Extreme fear of being laughed at: Components of Gelotophobia*

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Abstract.   The present study investigated individuals with slight, marked and extreme fear of being laughed at (gelotophobia) (Ruch and Proyer 2008a). Altogether 640 individuals filled in the GELOPH<15> (Ruch and Proyer 2008b) online and 228 filled in a paper and pencil version. In both samples principal components analyses of the 15 items were computed for subgroups of individuals exceeding the cut-off point for slight gelotophobia (i.e., 2.5). All solutions between one and five factors were examined but a three-factor-solution seemed most preferable. These positively correlated components were interpreted as coping with derision (by control, withdrawal, internalizing), disproportionate negative responses to being laughed at, and paranoid sensitivity to anticipated ridicule. The latter two are seen specific to gelotophobia while the former might be shared with social anxiety in general. In the hierarchical factor analysis the more unspecific coping factor did split up further into three factors of control, withdrawal, and internalizing, while the two gelotophobia-specific factors stayed stable between the three- and five-factor solutions. These three factors yielded different correlational patterns. Coping with ridicule was higher among females and among the older while there were no differences for the other two factors. Furthermore, people reporting having been bullied were higher in defensive coping with ridicule and had stronger disproportionate negative responses to being laughed at than those who were not bullied. Results are discussed within a framework for future studies of individuals with higher levels of this fear. In particular, the computation of subscales is recommended when the focus lies on the extreme scorers.

Keywords: gelotophobia, laughter, hierarchical factor analysis, fear, bullying

1. Introduction

In the past five years there was a substantial increase of interest in the fear of being laughed at; i.e., gelotophobia. After an initial introduction of gelotophobia along with the empirical verification of the concept in *HUMOR: International Journal of Humor Research* (Ruch and Proyer 2008a, Titze 2009), the presentation of the GELOPH<15>, a first assessment tool (Ruch & Proyer 2008b) and the initial finding that those who fear being laughed at might not be able to distinguish between friendly and hostile laughter (Platt 2008, Ruch, Altfreder and Proyer 2009) a lot of research was carried out (for compilations of articles see Ruch 2009, Proyer and Ruch 2010). The initiation of a multi-cultural study involving 73 nations yielded that this fear exists everywhere (Proyer et al. 2009). However, as the fear of being laughed at, in its pronounced/marked and extreme forms are rare among adults in normal population, most studies did not include many individuals with extreme fear and hence little is known about the high scorers in gelotophobia. The present article adds to the foundation for researching the high scorers.

1.1. Origin and Development of the Concept

The fear of being laughed at was mentioned in the context of shyness more than a hundred years ago by the French psychiatrist Paul Hartenberg. Hartenberg published a book on "Les Timides et la Timidité" (1901) in which he described that among timid people a combination of fear and shame—both groundless—is felt in the presence of other persons can be observed. This is accompanied by physiological symptoms, such as trembling, blushing, disturbances in speech and in the visceral and secretory functions. Furthermore, psychological symptoms involve derangements in the processes of attention, reflection, volition and memory. Most importantly, Hartenberg suggested as one of the characteristics of the timid people that they have a *fear of ridicule*; he relates this to their fearfulness of self-disclosure and of the expression of their opinions. About 100 years later Michael Titze, a German psychotherapist coined the term *gelotophobia* (*gelos* is Greek for 'laughter') for describing a condition of pathological fear of being laughed at that he observed in private practice among some of his clients. Gelotophobes fear exposing themselves to others as they fear that these individuals screen them for evidence of ridiculousness. Gelotophobes are also convinced that such evidence exists as they experience themselves as being ridiculous and involuntarily funny. They react hyper-sensitively towards the laughter of others—even if there is no evidence that this laughter is actually directed at them. Gelotophobia at its extreme involves a more or less pronounced paranoid tendency, a marked sensitivity to offence, and social withdrawal (see Titze 2009 for an overview and a vignette).

First studies involved patients diagnosed by Titze as being gelotophobic, different clinical samples and also community samples of adults (Ruch and Proyer 2008a). Indeed, gelotophobes could be separated from the different groups of patients and normals through a list of items that represented gelotophobic symptoms (i.e., the 46 item version of the GELOPH), but there was also evidence that approximately 11% of people in the community sample (that has not been screened for psychopathology) displayed higher levels of this fear (Ruch and Proyer 2008b). Subsequent research was carried out with the GELOPH<15>, a more economic, though highly reliable and valid, 15-item measure of gelotophobia in a four-point answer format.

1.2. Graduation Hypothesis and Cut-Off Scores

Observation in the countries initially studied showed that a substantial, but varying number of individuals exhibited the fear. This led to the formulation of a dimensional (no vs. extreme fear of being laughed at) rather than categorical (gelotophobic vs. non-gelotophobic) view of gelotophobia. Thus people are assumed to vary between absolutely no fear of being laughed at, through a borderline area, to slight, marked or pronounced and extreme fear. The cut-off-score for slight gelotophobia was set at 2.5 (Ruch and Proyer 2008b). The cut-off was set where a) the distributions of the clinically tested gelotophobes and normals overlapped, b) individuals agree to half of the items (i.e., every second symptom applies) and c) two standard deviations to the mean of the normals were added. The standard deviation in various countries was roughly .50 and this was chosen to be the unit for segmenting the levels of fear. The segment between 2.5 and 3.0 defines slight fear, the range of 3.0 to 3.5 defines marked or pronounced fear and extreme fear is between 3.5 and 4.0 on the GELOPH<15> (Ruch & Proyer 2008b).

1.3. Distribution of Slight, Marked and Extreme Gelotophobes

The initial study with the German adults yielded a highly typical result, namely that most of the gelotophobes had either slight (e.g., 6.83%) or pronounced (4.02%) fear and only very few had an extreme (0.80%) expression of the fear (Ruch and Proyer 2008b). Subsequent studies found that the percentage of gelotophobes varies within nations; e.g., there were 1.62% gelotophobes (slight: 1.21%, marked: 0.40%, extremes: 0.00%; Führ et al. 2010) in Denmark, but 13% gelotophobes in England (10%, 2%, and 1%; Platt et al. 2009). Across all nations samples tested so far there are about 9.9% with slight, 2.9% with pronounced, but only 0.5% with extreme fear of being laughed at. Thus, typically in such samples most of the participating gelotophobes have a slight fear, some a marked fear and almost no one has an extreme fear of being laughed at. Thus, roughly 90% of the sample does not have a fear of being laughed at and this substantial group affects the results more than the 10% gelotophobes. Furthermore, most of the gelotophobes actually only have a slight and only some a marked fear. Thus, different levels of *not* being fearful outweigh the levels of having the fear by far.

