantic content depends to a large extent on connections with other texts.

Internet memes are usually characterised by (4) cognitive simplicity, which contributes to their rapid processing by users and viral spreading on the Internet. However, researchers note that memes typically convey a specific semiotic message, even though it might be relatively simple (Wiggins 2019: 33). The semiotic component of meme is usually related to its genre component or ideological aspect, which allows decoding a message in accordance with some standard semantic pattern. Finally, memes are very often characterized by (5) rhetorical content (Milner 2012). This means that, despite the humorous content, many memes also represent a certain attitude towards current social or political discourse. Shifman describes memes as a form of political participation (Shifman 2013: 119). This characteristic is largely related to the intertextuality and ideological communicative capacity of memes. It is noteworthy that rhetorical statements do exist in a certain discourse determined by the information environment shared by a social group. Therefore, Internet memes may reflect the rhetoric specific to a particular group of people.

Since there is a large number of types of Internet memes, and new memes are rapidly replacing old ones, it is hardly possible to provide a universal description of their cognitive structure. Therefore, researchers describe the cognitive structure of specific types of Internet memes and introduce categories combining these types. Davison describes the comical effect of the previously popular meme *Advice Dog* (Davison 2012: 127-130). In another paper, cognitive structure of photo-based memes is analysed from a cultural perspective (Shifman 2014: 340-358).

It is worth noting that the analysis of semantic structure of memes from a cognitive psychology perspective is only beginning to take shape. The above studies are the first attempts to describe the cognitive structure of comical effect for some types of memes. Nevertheless, it is already possible to conclude that at least some Internet memes are varieties of comical texts. Some researchers investigate the phatic aspect of memes that is associated with conviviality and their use as a social glue (Varis & Blommaert 2015). This aspect covers the viral spread of memes with relatively low degrees of “information” or “meaning”. However, our study precisely focused on understanding of memes and, consequently, the subject of the study was not their phatic but cognitive aspect. We assume that Internet memes (as comical texts) include several key ideas related to different characteristics of memes described above (for instance, genre component or rhetorical content). It is necessary to perform certain thinking operations to identify all the key ideas embedded in the meme. If these operations are successful, they lead to complete understanding of a meme. Importantly, the number of key ideas as well as specifics of thinking operations required to identify them differ between various Internet memes, as humour in them is often based on different cognitive and social contexts.

3. Research design and methods

An exploratory study was conducted in order (1) to test the hypothesis about the potential correlation between the degrees of gelotophobia, gelotophilia, and katagelasticism and the understanding of Internet memes and (2) to qualitatively describe the mechanisms of such understanding. Due to two separate purposes of the study, the research design was based on a mixed research methodology combining qualitative and quantitative approaches. All participants were informed about the purpose of the study, treated in accordance with Helsinki declaration, and provided informed consent.

The study included three stages. First, we selected nine Internet memes. These memes had a transparent but not too primitive cognitive structure and were maximally neutral in terms of their social, political, religious, and sexual connotations. Then, during this pilot stage of the study, the key ideas of these selected Internet memes were identified and used to develop the scoring criteria describing the levels of their understanding (these scoring criteria were used at a later stage of the study). For this purpose, an in-depth semi-structured interview method was used (Kvale 1996). During these pilot in-depth semi-structured interviews, Internet memes were presented to the participants ($N = 3$), and they were asked to explain the meaning of each meme in the most detailed manner. The scoring criteria for assessing the level of understanding of each Internet meme was based on the set of key ideas identified by each of the interviewees. As the result of the pilot stage, we selected five items out of the initial pool of nine memes and arranged them into a stimulus set; the cognitive structure of each meme of the set was thoroughly described, and the scoring criteria for assessing the level of understanding of each meme was developed.

