How do gelotophobes interpret laughter in ambiguous situations? An experimental validation of the concept

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Abstract

The present study was designed to examine the phenomenon of the fear of being laughed at. Three groups of adults, preselected with respect to: (1) having no fear of being laughed at, (2) being borderline with respect to the fear of being laughed at, and (3) being abnormally afraid of being laughed at (gelotophobic). All the subjects listened to tape recordings of laughter. These recordings of laughter reflected a variety of emotional qualities. The subjects rated these recordings according to several criteria and estimated the emotional-motivational state of the laughing person. The subjects were also shown 20 cartoons depicting social situations that involved laughter or the potential of someone's being laughed at and were asked to stipulate what a target person in the cartoon would think or say. It was shown that gelotophobes experienced positively motivated laughter as more unpleasant than did subjects in the non-gelotophobic groups. The gelotophobic group was also more prone to estimate that the laughing person was in a state of negative affect. Those with no fear of laughter and those on the borderline experienced an increase in mood level after the laughter perception task whereas the gelotophobes remained unaffected. Finally, in the semi-projective cartoon evaluation task, the gelotophobes gave more answers that expressed mockery and fear of being laughed at than the other subjects. The results of these experiments show that anomalies relating to individual subjects' degrees of fear of laughter (gelotophobia) exist and can be predicted by the measures described.

Keywords: Assessment; gelotophobia; laughter; mood; perception; semi-projective test.

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1. Introduction

1.1. *"Gelotophobia": the fear of being laughed at*

The first empirical studies on the "fear of being laughed at" (gelotophobia) were conducted by using a list of statements for the subjective assessment of gelotophobia (the "Geloph"-questionnaire; Ruch and Titze 1998). These findings were combined with clinical evaluations of selected patients suffering from the postulated disorder (cf. Ruch and Proyer 2008a, 2008b) and the data collected from these two methods were found to converge quite well. A certain amount of overlap using these complementary methods, was however, practically inevitable inasmuch as the list of statements for the questionnaire stemmed from descriptions that other presumably gelotophobic patients had given about themselves.

In order to provide a more robust demonstration of this syndrome, the search for a measure of its existence derived from sources other than subjective reports seemed worthwhile. One such possible measure might, say, derive from experiments that would reproducibly detect differences between the response of a normal population and a group of presumed gelotophobes. More follows on such possible hypothesis testing below. First, a brief description of some of the clinical characteristics of the presumed syndrome that brought it to the attention of psychologists seems appropriate.

Gelotophobia is presently presumed to develop in response to traumatizing childhood or adolescent events — such as having been the target of mockery, having been laughed at, and/or having been not taken seriously. Gelotophobes are peculiarly sensitive to the laughter of other people. In contrast to a normal collection of subjects, gelotophobes perceive essentially all laughter as a threat — irrespective of the laughter's actual emotional quality. Gelotophobes are prone to be particularly sensitive to scornful, derisive laughter and react to it with enormous intensity; e.g., with panic reactions sometimes including physiological components. Thus, as suggested above, overreaction to scornful laughter and ridicule might be one type of evidence that would reveal the existence of gelotophobia quite independent from the verbal domain.

Related, (perhaps causally) to differences in the reactions gelotophobes demonstrate to the perception of laughter, it may be that these persons simply lack the ability to appreciate positively, non-mocking, motivated laughter as normal people do. It may be that it is difficult or impossible

for gelotophobes to trust the friendliness and innocence that normal people associate with most laughter. Gelotophobes tend to misinterpret all forms of laughter as malicious and react accordingly. Whereas most people interpret smiling and laughter in social situations as signs of friendliness, facilitating, and enriching interaction and communication — or as expressions of mirth and positive affect — gelotophobes may be unable to interpret these signs as positive and non-threatening. As opposed to the perception of a normal person, a gelotophobe would interpret a friendly smile as an offensive act. Gelotophobes would tend to think that their social partner was not laughing with them but laughing at them. This skewed presumption of motivation (possibly associated with an atypically developed "theory of mind") might provide for a further independent means of demonstrating the existence of an extreme fear of being laughed at in gelotophobes.

If independent evidence is revealed from a variety of domains for the tendency toward a fear of being laughed at, a further question can be asked, namely "How well do data from these disparate domains converge?" In other words, how many individuals (say out of 100) are gelotophobic according to their responses to a questionnaire, and how many appear to be gelotophobic in the laughter perception task? Is one measure more sensitive in finding these individuals than another method? Does one method suggest the presence of a higher number of presumed gelotophobes than another method? Ideally, of course, individuals appearing to be gelotophobic according to the questionnaire should also be identified as gelotophobes according to the laughter perception task (or at least the two groups should overlap significantly). Such findings would not only buttress the validity of an extreme, identifiable fear of being laughed at derived from a different behavioral domain, but they would also validate the questionnaire used for the assessment of gelotophobia.