1.4. Factor Structure of the GELOPH<15>

Several contents describing the gelotophobic symptomatology entered the original list of 46 items (Ruch and Proyer 2008a). These items covered the domains of a paranoid sensitivity towards mockery of others, fear of the humor of others, critical self-consciousness of their own bodies, critical self-consciousness of their own verbal and non-verbal communicative functions, social withdrawal, general response to the smiling and laughter of others, discouragement and envy when comparing with the humor competence of others, but also traumatizing experiences with laughter in the past. While some of the statements formulated are specially referring to the gelotophobic symptomatology (e.g., domains 1 through 4), others (e.g., domain 5) are prevalent among gelotophobes but not specifically restricted to them; i.e., might be shared with other groups. A principal components analysis of the 46 items yielded a strong gelotophobia factor and two minor factors. Only items loading highly on the first factor were used in the generation of the final questionnaire (i.e., the GELOPH<15>), and additionally the items needed to discriminate well between a group of gelotophobes and several comparison groups (Ruch and Proyer 2008b).

In the subsequent studies the gelotophobia items usually formed a single factor and they typically have a high internal consistency (Carretero-Dios et al. 2010, Proyer et al. 2009). Carretero-Dios et al. (2010) explicitly tested for unidimensionality and found a single factor to account for the intercorrelatons. In the study by Proyer et al. (2009) 93 samples from 73 countries (comprising a total of 22,610 participants) entered the study. For the total sample, a one-dimensional solution did fit the data best. Furthermore, separate factor analyses were carried out for each sample and the median of the eigenvalues of the first factor was 5.27; i.e., about 35% of the variance was accounted by the first factor. The median of the loadings on the first factor ranged from .43 to .67 across all samples suggesting that gelotophobia is unidimensional. However, the median of the eigenvalues for the second and third factors exceeded unity as well and were 1.30 and 1.09, respectively. Those factors were not extracted as unidimensionality was assumed. Additionally, an analysis across the 93 samples was computed where the means of the 15 items entered the analysis.

The principal component analysis based on the intercorrelations among item means yielded a strong first factor (eigenvalue = 9.08) explaining 60.54% of the variance suggesting that the items not only co-vary across individuals but also across samples. Also here two more eigenvalues exceeded unity (1.32 and 1.00; explaining 8.78% and 6.61% of the variance, respectively). This indicated that there were reliable differences among samples that were independent from the general level of gelotophobia. No rotation was undertaken but the two dimensions already provided a meaningful dimensional system, with factor two and three representing dimensions of *insecure* (e.g., trying to hide ones experienced insecurity, feeling of being involuntarily funny) vs. *intense avoidant-restrictive reactions towards the laughter of others* (e.g., avoiding places where one has been laughed at, feeling uncomfortable if dealing with people from whom one was earlier laughed at, taking a long time for recovering form having been laughed at) and *low vs. high suspicious tendencies towards the laughter of others* (e.g., suspiciousness if others laugh).

2. Open Questions

As mentioned above different levels of *not* being fearful outweigh the levels of having the fear. This might, first, affect the correlations between the GELOPH<15> and external variables where the covariation of the two variables in the span between 1.0 and 2.5 might determine the coefficient more than their covariation in the span between 2.5 and 4.0 (as it only involves 10% of the sample). Secondly, past experiments (for example when different types of laughter are perceived) mainly made statements about differences between the groups of having no fear and slight fear; due to the lower number of high scoring participants most often the marked and extreme groups were collapsed into one, and occasionally also a borderline group (2.0 – 2.5) needed to be formed. Finally, the dimensionality of gelotophobia might also be affected. Although there are several elements in the gelotophobia scale, the set of items appeared to be strictly unidimensional in heterogeneous samples.

However, a factor structure depends on the sample and a very homogeneous sample (e.g., high scorers in the GELOPH<15>; a clinical group of people with a high fear of being laughed at) might yield more distinguishable components. Even if there are different types of gelotophobes at the high end of the dimension, the correlation between the items will also involve the 90% non-gelotophobes and this will override the pattern that might be found if the analysis is restricted to the high end of the spectrum. The factor structure of the gelotophobia items might not only be different when the GELOPH<15> is analyzed in a sample of gelotophobes (rather than a random sample of the population) with scores between 2.5 and 4.0; but this also might be again different in a sample representing equal numbers of people with slight, marked and extreme fear of being laughed at.

In a study by Ruch and Proyer (2008a) the factor structure was determined across all participants which contained only 11.65% gelotophobes, of which most were only slightly (i.e., 6.83%) fearful of laughter, participants with a pronounced (4.02%) and extreme (0.80%) fear being rare. A group of 99 clinically diagnosed gelotophobes was analyzed as well and while only 7.07% had no fear of being laughed at, the 92.93% that expressed a fear tended to have more often slight (31%) and marked (39%) than extreme (22%) fear of being laughed at. Thus, it is obviously difficult to obtain a sample of equally slight, pronounced and extreme gelotophobes that is large enough to conduct statistical analyses. Based on our experience with the world wide sample (Proyer et al. 2009), we can say that in a random sample of adults

only 5 out of 1,000 will have extreme gelotophobia scores, and only 30 out of 1,000 will have a pronounced fear. Roughly one out of 20 gelotophobes (i.e., individuals with a GELOPH score > 2.5) will have an extreme fear (> 3.5).

For a factor analysis of the 15 items 150 to 200 gelotophobes are needed, in which ideally slight, pronounced and extreme gelotophobes are roughly equally represented. Thus, to have at least 50 individuals with extreme scores in the sample we would need to unspecifically test 10,000 individuals. Clearly, to find a suitable sample a strategy needs to be pursued that targets gelotophobes worldwide. Thus, an international sample (rather than local) is sought for using the English version of the GELOPH<15>. For this an online research and assessment portal was established (www.gelotophobia.org). Furthermore, to find and interest individuals with higher fear of being laughed at and direct them to the online portal, appropriate advertisement in international media and at appropriate places in the Internet needs to be done (e.g., we have opened a Wikipedia site on gelotophobia, or have posted advertisements on the websites of some self-help groups). Finally, this online portal needs to be safe and hence individuals could log in anonymously yet still stay in contact with the researchers if they wanted to.