The main data set was collected at the second stage of the study. At this stage, 45 participants were recruited for an in-depth semi-structured interview. The detailed procedure and guide of this interview are described below in Section 2.3. In addition to the interview, all participants were administered Raven's Progressive Matrices test (Raven et al. 2000) and PhoPhiKat<30> questionnaire. Raven's Progressive Matrices were used to control the level of psychometric intelligence of the participants considering that the study was focused on the process of understanding. PhoPhiKat questionnaire was originally designed by Ruch and Proyer to evaluate the levels of gelotophobia, gelotophilia, and katagelasticism (Ruch & Proyer 2009a). In our study, we used Russian translation of this questionnaire (Ivanova et al. 2016). In total, we conducted 45 interviews; all of them were audio-recorded and then transcribed verbatim. Both authors of this paper independently analysed all interview protocols in order to assess the levels of understanding of Internet memes by each interviewee. External judges were not involved in the assessment, since we only needed to count the number of ideas voiced by participants according to the scale that was developed at the pilot stage of the study. The agreement among the scores of the two judges (authors of this paper) was calculated with the use of Kendall's coefficient of concordance (Kendall's W). For all estimates, it exceeded the value of 0.7, indicating a high degree of agreement among the scores of both judges. The average value of these scores given by two judges was used for further statistical analysis.

At the final stage, correlation analysis was performed in order to reveal a potential correlation between gelotophobia, gelotophilia, and katagelasticism scores, IQ level, and levels of Internet memes' understanding. We used Spearman's rank correlation coefficient. The variables of age, types of attitudes towards humour, and psychometric intelligence were examined through descriptive statistics. In addition, we conducted qualitative content analysis of the protocols of the interviews. The latter revealed, on the one hand, the peculiarities of intellectual performance, typical of those who successfully reconstructed the cognitive structure of Internet memes, and, on the other hand, unsuccessful strategies of understanding of memes and intellectual difficulties caused by them.

3.1. Participants

The total number of participants was 48. Three Russian native speakers (two males and one female; $M = 23.33$; $SD = 0.47$) participated voluntarily and anonymously in the pilot stage of the study. They were advanced users of social networks well acquainted with the modern culture of Internet memes. Two of them administered public groups on the popular Russian 'VK' social network, created their own memes and had knowledge of their structure. These participants were involved as independent judges of Internet memes since, during the pilot stage of the study, the main objective was to obtain their opinions regarding the selected memes in order to develop the scoring criteria.

45 Russian native speakers (12 males and 33 females; $M = 23$; $SD = 2.87$) participated in the second stage of the study on the same terms. They had various occupational backgrounds (law, psychology, marketing, education, philology, construction engineering, management), mainly performing creative intellectual tasks, with (incomplete) secondary education. Participants were not previously familiar with the PhoPhiKat questionnaire and contemporary humour research at the time of taking part in the study.

3.2. Semi-structured interview procedure

Participants were interviewed individually by the authors of this paper. Selected Internet memes were presented in the laptop touch screen one by one. Each interviewee was allowed to rank the image and its elements if necessary. The basic instruction given at the beginning of the interview was to look at the meme and explain its meaning. They were also instructed to respond as fully and in detail as possible and to voice whatever comes to their minds due to the importance of their subjective understanding of a meme. Further interview guides had its own specifics at the pilot and main stages of the study due to their different purposes.

The primary goal of the pilot interviews was to identify the key ideas of memes and thinking operations that participants had to perform in order to reveal them, as well as to deduce the main difficulties and possible alternative approaches to understanding Internet memes. Participants were treated as independent judges assessing the cognitive structure of Internet memes. Firstly, the participants were asked to comment on the presented meme in a free format. They were asked questions that allowed them to have a broader perspective of the main ideas of each meme: "Which elements of the meme are necessary for its comical effect?", "Would you change something in that meme to make it funnier?". When a participant revealed a certain key idea of a meme, the interviewer noted it and then asked to describe introspectively the chain of thinking operations that led him or her to that idea. The scoring criteria for the understanding of each particular meme were based on a combination of key ideas that were identified in all three pilot interviews. On average, each interview of this stage lasted for 72 minutes.

The primary purpose of the interviews at the second stage was to mark down all the ideas that participants could identify in each meme. Participants were also asked to describe thinking operations that led them to each idea they noted, but additional questions were not asked. On average, each interview of this stage lasted for 37 minutes.

3.3. Materials

3.3.1. Stimulus set: Internet memes and their key ideas

A total of five Russian-language memes were included in the final stimulus set that was used at the main stage of data collection. They can be found in the Appendix with translation into English. Four memes were originally published on Pikabu, a popular Russian-language

information and entertainment website (<https://pikabu.ru/>), and one meme was on The Suffering Middle Ages group on VK.com, the largest Russian-language social network (<https://vk.com/souffrantmittelalter>). Below is the example of English-language version of the meme which was included in the stimulus set (Figure 1) and the scoring criteria for the levels of its understanding, based on the key ideas in the meme. Along with the key idea, thinking operations that are necessary to be performed to understand the meaning of this meme are described.



Figure 1. An example of an Internet meme from a stimulus set. Source: <https://pikabu.ru/>

The *scoring criteria for levels of understanding* for this meme were based on five following key ideas, which were identified during the pilot stage of the study:

1. The reason for committing suicide (the lack of physical knowledge) coincides with the reason for the failure of the suicide attempt (the same lack of physical knowledge). An interviewee has to mentally reconstruct two cause-effect relationships: (i) “the character of a meme does not know physics, therefore, s/he does not know about the electrical conductance of the materials, and, consequently, s/he will not be able to commit suicide in this way” and (ii) “the character of a meme does not know physics, and, therefore, s/he did not pass the exam and was so upset with that, and, for that reason, s/he decided to commit suicide”.
2. Suicide due to a failure of the exam is ridiculous in itself as any exam failure is not worth committing suicide. An interviewee has to evaluate the behaviour of the character in the context of everyday social life, irrespective of a situation described in a meme.
3. The character is a “double loser” because s/he could neither pass the exam nor kill him/herself. An interviewee has to realise that all the goals of the character, regardless of how small (to pass an exam) or large (to commit a suicide) they were, ended in failure.
4. Playing with an established cultural pattern associated with the possibility of self-harming by putting fork into electrical socket. An interviewee should be aware of this

pattern, which is usually associated with parents instructing their children not to put objects into a socket. An interviewee is supposed to consider the method of suicide apart from the meme and recognize it as a separate cultural pattern.

5. The typical structure of the verbal part of the meme beginning with the word “when”. An interviewee is supposed to switch his/her attention from the *content* of the meme to its verbal description and recognise its typicality.

Below is an example from an interview with a participant who correctly identified ideas (1), (3), and (4)³: “This is something childish, I have now realized that it is also quite easy and not quite dangerous, you know, ‘fingers in a socket’, ‘fork in a socket’, and, most likely, it is young children who are interested [in anything and everything], and something [bad] can really happen to them. I mean, an adult rarely shoves any objects into sockets. <...> That is, a person is already so upset that s/he failed the physics exam, s/he is so ridiculous, that s/he decided to cope with the stress of the failed physics exam, *using the knowledge of physics, which s/he cannot use*. I mean, *s/he did not only fail the exam but s/he also failed to commit suicide*” (female, 29 years old).

It should be emphasised that mental reconstructions of cognitive structures of different memes from the stimulus set we used had their own specifics and included various sets of thinking operations that needed to be performed by a participant in order to fully understand it. All the memes differed in number of key ideas, and the scoring criteria for levels of understanding differed, correspondingly. Thereby, they were used as five different variables during further correlation analysis.

3.3.2. *Raven’s Progressive Matrices and PhoPhiKat<30>*

The level of psychometric intelligence was measured with Raven’s Progressive Matrices test (Raven et al. 2000). This classic test is generally recognized as one of the “purest” measurements of general intelligence factor (Hunt 2009: 115-119). The participants were given 20 minutes to complete a test consisting of 60 tasks.

The Russian-language adaptation of the PhoPhiKat questionnaire consists of 30 statements describing three attitudes towards humour: gelotophobia, gelotophilia, and katagelasticism, with ten items per category mixed in counterbalanced fashion. Before completing the questionnaire, participants were not given any specific information about the types of attitudes towards humour. The instruction for them was to complete a questionnaire on humour in general.

The results previously obtained on the Russian sample showed that descriptive statistics for the three scales were as following: gelotophobia ($M = 1.82$; $SD = 0.61$), gelotophilia ($M = 2.34$; $SD = 0.65$), and katagelasticism ($M = 2.53$; $SD = 0.70$) (Ivanova et al. 2016). Thus, in the Russian sample, the normal scores are 1.82 ± 0.61 for gelotophobia; 2.34 ± 0.65 for gelotophilia; and 2.53 ± 0.70 for katagelasticism, respectively.

4. Results

This section presents the results of statistical analysis, which tested the main hypothesis of the study, and the results of qualitative content analysis, which examined the peculiarities of the understanding of the Internet memes.

³ Hereinafter, all the protocols of the interviews are translated from Russian into English.