3. Aims of the Present Study

The present study will examine the factor structure of the GELOPH<15> in a sample of individuals with a fear of being laughed at. For this analysis only the individuals with at least slight gelotophobia will be employed and it will be attempted that equal numbers of slight, pronounced and extreme scorers will be present. As a comparison, and to test the factor structure in an independent sample, all the high scorers from the study by Ruch and Proyer (2008a) will be reanalyzed (be they clinically diagnosed gelotophobes, or high scorers in the GELOPH<15> from the unscreened sample of adults).

Furthermore, a hierarchical factor analysis (Goldberg 2006) will be employed to see how the factors unfold with increasing numbers of extracted factors. Factor solutions that can be derived from both samples will be preferred and a scoring key for subscales will be derived. These factors will be validated against a set of socio-demographic and biographical data (e.g., experiences of having been bullied). Especially the prior finding that gelotophobes claim to have been bullied (Platt et al. 2009) will be examined in the relation to any factor that might emerge. As the written form of a structured interview can be voluntarily filled in on the website it will also be possible to get illustrations on behavior, feelings, and thoughts of the high scorers of the factors extracted.

4. Method

4.1. Participants

Sample I. A sample of 622 adults, 57.1% male and 42.9% female, whose ages ranged from 18 years to 68 years ($M = 26.82$; $SD = 11.31$) were recruited by Internet contact. The sample consisted of 67.2% single, 11.6% cohabiting, 18.8% married, 1.9% divorced and 0.5% widowed individuals.

Sample II. The comparable sample consisted of 232 German gelotophobes, 39.4% male and 60.6% female, whose ages ranged from 19 years to 83 years ($M = 38.73$; SD

= 12.59. These data were taken from the first publication on gelotophobia (Ruch and Proyer 2008a) where a larger group was tested that was composed of clinically diagnosed gelotophobes and three other comparison groups (normal controls, shame-based depressives, and non-shame based depressives; for more details see Ruch and Proyer 2008a). For the present analysis, the clinically diagnosed gelotophobes (43.8% of the sample) were taken and those of the three comparisons groups that exceeded the 2.5 cut-off point.

4.2. Instruments

The GELOPH<15> (Ruch and Proyer 2008b) is a questionnaire assessing the level of the fear of being laughed at consisting of fifteen items in a four-point answer format (1 = strongly disagree; 2 = moderately disagree; 3 = moderately agree; 4 = strongly agree). A broad variety of studies supported the high internal consistency, stability (test-retest correlation), and validity of the GELOPH<15>. Its English translation (Platt et al. 2009) yielded a high reliability ($\langle$ = .90) and a one-dimensional solution did fit the data best. Earlier studies support the validity of the English language version (e.g., Edwards et al. 2010; Platt et al. 2010, Rawlings et al. 2010).

The *Structured Gelotophobia Interview — Written Experimental Form* (Platt et al. 2011) contains a list of 20 questions relating to a variety of issues regarding the onset of the fear of being laughed at, typical ways of dealing with it, thoughts, emotions and actions while being laughed at, as well as socio-demographic variables. One of the latter questions refers to "would you say that you have experienced being bullied, ever?" (yes, no). The interview is still in an experimental form and was administered here in a written format.

4.3. Procedure

Information websites such as Wikipedia as well as media coverage of feature stories on gelotophobia were utilized to elicit participants by providing a URL that directed interested people to a website (www.gelotophobia.org). The website allowed initial screening for gelotophobia using the GELOPH<15> (Ruch and Proyer 2008b) and provided instant feedback. Participants were then invited to complete further questionnaires on the site. A personal login allowed for participants to return to the questionnaires as many times as they liked. No personal identifying information was taken but participants were offered a more in-depth assessment if they left a contact email address where the information in the other questionnaires would be used to broaden the participant's understanding of gelotophobia.

5. Results

The English version of the GELOPH<15> proved to be reliable in this international setting, yielding a high internal consistency (α = .91). The total score in gelotophobia was not related to gender, age or marital status in the present sample. The sample statistics for gelotophobia (M = 2.87, SD = 0.68) indicated elevated total scores, with the sample mean exceeding the cut-off point for a slight fear of being laughed at. Also the sample was more heterogeneous than usual.

Only one fourth (n = 162, 26.05%) indicated no fear, 26.05% (n = 162) reported a slight fear, 29.74% (n = 185) pronounced fear and 18.17% (n = 113)

extreme fear of being laughed at in the total sample. Thus, about 74% of the participants exceeded the cut-off score (i.e., 2.5) for slight gelotophobia. Furthermore, the three levels of the fear were strongly and fairly equally represented, demonstrating the success of the recruitment strategy for gelotophobes.

5.1. Structure of Gelotophobia Among Gelotophobes

A principal components analysis was performed on the intercorrelations among the 15 GELOPH<15> items for the 460 gelotophobes in sample I and for the 232 gelotophobes in the comparison sample (sample II). In sample I ($M = 3.21$, $SD = 0.36$) 162 had a slight (35.22%), 185 had a pronounced (40.22%) and 113 had an extreme (24.57%) expression of gelotophobia. Of the participants in sample II ($M = 3.02$, $SD = 0.37$), 57.63% had a slight, 29.66% indicated a pronounced, and 12.71% an extreme expression of gelotophobia. Thus, sample I (collected via the Internet) contained higher expressions of gelotophobia than the initial sample of Ruch and Proyer (2008a). A t-test on the sample means indicated a medium effect (Cohen's *d* = .52).

For both samples, the screen test suggested the retention of three factors although five eigenvalues exceeded unity (eigenvalues were, reporting sample I/sample II: 3.24/2.77, 1.44/1.77, 1.30/1.41, 1.04/1.18, 1.01/1.14, 0.99/0.99, and 0.93/0.90). We decided to extract 1–5 factors in order to have the possibility to study the relations between factors of different stages of extraction. Special attention was given to the solutions between 3 and 5. This procedure is called *hierarchical factor analysis* (Goldberg 2006) and it was successfully applied to a variety of problems (de Raad and Barelds 2008). In more detail, the first principal component was extracted and the factor scores were saved. Next, two factors were extracted, rotated according to the Varimax criterion, and the factor scores were saved. This was repeated for three, four, and five factors. The factor scores of adjacent factor solutions were then correlated with each other, and the salient relations (correlations > .35) were represented using arrows. This way, it can be shown how the factors unfold; how they split up or stay stable from solution to solution. This tree for the factor analysis in sample I is depicted in Figure 1.