4.1. Statistical analysis

Table 1 represents data on age, types of attitudes towards humour, and psychometric intelligence of the participants.

Table 1. Descriptive statistics

		Gelotophobia	Gelotophilia	Katagelasticism	IQ	Age
N	Valid	45	45	45	45	45
	Missing	0	0	0	0	0
Mean		1.667	2.416	2.418	115.31	22.93
Median		1.800	2.400	2.400	116.00	23.00
Mode		1.8	2.6	2.7	112	24
Std. deviation		0.3937	0.4690	0.5536	10.273	2.871
Minimum		1.0	1.6	1.1	90	18
Maximum		2.7	3.5	3.5	128	30
Percentiles	25	1.300	2.100	2.000	108.00	21.00
	50	1.800	2.400	2.400	116.00	23.00
	75	1.900	2.750	2.800	124.00	24.00

It is worth mentioning that the scores for the types of attitudes towards humour in our sample were mostly within the statistical norm. Only seven participants demonstrated a lower level of gelotophobia (1.0 – 1.2), and only one – a higher level (2.7). The lower level of gelotophilia was observed only in two cases (1.6), and a higher level in six cases (3.0 – 3.5); seven participants had a lower level of katagelasticism (1.1 – 1.8) and two participants – a higher one (3.4 – 3.5). These data corroborate previous results demonstrating less pronounced gelotophobia in healthy controls compared to psychiatric patients (Ivanova & Enikolopov 2009: 23).

Along with that, the participant with the highest level of gelotophobia was found to have normal levels of gelotophilia and katagelasticism (2.4 and 2.0, respectively). This, again, confirms the claim mentioned above that people with high gelotophobia may have either high or low levels of gelotophilia and katagelasticism (Ivanova et al. 2016).

According to the psychometric intelligence scores, more than half the participants reached an above-average IQ level. A single participant received a below-average intelligence score of 90. We did not consider this result to be a statistical outlier, since this score is the upper threshold of the below-average group (81 – 90), and the average intelligence group among the participants included close values (92, 94). About a quarter of the sample showed a “high level” of intelligence. Thus, most participants of this study had high levels of general cognitive abilities.

Tables 2.1 and 2.2 below represent the results of the correlation analysis.

Table 2.1 Correlation analysis results

Spearman's rho		Gelotophobia	Gelotophilia	Katagelasticism	IQ
Gelotophobia	Correlation coefficient	1.000	-0.199	-0.140	-0.030
	p-value	.	0.191	0.358	0.844
Gelotophilia	Correlation coefficient	-0.199	1.000	0.457	-0.039
	p-value	0.191	.	0.002	0.799
Katagelasticism	Correlation coefficient	-0.140	0.457	1.000	0.162
	p-value	0.358	0.002	.	0.289
IQ	Correlation coefficient	-0.030	-0.039	0.162	1.000
	p-value	0.844	0.799	0.289	.
Meme 1	Correlation coefficient	-0.165	0.128	-0.014	0.149
	p-value	0.278	0.401	0.927	0.328
Meme 2	Correlation coefficient	0.044	-0.117	-0.155	0.154
	p-value	0.777	0.443	0.309	0.313
Meme 3	Correlation coefficient	-0.070	0.170	-0.021	0.182
	p-value	0.648	0.265	0.889	0.231
Meme 4	Correlation coefficient	0.177	-0.114	-0.089	0.333
	p-value	0.245	0.457	0.561	0.025
Meme 5	Correlation coefficient	-0.172	0.210	0.137	0.177
	p-value	0.259	0.167	0.371	0.245

Table 2.2 Correlation analysis results

Spearman's rho		Meme 1	Meme 2	Meme 3	Meme 4	Meme 5
Gelotophobia	Correlation coefficient	-0.165	0.044	-0.070	0.177	-0.172
	p-value	0.278	0.777	0.648	0.245	0.259
Gelotophilia	Correlation coefficient	0.128	-0.117	0.170	-0.114	0.210
	p-value	0.401	0.443	0.265	0.457	0.167
Katagelasticism	Correlation coefficient	-0.014	-0.155	-0.021	-0.089	0.137
	p-value	0.927	0.309	0.889	0.561	0.371
IQ	Correlation coefficient	0.149	0.154	0.182	0.333	0.177
	p-value	0.328	0.313	0.231	0.025	0.245
Meme 1	Correlation coefficient	1.000	0.045	0.447	0.084	0.263
	p-value	.	0.770	0.002	0.584	0.081