1/1
Gelotophobia

.74

2/1
Negative self evaluation & misperception

.67

2/2
Disproportionate, negative responses to being laughed at

.84

3/1
Control, withdrawal & internalizing

.54

3/3
Paranoid sensitivity to anticipated ridicule

1.00

3/2
Disproportionate, negative responses to being laughed at

.86

4/1
Self protection from derision: control, withdrawal

.51

4/4
Internalizing that one is a valid object of derision

1.00

4/3
Paranoid sensitivity to anticipated ridicule

1.00

4/2
Disproportionate, negative responses to being laughed at

.87

5/1
Self protection through withdrawal

.47

5/5
Self protection through controlling the situation

.98

5/4
Internalizing that one is a valid object of derision

.98

5/3
Paranoid sensitivity to anticipated ridicule

1.00

5/2
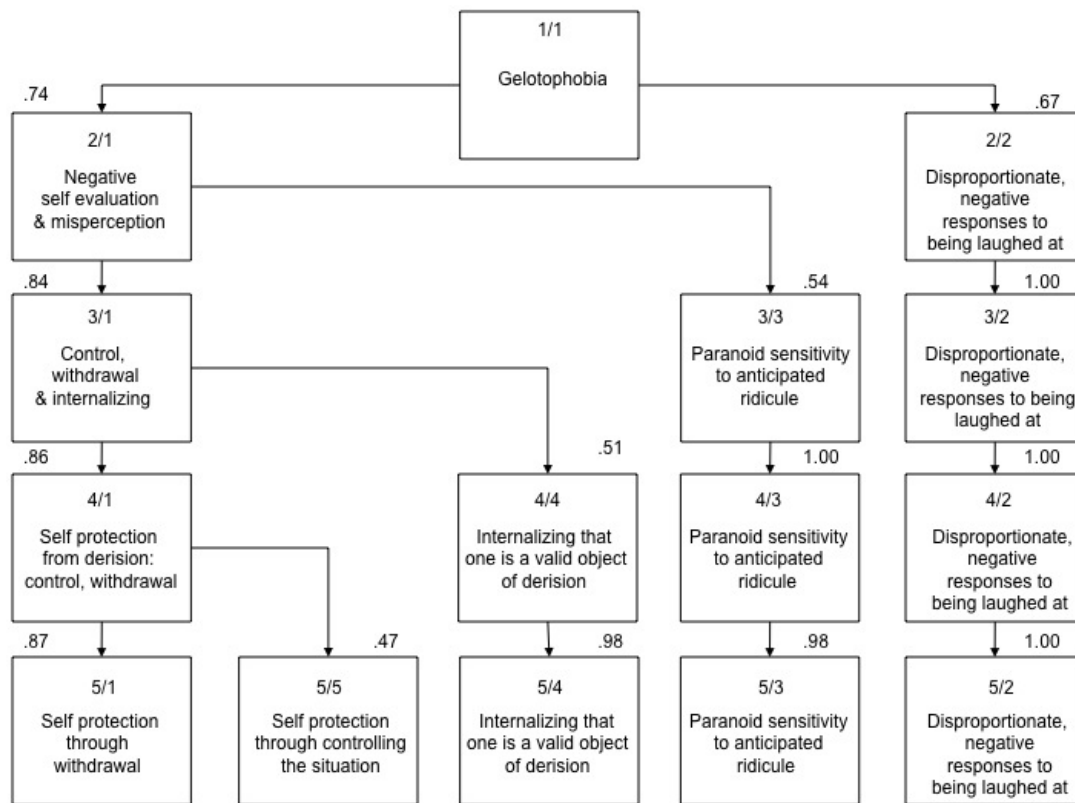Disproportionate, negative responses to being laughed at

Figure 1. Hierarchical factor analysis of the set of gelotophobia items.

Figure 1 presents an overview of the succession of factor extraction with correlations between the factors from adjacent levels of extraction. The codes above the factor names refer to the factor numbers at a certain level; for example, 3/1 and 4/3, respectively, refer to the first factor at the three-factor level and third factor at the four-factor level. Included at the top level of Figure 1 is the first unrotated principal component (FUPC), which in this case was a general factor of "gelotophobia". The second level depicts the two-factor solution, and it appeared that the global gelotophobia factor splits up into a factor of "negative self-evaluation and misperception" and "disproportionate negative responses to being laughed at". In the three-factor solution there was a factor of "coping with derision: control, withdrawal, internalizing," "paranoid sensitivity to anticipated ridicule", and "disproportionate negative responses to being laughed at".

The latter two also appeared, rather unchanged, in the four- and five-factor solutions; i.e., these two factors remained essentially the same in the higher order solutions. In the four-factor solution the element of "internalizing (self-believing that one is a valid object of derision)" broke apart from the component of "self-protection from derision (control and withdrawal)". The former also appeared in the five-factor solution, and there was a factor of "self-protection through withdrawal" and "self-protection through controlling the situation". Thus, as the factors unfolded at each step one new factor emerged (i.e., split away from the first one) and stayed stable in the subsequent solutions. The tree clearly underscored that it was the first factor that consecutively gave away variance to new factors.

A hierarchical analysis for the data in sample II (not shown in detail) yielded a similar but not identical pattern. The similarities lay in the fact that the factors of "paranoid sensitivity to anticipated ridicule" and "disproportionate negative responses to being laughed at" stayed stable between the three- and five-factor solutions.

Likewise, it was the "coping with derision (control, withdrawal, internalizing)" that systematically diversified and at each step one new factor broke away from it. The differences were that these factors did not correspond very well with the ones from sample I and that even the two factor solutions were not comparable as the factor of "coping with derision: control, withdrawal, internalizing" (3/3) emerged only in the third step and its items were distributed across both factors at the two factor level. This could also be seen when computing congruence coefficients between the factors of sample I and II for each of the factor solutions separately. Only for the three-factor solution a complete match between corresponding factors could be found. Tucker's Phi was .86 (for F1), .92 (for F2), and .73 (for F3).

Thus, the number of factors was set to three. These three factors explained 40% of the variance in both samples and were rotated by Orthothran. The oblique factor structure (in both samples) is given in Table 1. Table 1 shows that Factor 1 had eight salient (>.30) loadings in sample I and six in sample II. It was loaded most highly by the items relating to withdrawal or social avoidance with the items referring to controlling yielding smaller loadings in sample I. The congruence coefficient was .86. The second factor had five salient loadings in sample I and six in sample II. It referred to *disproportionate negative responses to having been laughed at* and combined elements of having been affected enduringly by being laughed at, slow recovery from ridicule and freezing/inadequate motors responses. The factor congruence was .92. The third factor had four salient loadings in sample I and four in sample II. It referred to *paranoid sensitivity to anticipated ridicule* and combined the suspiciousness to being laughed at with the conviction that others were right to laugh at oneself (only sample II). The congruence coefficient was .73.

Table 1
Factor Structure of the GELOPH<15> in Two Samples of Gelotophobes (2.5 > X < 4.0)

Nr.	Items	F1.1	F1.2	F2.1	F2.2	F3.1	F3.2
1	When others laugh in my presence I get suspicious.	-.05	.09	.04	.00	**.81**	**.68**
2	I avoid showing myself in public because I fear that people could become aware of my insecurity and could make fun of me.	**.67**	**.72**	-.10	-.07	.01	-.09
3	When strangers laugh in my presence I often relate it to me personally.	.01	.00	.00	.08	**.79**	**.82**
4	It is difficult for me to hold eye contact because I fear being assessed in a disparaging way.	**.47**	**.55**	.04	-.07	.00	.17
5	When others make joking remarks about me I feel being paralyzed.	.00	.10	**.60**	**.30**	-.02	**.30**
6	I control myself strongly in order not to attract negative attention so I do not make a ridiculous impression.	**.32**	**.31**	.29	.06	-.22	.06
7	I believe that I make involuntarily a funny impression on others.	**.37**	.05	-.07	.02	-.01	**.67**
8	Although I frequently feel lonely, I have the tendency not to share social activities in order to protect myself from derision.	**.56**	**.49**	.04	.08	-.07	.25
9	When I have made an embarrassing impression somewhere, I avoid the place thereafter.	.01	.25	**.43**	**.39**	.03	-.04
10	If I did not fear making a fool of myself I would speak much more in public.	**.32**	**.61**	.03	.10	-.20	-.25
11	If someone has teased me in the past I cannot deal freely with him forever.	-.11	-.17	**.70**	**.79**	-.05	.16
12	It takes me very long to recover from having been laughed at.	-.16	-.01	**.71**	**.78**	.17	-.09
13	While dancing I feel uneasy because I am convinced that those watching me assess me as being ridiculous.	**.36**	**.37**	-.06	.05	.05	.15
14	Especially when I feel relatively unconcerned, the risk is high for me to attract negative attention and appear peculiar to others.	**.43**	-.01	.04	**.34**	.12	.24
15	When I have made a fool of myself in front of others I grow completely stiff and lose my ability to behave adequately.	.23	.16	**.51**	**.52**	-.06	-.02

Note. Marker loading in bold.

The three factors were positively intercorrelated in the two samples, disproportionate negative responses to being laughed at correlated positively with both coping with derision (control, withdrawal, internalizing) (sample I: $r = .29$, sample II: $r = .33$) and paranoid sensitivity to anticipated ridicule ($r = .14$, $r = .15$), and the latter two were positively correlated as well ($r = .30$, $r = .26$). For the subsequent analyses three subscales were formed by averaging the markers for each factor.

5.2 Validating the gelotophobia factors in the case studies material

For a better understanding of the factors at the content-level, high scorers in the three factors were compared on the basis of written descriptions of their typical behavior and convictions in different laughter-related situations and incidents. The basis of these analyses was answers provided by participants of sample I to a structured interview. In detail, the structured gelotophobia interview contains 12 questions that are sensitive to the three factors, namely four for factor F1, five for F2, and three for F3.

About 80 participants did fill in the interview and three individuals for each factor were selected based on their scores in the three subscales. Candidates were chosen if they, ideally, were high in one scale and comparatively lower in the others. The answers to the 12 questions are presented in Table 2 (overleaf) in a slightly re-worded, shortened and partially restructured manner. The first three represent high scorer in factor F1, the next three represent high scorers in factor F2 and the last three scored high on the third factor F3.

Table 2.
Excerpts Taken From Extreme Gelotophobes Case Studies

Case study participant demographics	Answers to four F1-related questions	Answers to five F2-related questions	Answers to three F3-related questions
CS1: (IC = 430) (American, male, 30 yrs, single); G<15> = 3.2 (marked); F1 = 3.5; F2 = 2.8; F3 = 3.0	(a) I was definitely not prepared for having the whole class laughing at me while I cried. I just sat there and cried until the other students convinced the old bat that I was supposed to be there. (b) I flush, blush, and overheat. This sometimes triggers fever blisters. My heart races and I have an adrenalin surge. (c) Sheer panic. I am usually just totally self-conscious and worry about my facial redness. (d) Avoidance. When I have to be in a situation, I make a lot of crass and crude remarks, self-effacing sarcasm, and totally asshole statements to draw laughter elsewhere.	(e) Dry, red blotchy skin, a full on flush, fever blisters (I am actually herpes free, they are blisters at the vermillion barrier). (f) I live in a cabin outside of town in Alaska. I have a lot of control to avoid crowds. I keep in the shadows. I cannot date people who are not loners because they always want to make me interact in groups. (g) No, I seriously doubt that it is something I have intellectual control over. (h) No. My parent's didn't help but they did not contribute either. Mostly it was the choices they made for me. For example- I was the only rider on the school bus who wore a catholic school uniform every day. (i) I am a self-independent loner. I make sure my friends are not friends with one another. I don't date much and the women I do date cannot be too social. I am not needy, I just cannot be part of that aspect of their lives and feel left out if they insist.	(j) Not really, I am still convinced they are laughing at me. (k) No. (l) No.
CS2: (IC = 447) (American, female, 42 yrs, single); G<15> = 3.7 (extreme); F1 = 4.0; F2 = 3.6; F3 = 3.0	(a) No, I was young and didn't expect it. I went to therapy for 11 years for the depression, gave up recently, take meds to take the edge off, but it will never get better, & thinking about it, I still get very angry. (b) I only leave my apartment about once a week, to shop, doctors appointments. People make me very nervous in general nowadays. I try to just hurry and ignore everyone around me. (c) I just feel like everyone can see how screwed up I am, its not just laughter, its more the sense that people are just are	(e) Chest pain, short of breath, sweating, dizzy. (f) Cant cope, so I don't socialize except for my mom & a neighbor who helps me with stuff I can't do...its basically just me and my cat. (g) No. (h) No. (i) No.	(j) No I cannot. (k) No. (l) I would never confront anyone.