Meme 2	Correlation coefficient	0.045	1.000	0.319	0.283	0.025
	p-value	0.770	.	0.033	0.060	0.869
Meme 3	Correlation coefficient	0.447	0.319	1.000	0.549	0.468
	p-value	0.002	0.033	.	0.000	0.001
Meme 4	Correlation coefficient	0.084	0.283	0.549	1.000	0.415
	p-value	0.584	0.060	0.000	.	0.005
Meme 5	Correlation coefficient	0.263	0.025	0.468	0.415	1.000
	p-value	0.081	0.869	0.001	0.005	.

According to the results of the correlation analysis, the main hypothesis of the study did not receive any support, since statistically significant correlations between gelotophobia, gelotophilia, and katagelasticism, on the one hand, and the level of understanding of Internet memes, on the other hand, were not revealed. However, the following statistically significant relationships were identified:

1. positive correlation between gelotophilia and katagelasticism ($p < 0.01$);
2. positive correlation between the level of psychometric intelligence and the level of understanding of the fourth Internet meme ($p < 0.05$);
3. positive correlation between the level of understanding of the third Internet meme and the levels of understanding of the first, fourth and fifth Internet memes ($p < 0.01$) and the level of understanding of the second Internet meme ($p < 0.05$);
4. positive correlation between the level of understanding of the fourth Internet meme and the level of understanding of the fifth Internet meme ($p < 0.01$).

4.2. Qualitative content analysis

The successful identification of key ideas of an Internet meme depended on the performance of several thinking operations, which contributed to the proper mental reconstruction of its cognitive structure. Some of the strategies of intellectual performance demonstrated by the interviewees were more efficient in accomplishing this task, while others led to lower levels of understanding.

4.2.1. Inefficient understanding strategies

One of the main obstacles on the way to complete understanding was a participant's *negative attitude*, which often manifested in a premature negative assessment of the Internet meme in general. Here is an example of a verbal marker of such an attitude: "Not funny! <...> Well, the meme is not funny to me, so it is kind of hard for me to find out what it is based on" (female, 18 years old, meme no. 2). As can be seen in this example, the initial negative assessment of the meme blocked the understanding of its meaning. It should be emphasised that understanding the meaning of a meme does not necessarily depend on its emotional evaluation. Frequently, participants found a meme unfunny and yet successfully coped with its understanding. Whereas negative attitude towards a meme devalued the very attempt to understand it. As a rule, such an attitude arose as a first impression of an Internet meme, but sometimes it appeared later in the course of the interviewee's reasoning directly interfering with it: "What else to add... Well, obviously this signature, it is superfluous, as I think... <...> Well, it is not superfluous, if... okay, *this meme could be on some second-rate, distasteful*

website” (male, 20 years old, meme no. 3). Though, a negative assessment of a meme was not always associated with a negative attitude. Some of the subjects who assessed a meme as outdated or pointless/unfunny, however, represented its cognitive structure in detail and, therefore, received high scores for its understanding.

In certain instances, incomplete understanding was mediated by pre-operational (preconceptual) thinking (Piaget 2001) which is typical for children under seven years old but is also often in adults regardless their health status or educational background (Shcherbakova 2019) and *focusing on superficial and non-essential aspects* of a meme at the start of the interview. To achieve complete understanding, participants needed to abstract away from a particular situation depicted in a meme and mentally detach from the emotional states of the characters, in order to see the structure of a meme from a different perspective and mentally cover all the semantic details of a meme. Occasionally, participants tended to stick to concrete details (e.g., to provide many commentaries on the minor characteristics of a picture or text) that triggered affective reactions irrelevant to the core idea of a meme. They also appealed to the technical parameters of the picture or meme (the process of designing a picture or photo, the original publication source, etc.). The following example illustrates the misunderstanding of the key idea of the meme (see Section 2.3.1.) and interpreting the comical effect through its irrelevant technical parameter: “*I laughed, I like this curve, plastic fork. Maybe if it was something else, I don’t know, a metallic one, it wouldn’t be so funny. And this one is such a crippled small fork*” (female, 23 years old, meme no. 4).

Participants also demonstrated an incomplete understanding when it was *difficult* for them *to establish emotional contact* with the events described in a meme. In this case, participants considered Internet meme pointless and incomprehensible: “There was something... *I had more to say* [about previous meme] *because I experienced* [similar situation] *every day*... and here, I’ve never had such situations in my life. <...> It’s not a part of my everyday routines, I guess, so this meme is far from me” (female, 22 years old, meme no. 5). It is assumed that in the above case, the participant used a strategy of complete affective identification with the situation to understand the comical effect of the meme. As can be seen from above, this strategy is blocking the understanding of a meme in case the participant’s experience is not exactly the same as that of a meme’s character.

4.2.2. Subjective projections

Subjective projections (emotionally loaded associations, lateral ideas, fears, or past experiences) make a significant impact on processes of understanding (Shcherbakova 2009: 33). In this study, subjective projections of participants played an ambiguous role in the process of understanding of memes.

Occasionally, associations evoked by a meme enhanced establishing an emotional contact with the situation described in it and, also, contributed to efficient reconstruction of its cognitive structure. Predominantly, subjective projections of this kind were irrelevant to the core ideas of a meme and interfered with them thereby provoking semantic ‘noises’. On the contrary, subjective projections that expressed in an emotionally loaded attitude to the situation described in an Internet meme had the most severe impact on the completeness of meme understanding. During the discussion of the meme (see Section 2.3.1.), one of the participants showed an affective reaction to the suicide topic: “I wouldn’t laugh at that. <...> No, because... maybe it’s kind of professional, *but ‘killing yourself’ isn’t perceived as something funny*, and it hurts a little bit” (female, 21 years old, meme no. 4). Projections of this kind elicited negative associations in several participants and discouraged them from discussing the meme; they also tended to be observed in participants with lower levels of understanding.

4.2.3. Efficient understanding strategies

Participants with higher levels of understanding of Internet memes reflected more on their own thinking processes demonstrating higher *metacognitive reflection*. They followed the course of their reasoning and sometimes provided detailed commentaries on their thinking operations. In the following examples, the participants were able to give a verbal report on how they disproved the wrong hypothesis about the meaning of a meme and correctly identified its key idea: “In fact, *this is the first idea that comes to mind* <...>. And then you read and realise that *this is the situation*” (male, 23 years old, meme no. 5), “*It seemed to me at first, that* <...> *And then I realised exactly what it meant*” (female, 21 years old, meme no. 3). Below is the fragment of the interview demonstrating a high level of metacognitive reflection, wherein the participant was able to mentally reconstruct her understanding process step by step and detail the underlying thinking operations: “It’s the usual way *I perceive information... from left to right, from top to bottom*. Well, I guess that’s because of how the reading process works. Accordingly, *if you analyse this meme in this way, you don’t understand anything* <...>. When *I went through the picture from top to bottom, I didn’t understand anything*, which means that you have to do it somehow differently, and *you start with different sequences... and when you have already found a sequence, you understand the gist*” (female, 22 years old, meme no. 5).

Successful participants also *easily switched from an abstract level of reasoning to a concrete one, and vice versa*. During the reasoning, they could describe specific details of a meme and then comment on its meaning in a more generalized way. Hereunder, the participant came up with a metaphor that summarized the meaning of the meme and then explained it in concrete details: “You know, it’s like ‘*Woe from Wit*’, and *there’s no wit here, so there’s no woe. You don’t have enough knowledge to do something harmful for yourself, and it saves you.* <...> *You failed the exam because you didn’t have enough knowledge, and you want to kill yourself, but you can’t do it, because you don’t have that knowledge*” (male, 24 years old, meme no. 4). This participant also summarized all previous discussions about the events described in the meme at the highly-generalized, abstract level of reasoning: “*I failed the physics exam, and then I want to kill myself.* <...> Yeah, well, *the problem and the solution don’t fit together*” (male, 24 years old, meme no. 4).

Finally, participants with higher levels of understanding *consistently developed detailed mental representations of the memes* that could be seen from the protocols of their interviews. These participants used method of analysis (e.g., dividing the cognitive structure of a meme into several elements) and applied certain metacognitive techniques that helped to bring more structure into the thinking processes (e.g. listing, using sequential constructions “firstly”, “secondly” and subordinating conjunctions “because of”, “since”, “in order to”, etc.). As a result, the protocols of their interviews did not include confusions and ‘self-perpetuations’. Also, these participants were better at managing their own reasoning processes: “There are *several layers of humour: the picture itself* <...> Then there is *the second layer* – this comment <...> And here is *the third layer of humour*, another comment, which adds, let’s say, a new twist and... well, it is very suitable for the image, so it is funny” (female, 24 years old, meme no. 3).