	almost "offended" by me, because at some level, they just feel I'm "wrong". (d) Ativan (*i.e.,* a benzodiazepine used in the treatment of anxiety disorders).		
CS3: (IC = 371) (Australian, female, 22 yrs, single); G<15> = 3.2 (marked); F1 = 3.7; F2 = 2.6; F3 = 3.0	(a) I was deeply ashamed. (b) I outwardly ignored it. (c) It is my weight problem. (d) Not really.	(e) Tachycardia, tremor and sweating. (f) Yes I constantly avoid novel social situations. (g) Possibly, as a method of reconditioning. (h) Ridicule is commonplace in my family in both my parents and siblings. Often it is about academic performance and intelligence. (i) I often have to give case presentations to my colleagues- but I often suffer from extreme nervousness beforehand. I often begin to stutter, which only aggravates the situation further.	(j) Often in public, once I follow the conversation where laughter occurred. (k) I cannot recall. (l) I cannot recall.
CS4: (IC=546) (Mexican, male, 29 yrs, single); G<15> = 3.2 (marked); F1 = 2.8; F2 = 4.0; F3 = 2.5	(a) With anger then sadness. (b) Anger and sadness, just tiredness. (c) I just want to be left alone, I guess. (d) No really but lately I'm begging to think I need to get me some mind tools for this task specifically.	(e) Cold sweat, stiffness. (f) I am an artist. I like my work quite a bit so I dive into it to cope. The funny thing is that I don't dislike humor per-se; I'm just not very good at dealing with it. The lines get blurred but if I am with someone I really trust I can do play-ful banter. (g) Yes, I think so. Training in quickness of mind to do comebacks to snaky remarks would be useful, as would Greek rhetoric. (h) No. I do not fear them but I cannot trust them either. (i) In the past it was more fear of being laughed at, in the present its more fear of not being able to come up with a witty remark to a tease what bothers me, if you freeze on the middle of a tease, even if you know if is tease, the results are not favorable.	(j) Some times, yes I can see some moment when I could have acted better, thus defusing social tension. (k) Yeah in high school some people where laughing at me one of them did a drawing of me, they were hiding it, and the showing it among them self's when I was not looking on that area, I found the drawing later on a trash can, I was sad, angry and tired afterwards. (l) No not really as the bullying was rather open so I need not hide my responses most of the time.
CS5: (IC = 594) (Indian, male, 31 yrs, married); G<15> = 3.5 (marked); F1 = 2.7; F2 = 4.0; F3 = 4.0	(a) No, I was not emotionally prepared to cope with those events. I withdrawn from social events or meeting people whenever possible in order to escape from being laughed at. I use to become extremely upset by thinking about those events. (b) Anger.	(e) Stiffness in body and extreme fear of humiliation. (f) Stiffness in body and extreme fear of humiliation (same as above). (g) No help needed. (h) It has developed over the years because I was being laughed at over my color and appear-	(j) No. (k) No. (l) No.

	(c) Run away from there or wish I had never came here. (d) To be confident and dress smartly.	ance, which developed into gelotophobia. (i) There are consequences of having gelotophobia. The suffering person withdraws from all kinds of interaction or at least tries his/her best to avoid those interactions, which can hamper his/her life in a very adverse way.	
CS6: (IC = 700) (Peru, female, 58 yrs, separated); G<15> = 3.7 (extreme); F1 = 3.5; F2 = 4.0; F3 = 3.0	(a) Shame, shame, shame and sadness. (b) Fear shame and pain. (c) I'm not going to be able to hold back from crying. (d) No.	(e) Intense burning in my chest and need to urinate. (f) I am doing better as I am in therapy for other issues. (g) I feel intense anger and want to strike back. (h). Absolutely! (i) Interpersonal relationships suffer deeply. I do not feel I can be truly loved for what/who I am.	(j) Not specifically but there have been times when, after self-talk; I have dealt with the reality that I wasn't in danger. (k) This happened just today. I am petite (4' 10''). In a fleeting moment two people commented on my height while comparing me to an inanimate object. I had to say something to defend myself. (l) Not that I know or remember.
CS7: (IC = 488) (American, female, 42 yrs, married); G<15> = 3.5 (extreme); F1 = 3.8; F2 = 3.2; F3 = 4.0	(a) I have always stuffed my emotions so I haven't had to deal with anything unpleasant. (b) Pain, feelings of betrayal, anger, paranoid. (c) What did I say? Do I look abnormal? Why do they keep laughing at me? (d) No.	(e) My stomach drops, heart feels as if it is racing, hands get shaky, breath gets faster. (f) I follow into a room-I never lead. I try to stay with one person I know and cling to them the whole time. (g) I am not sure I would be able to convince myself that people aren't laughing at me. (h) Absolutely. As I grew up, my mother\'s husband was always putting me down and saying how worthless I was. (i) Always consequences. My social life is non-existent. I even get paranoid with family and friends if they are laughing. I don't like laughing around others because I think they laugh at how I laugh. I try not to talk too much for fear that I will sound or look stupid as I talk.	(j) When my husband and daughter were in a different room and I thought they were laughing at me, I asked them why they were laughing at me and they said they weren't. (k) Even though they denied it, I still felt they had been laughing at me. It didn't help that my husband said that if I thought they were laughing at me- then they must have been. I believe to day that they were laughing at me. (l) I don't remember.
CS8: (IC = 350) (British, female, 21 yrs,	(a) Scared and upset now more accepting as these things happen.	(e) Blushing and sometimes tightening in the chest.	(i) All the time. (j) I never confront them.

cohabiting); G<15> = 3.3 (marked); F1 = 3.0; F2 = 3.4; F3 = 4.0	(b) Mildly panicked and annoyance. (c) Why are they laughing? Is it me? Maybe I should go away... (d) I try and stay calm and constantly tell myself that they don't even know I exist.	(f) Just try to ignore it. My boyfriend has helped a lot and I have got more used to it over the years. (g) I don't know, possibly. (h) No, I have always got on well with them. (i) Short temper and difficulty telling the difference between fun teasing and bullying.	(k) Not applicable.
CS9: (IC = 356) (British, male, 18 yrs, single); G<15> = 3.3 (marked); F1 = 3.0; F2 = 3.4; F3 = 4.0	(a) Not really, I deal with it by sticking to my friends. I already have a fear of making new friends. (b) Sadness, shame, embarrassment, despair, unfair, uneasy, sweating, shaky, stiff. Stare at a wall or roof and try to phase out the other people. (c) What are they laughing about to do with me? What looks stupid on me? Why me? Why do people have to be so cruel? (d) Stare at a wall or roof and try to phase out the other people.	(e) Stiffness, sweats, rising heartbeat, harsher breathing, claustrophobia (f) Meeting people is hard; I cope by having close friends with me. Talking to strangers is usually hard, as I fear I'll do something embarrassing. (g) Most likely, I would be willing to try. (h) Possibly my dad. He used it intentionally to embarrass him and me in public. He did not care but I did. (i) I avoid certain places that are crowded or have people staring. I make few friends and find it hard to make them.	(i) Not specifically but yes that has happened. (j) I try not to make a scene. (k) As I said, I try not to make a scene.