5. Discussion

5.1. The levels of gelotophobia, gelotophilia, and katagelasticism and correlations between them

The scores for the types of attitudes towards humour in our sample varied mainly within the statistical norms. Due to the small sample size, it is not possible to compare these indicators

with sociodemographic characteristics identified in early studies. No correlations between gelotophobia, on the one hand, and gelotophilia and katagelasticism, on the other, were found, which is consistent with the previously reported results (Ivanova et al. 2016: 169). The positive and persistent relationship between gelotophilia and katagelasticism was replicated (Ivanova et al. 2016: 169; Ruch & Proyer 2009a: 199). Thus, independence of gelotophobia from gelotophilia and katagelasticism was once again confirmed, and the latter two types of attitudes towards humour once again revealed a high degree of interrelation.

5.2. The correlations between types of attitudes towards humour, intelligence and understanding of Internet memes

Evidence was given in support of the previously described results showing no correlation between gelotophobia and psychometric intelligence (Proyer & Ruch 2009: 165). The correlation analysis also did not reveal any statistically significant relationships between gelotophilia and katagelasticism, on the one hand, and psychometric intelligence, on the other. These results suggest that stable attitudes towards humour and intelligence are relatively independent psychological phenomena.

Gelotophobia, gelotophilia, and katagelasticism have also proven to be statistically unrelated to levels of understanding of Internet memes. Thus, the hypothesis of the present study has not found statistical support. Two possible methodological reasons for this result should be mentioned. The participant sample used in the present explorative study may not be sufficient to provide convincing evidence. Therefore, some of the results may not be fully representative of the general population. It may also be suggested that the types of attitudes towards humour do not affect the processes of understanding whenever their scores vary within the statistical norm, as was the case in our study. This assumption is confirmed by several observations described in Section 4.1.4.

From another perspective, our findings might suggest that gelotophobia, gelotophilia, and katagelasticism are not related to the cognitive aspect of humour perception, which partially corresponds to the lack of relationships between the types of attitudes towards humour and psychometric intelligence. Some evidence suggests that gelotophobia, gelotophilia, and katagelasticism mediate the perception of comical situations exclusively in a social context, as these types of attitudes towards humour were initially described through social interactions (Titze 1996: 1-11; Ruch & Proyer 2009a: 165-182). This idea is consistent with the fact that gelotophobia, as the first identified and most thoroughly studied attitude towards humour, was initially considered to be a form of anxiety included in the social phobia symptom complex (Titze 1996: 1-11). Furthermore, it might be assumed that general cognitive abilities neutralise the influence of emotional attitudes towards humour on the process of understanding. Thus, the high level of general mental abilities of our participants could determine the mutual independence of understanding of Internet memes and types of attitudes towards humour.

5.3. Intelligence and understanding of Internet memes

A positive relationship between the levels of psychometric intelligence and understanding of the fourth Internet-meme (see Section 2.3.1.) appears to be a highly unexpected result. There is not enough evidence to suppose that understanding of this meme is linked to intelligence level while understanding of other memes of the stimulus set is not. Therefore, we tend to consider this result a statistical artefact. At the same time, it may be attributed to a higher cognitive challenge that this meme might present. The specificity of the research design does not allow testing this assumption.

It also seems remarkable that the level of understanding of the third meme (see Appendix) turned out to be the most “representative” since it was positively related at a high level of

significance to the understanding levels of all other memes. This brings us to the conclusion that a high level of understanding of the third meme might be considered a predictor of a high level of understanding of all other memes. Interestingly, this meme to the maximum extent corresponded to all the features of Internet memes described in the Introduction section of this paper (see Section 1.1.). Thus, the prototypic nature of the meme itself might be an explanation for the obtained result.

5.4. Qualitative content analysis and illustrative examples

Any conclusions about the relationships between types of attitudes towards humour, intelligence, and understanding of Internet memes, on the one hand, and strategies of the intellectual performance described in the course of qualitative analysis, on the other hand, cannot be drawn because these correlations were not statistically verified during the study. However, it is important to list a number of interesting observations.

The participant with the highest gelotophilia score among the sample (3.5) and also with a very low gelotophobia score (1.1) received extremely high scores for the understanding of Internet memes (3/3; 2/3; 6/6; 2/5; 6/7). The comprehensive interview protocol of this participant included all efficient understanding strategies described above. During the interview, this participant voiced a large number of subjective projections, including comical autobiographical facts and personal attitudes to certain memes, which was consistent with the highest level of gelotophilia. The reports of this participant were detailed and long, often turning into a large and rather abstract monologue.

Another interviewee with high scores for the understanding of Internet memes (3/3; 2/3; 4,5/6; 3,5/5; 5/7) equally demonstrated consistent development of detailed mental representations. This participant received average scores on gelotophobia and gelotophilia (2.0 and 2.6, respectively) and the highest katagelasticism score among the sample (3.5). Responses of this participant were also lengthy and detailed, but the subjective projections were less frequent and autobiographical.

Gelotophobia, gelotophilia, and katagelasticism scores among participants who demonstrated inefficient strategies of understanding of Internet memes usually varied within the statistical norm. However, it is possible to distinguish two participants who demonstrated a negative attitude, the elements of pre-operational (preconceptual) thinking, and focusing on superficial and non-essential aspects of a meme, respectively. They both received rather low scores for the understanding of Internet memes (1,5/3; 0/3; 2/6; 1/5; 3,5/7 and 1/3; 2/3; 3/6; 2/5; 3/7). These two were the only participants whose gelotophilia scores were lower than normal (1.6).

The observation data confirm that gelotophobia, gelotophilia, and katagelasticism may particularly affect the process of humour understanding when they fall outside the normal range, taking on extreme values. It could be suggested that the extreme forms of appreciation or aversion towards humour might influence the cognitive processing of comical texts. This thesis can be used as a hypothesis in further research.

5.5. Limitations

It should be noted that the qualitative component of the research methodology determines the entire procedure of the study and, consequently, entails a number of research limitations. Thorough consideration of the strategies of intellectual performance and the organisation of in-depth interviews resulted in a limited number of stimuli and participants which is typical for qualitative and mixed-methods studies (Kvale 1996). Therefore, quantitative results of this exploratory study should be treated with caution. Besides, the high average score of subjects' intelligence is another common characteristic of this kind of research, since it is people with

more years of education and more pronounced intellectual interests who usually volunteer to participate in it. However, subsequent research could examine similar hypotheses on other samples, including participants with different levels of psychometric intelligence.

Furthermore, our main research interest was precisely the cognitive aspect of perception of Internet memes. Previous studies indicated that this aspect is relatively independent of the funniness variable (Shcherbakova 2009). This implies that one can thoroughly understand a joke that does not seem funny to him/her and vice versa. For this reason, and for the purpose of keeping the research design simple and implementable, we did not include this variable into the present study, but it may be of a certain interest for further research.

6. Conclusion

The results of the study bear evidence that moderately expressed gelotophobia, gelotophilia, and katagelasticism do not play a significant role in the process of humour understanding. It is suggested that types of attitudes towards humour have a greater impact on the perception of comical situations in the social context. The hypothesis about the correlation between levels of gelotophobia, gelotophilia, and katagelasticism and understanding of Internet memes is subject to further testing in studies with other designs and larger samples.

In the pilot stage of the study, we found that cognitive structures of different Internet memes and, therefore, processes of mental reconstruction of their semantics have their own specificity. Namely, Internet memes differ in a number of key ideas, because various kinds of memetic humour are often based on different principles. Internet memes are a non-homogeneous genre of comical texts, and this study is one of the first attempts to formalise and explicate the process of understanding the comical effect of Internet memes.

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Appendix



Internet meme no. 1 from a stimulus set. Source: <https://pikabu.ru/>



Internet meme no. 2 from a stimulus set. Source: <https://vk.com/souffrantmittelalter>

When things are getting tough, just remember what it's like for this guy to make a bed every day



Hands don't get there
two hours ago Reply

Internet meme no. 3 from a stimulus set. Source: <https://pikabu.ru/>

Note: The phrase "hands don't get there" is a phrase in Russian which means "not getting around to do something"



Internet meme no. 4 from a stimulus set. Source: <https://pikabu.ru/>



Internet meme no. 5 from a stimulus set. Source: <https://pikabu.ru/>

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