Notes. CS = Case study; IC = Internal code; G<15> = mean score in the GELOPH<15>; F1 = Coping with derision subscale, F2 = Disproportionate, negative responses to being laughed at subscale, F3 = paranoid sensitivity to anticipated ridicule subscale.

F1-questions: (a) Do you have any affective strategies to deal with such a moment, when you feel you are going into a situation where you may be laughed at? (b) When you are convinced that others are laughing or going to laugh at you, as you go about your typical daily life, what kind of emotional reaction would you have? (c) Can you give an example of the kind of thoughts that cross your mind at such a moment? (d) Do you have any affective strategies to deal with such a moment, when you feel you are going into a situation where you may be laughed at?

F2-questions: (e) When you are convinced that others are laughing or going to laugh at you, as you go about your typical daily life, what kind of emotional reaction would you have? Give an example of the kind of thoughts that cross your mind at such a moment? (f) How has your phobia consequently affected your social interactions? If you find it really difficult, how do you cope? (g) If someone offered you practical help (work shop, counseling, therapy) that helped you read and understand the different play and laughter signals, so you understood better and more precisely which ones were threatening and which ones were fun, do you think it might help you to reevaluate certain situations, so they do not appear as frightening? (h) Do you think that the way you interacted with your parents may have contributed to you developing gelotophobia? Can you give an example of the interaction you would have with them. (i) Are there any consequences of having gelotophobia? In what sense is your life impaired (work, social life, family, friends, etc)? Are there things that you do (that you wished you would not do) or not do as a consequence of having this fear of being laughed at.

F3-questions: (j) Can you recall any events where you have been convinced that others are laughing at you but then you have realized that you have been mistaken? (k) Have you confronted someone for laughing and they deny it? (Describe each situation, how it evolved, what you thought, felt and did, and how the others reacted; how did it end? Were there any afterthoughts or aftermath?) (l) Can you give an example of an instance where you first felt that someone laughed at you, but later (after you acted) it actually turned out that this was not the case. What was the worst trouble you run into?

Table 2 illustrates how individuals with a different factor profile answered the questions relating to coping, disproportionate response intensity and paranoid sensitivity to anticipated ridicule. Without going into detail one could see that overall the factor profile was reflected in the nature of the answers, providing a richer description of the experiential world of the extreme gelotophobe. In particular, the intensity of the responses and the consequences to ridicule showed how difficult the daily lives of the gelotophobes could be.

Next, the relations with the demographic variables were investigated. There were no gender and age differences in F1 and F3, but age correlated positively with F2 ($r = .22$, $p < .001$), and women ($n = 208$) scored higher ($M = 3.30$) than men ($M = 3.18$; $n = 252$) on this factor; i.e., disproportionately intense negative responses to being laughed at were more often found among the older and among female participants. Interestingly, in the group higher than 2.5, only 62 indicated not to have been bullied in the past and 398 indicated that they feel to have been bullied. Three 2 x 2 ANOVAs were computed for bully status (yes/no) and gender (females, males) as independent variables and the three subscales as dependent variable and yielded significant effects of bully status for both F1, $F(1,456) = 17.59$ ($p < .001$) and F2, $F(1,456) = 7.62$ ($p < .01$), but not for F3. Thus, those bullied were higher in coping with ridicule through control, withdrawal and identification ($M = 2.88$, $SD = .46$; non-bullied: $M = 3.16$; $SD = .47$) and also showed more disproportionately intense responses to ridicule ($M = 3.08$; $SD = .44$; non-bullied: $M = 3.25$; $SD = .51$).

Similar results were found for the comparison sample II, where disproportionately intense negative responses to being laughed at were more often found among the older ($r = .32$; $p < .001$), and women ($M = 3.23$; $SD = .54$) again scored higher than men ($M = 3.09$; $SD = .54$) on this factor ($p < .07$). Additionally, the younger indicated more paranoid sensitivity to anticipated ridicule ($r = -.21$, $p < .01$). Finally, it is of interest to see whether the clinically diagnosed gelotophobes are different from the other high scorers in the GELOPH<15> (i.e., individuals with a GELOPH<15> score over 2.5). Therefore, a 2 x 3 ANOVA with repeated measures was computed with type of group that entered sample II (clinically diagnosed gelotophobes vs. others) as grouping variable and the three gelotophobia subscales as repeated measures factor. Clinically diagnosed gelotophobes scored higher, $F(1,228)= 27.47$ ($p < .001$), but there was no interaction with type of subscale $F(2,456) = 0.4$ (*n.s.*).

6. Discussion

The aim of this study was threefold. First the factor structure of the GELOPH<15> was determined in two samples with high scorers, which was then used to distinguish among subtypes of gelotophobia. Second, hierarchical factor analysis was used to show the development of the factors at different stages in the hierarchy. Finally, correlations with socio-demographic variables were investigated for the subscales.

The factor structure involving three factors was relatively stable across the two independently collected samples. The two factors of "paranoid sensitivity to anticipated ridicule" and "disproportionate negative responses to being laughed at" emerge latest in the three-factor solutions and stay stable afterwards. The "defensive coping with derision (control, withdrawal, internalizing)" is what changes with higher number of factors. Those are different depending on the hierarchy in the model and are not stable across the two samples. Thus among the gelotophobes several components are distinguishing; one component describes how strongly people

overreact to having been laughed at (e.g., feeling paralyzed, growing stiff, long time to recover, being affected with the teaser in future interactions and also avoiding the place where teasing took place).

Such a component might be the cause of avoiding being laughed at (as it is upsetting) or the consequence (i.e., the response intensified with the number of repeats) of ridicule. Obviously, individuals with such intense responses avoid being laughed at in the future.

A second component refers to the conviction that any laughter of others might be directed at oneself (i.e., one presumably is the target of random laughter), and that laughing people are suspicious. Individuals not only relate laughter to themselves, they might even anticipate such ridicule and screen the environment for further potential attacks. This might also go along with the conviction that one is peculiar and odd (i.e., there is proper reason to get laughed at), but this needs to be replicated first in future analyses.

This factor was already extracted in the study by Proyer et al. (2009) where it appeared as the third unrotated component in an analysis across all 93 samples. The factor of "defensive coping with ridicule" seems to be the most heterogeneous; it is the one that splits up with higher number of factors into behavioral control, complete social withdrawal, and feeling peculiar. However, these factors seem to describe how far in the process of "no" to "intense" response gelotophobic individuals are; are they ignoring being laughed at, try controlling themselves (i.e., their responses and the situation), to withdrawing altogether and eventually internalizing what the presumed reason of ridicule was.

The pathological conditions of these factors would lie in the excessive response that is more punishing the self in some people but not in other, and also would lie in the automatic assumption that the laughter (perhaps randomly expressed, and most likely not even of a malicious nature) is directed at oneself as an act of derogation; i.e., the shame-response would be elicited without an actual stimulus. Finally, the attempts to control responses, situations, and complete social withdrawal have a pathological component as well. Laughing at is actually not that often to warrant such extreme avoidance responses leading to complete social withdrawal. Here the anticipatory fear is guiding the gelotophobe, in the excessive reaction factor emotion-regulation might be a problematic, and the third factor is based on developed convictions, views of the self as ridiculous and the belief in malicious intentions of others.

This allows making some predictions regarding the relationship to social phobia. Recently, first empirical evidence was provided on the relationship between gelotophobia and social anxiety disorder, or social phobia (Carretero-Dios et al. 2010, Edwards et al. 2010) and results showed that in general, the two constructs overlap theoretically and typically correlations of about .60 to .70 emerge in different studies. Given the results of the present study one can assume that the factor "coping with derision (control, withdrawal, internalizing)" will be shared with social phobia as it primarily describes how people deal with the fear, and how far they are in a process of dealing with the problem. The factors "paranoid sensitivity to anticipated ridicule and disproportionate negative responses to being laughed at" might be more unique to gelotophobia and will overlap less with social phobia. Thus, the correlation with social phobia measures and gelotophobia are expected to be lower, if the coping aspect is not considered in the scales. Perhaps this behavior represented the final common pathways in the way people cope with the fear although there may be different causes (e.g., fear of being ridiculed; fear of authorities and strangers).

It should be noted that this is only the first factor analysis and the results did not perfectly converge across the two samples (which differed not only in nationality but language versions). This initial separation of components of gelotophobia might be of interest in future studies when there is a need to separate types of gelotophobes. A requirement is that there are a sufficient number of high scorers in the samples. Obviously, in more random samples of the populations these three factors will be highly related or indistinguishable. Among the high scorers it might be interesting to distinguish among subtypes of gelotophobia and how they are related to other criteria in further studies. For example, which of the subfactors are higher in different psychiatric and clinical samples (Forabosco et al. 2009, Samson et al. 2011), or relate to different forms of humor (Kazarian et al. 2009, Ruch et al. 2009), emotions (Papousek et al. 2009, Platt and Ruch 2009, Proyer et al. 2010, Rawlings et al. 2010), and individual difference variables relating to self-presentation styles, personality and ability (Platt et al. 2010, Proyer and Ruch 2009, Radomska and Tomczak 2010, Renner and Heydasch 2010).

While in general no gender differences exist in gelotophobia, females were more inclined to report intense disproportionate negative responses. This might be in accordance with higher neuroticism or emotional lability scores. Furthermore, it is the older that have more intense responses; this might reflect an intensification of the responses over time; a lifetime of being laughed at (Platt et al. 2010). Furthermore, this study also sheds some light to the relationship of bullying and gelotophobia. Those bullied were primarily higher in coping with ridicule (by controlling the situation, withdrawal and internalizing that one is ridiculous) and also showed a tendency to react to ridicule in a disproportionate manner. However, in the present sample there is no difference in terms of paranoid sensitivity to anticipated ridicule; i.e., they do not assume to be laughed when perhaps there is no evidence for it. However, this lack of difference in this factor might be due to the low number of items in this factor.

Finally, one can confirm that the data collection strategy was successful. The website attracted individuals with higher scores in the GELOPH<15> ($M = 3.21$; $SD = 0.36$), than the group of clinically tested gelotophobes ($M = 3.18$; $SD = .41$) and the mixed group with scores higher than 2.5 ($M = 2.88$; $SD = .39$). Most importantly, the Internet sampling (i.e., sample I) brought almost equal amounts of individuals with slight, marked and extreme fear. Also of importance, the clinically tested gelotophobes and the comparison sample (i.e., sample II) did differ in all three subscales to the same extent. Thus, the Internet sample and the sample coming to clinical practice to seek a therapist do differ quantitatively but not qualitatively. Irrespective of this, the Internet sample yielded even a slightly higher average GELOPH<15> score. Thus, testing over the Internet perhaps also allowed the most shy and withdrawn individuals to participate.

Such samples need further investigation as they allow answering questions. In particular, it might be of interest to study the relationship of the three factors with the joy of being laughed at (i.e., gelotophilia) and the joy of laughing at others (i.e., katagelasticism; see Ruch and Proyer 2009). We were initially surprised that gelotophobia and katagelasticism turned out to be uncorrelated; gelotophobes seem to equally often like to laugh at others, as they do not like to laugh at others. The question is how the extreme gelotophobes react, and will the three components of gelotophobia relate differently to these concepts? One might expect that those who really, very strongly, fear being laughed at will be less inclined to laugh at others, both because they empathize with victims and because they might face retaliation.

Furthermore, the more one controls oneself and even withdraws the less likely gelotophilia and katagelasticism might be. The extreme sample may also elucidate more on differences between realistic and pure gelotophobes. Ruch and Proyer (2008) speculated that some people may fear laughter because there really is something that they get laughed about, thus giving a realistic reason why they have gelotophobia. The second group was defined as having no tangible reason to fear being laughed at and these are defined as pure gelotophobes. It may be that in the higher scoring population differences between the two types of gelotophobes occurs. Having some reason may make your gelotophobia worse, or it could be that misperceiving laughter permeates more aspects of interactions and so heightens gelotophobia. A closer look at the extreme population will allow for this.

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