1.2. *The presumption of the emotional-motivational nature of perceived laughter in gelotophobic subjects*

People laugh in a variety of situations and for any number of reasons. Their emotional-motivational states may vary greatly, as may the intentions of what they want to communicate with laughter (Ruch and Ekman 2001). Laughter can be seen as expressing joy (Darwin 1872) and/or being merely a "play signal" (van Hoof 1972). Alternatively, has also

been conceptualized as a means of repelling the deviant individual in a group, i.e. as a punitive measure to sanction inappropriate behavior (Eibl-Eibesfeldt 1989). Laughter, of course, varies not only in an on/off modality, but rather as a multidimensional behavior exhibiting variations in quality and intensity. It is a commonplace that people laugh when they feel embarrassed, nervous, or just silly. More than 100 words specifying various emotional, motivational and physical states or social functions of laughter are found in the natural language (Huber and Ruch 2007).

Scientific classifications of laughter are scarce. Some schemata provide categories of "types of laughter" (e.g., Heller 1902; Lersch 1932; Piderit 1919) others favor dimensional approaches. Kori (1987) used factor analysis to classify twelve laugh acts (produced by one actor; rated by ten adults) and he described the dimensions of "pleasant vs. unpleasant" and "superior vs. inferior." Laughter of the kind "funny," "happy" marked the pleasant pole and "mocking," "coldhearted" were associated with the unpleasant pole. "Triumphant" and "defiant" were located at the superior pole while the inferior pole was marked by "embarrassed," "ingratiating," and "awkward-covering."

Most importantly, those two dimensions correlated well with several objective acoustic parameters. For example, the pleasant vs. unpleasant dimension was correlated with the length of the expiratory noise at the beginning of episodes of laughter as well as the degree of decrease in the amplitude from the beginning to the end of the laugh utterance. Such observations provide evidence that laughter varies in emotional-motivational quality and that objective differences in these qualities allow the "receiver" to distinguish qualities on an acoustical basis. It seems reasonable, then, to assume that this vocal signal has been selected by evolution to allow for the expression of different psychological states in the "sender" or to communicate different motivations of the "sender" so that the sender and the receiver can, to some extent, "understand each other."

How might gelotophobes be different with respect to these characteristics? Can the "fear of being laughed at" as an individual differences phenomenon be extracted from differences in varying degrees of sensibility to the perception the nature and quality of laughter, and if so, how?

As a beginning, one might assume that gelotophobes would rate the "unpleasant" forms of laughter even higher on Kori's dimensions of "unpleasant" and "superior" than would normal subjects. There might also be physiological and/or behavioral indicators of being stressed—

associated with the desire to remove the source of discomfort. Furthermore, inasmuch as gelotophobes will not have experienced humor and laughter as elements of shared joyful experiences, but rather will have a past dominated by the pain of being laughed at (even to a traumatizing extent; see Titze 1996), one might predict that laugher per se might be misinterpreted as of a uniform malicious nature. One would thus predict that gelotophobes would perceive laughter of a pleasant quality as "negative" — and when asked to stipulate the nature of the laugh, gelotophobes would select negative qualities more often than would normal subjects. Such differences might be detected when studying normals and clinically diagnosed gelotophobes, but they might also occur when studying adults high and low on the Geloph.

Laughter, of course, can be quite contagious and hearing others laugh can increases one's own mood (Ruch 1997; Ruch et al. 1995). Among gelotophobes, however, the presence of laughter will often result in thoughts, feelings and action-tendencies related to the fear of being laughed at. Thus, it is predictable that listening to episodes of laughter will increase the positive mood level among non-gelotophobes, but will decrease it among gelotophobes.

1.3. *Gelotophobia in the perception of laughter at a target person in ambiguous social situations*

From early case studies (Titze this issue) it is known that gelotophobes tend to screen their social associates to identify any tendencies to get laughed at or ridiculed. This may lead to a more or less pronounced paranoid tendency, a marked sensitivity to offence, and in extreme cases to social withdrawal. The smiling or laughing by the other person is typically interpreted as being mockery. Gelotophobes will not only be characterized by high vigilance for signals of smiling and laughter, but also tend to interpret them more uniformly in a negative way. While this tendency might help in detecting attempts at ridicule more easily, it will also raise the number of false alarms drastically. Thus, gelotophobes will see ridicule where there is none.

This tendency may be demonstrated by confronting gelotophobes with a collection of ambiguous social situations involving smiling and laughter and then assigning them a task that requires them to interpret

the situations. A formal semi-projective test, the picture-Geloph, consists of 20 drawings depicting social situations typically involving two or three persons, each of which may or not be saying something. One person, the target, has a speech (or thought) balloon above his or her head. The participants are instructed to write down what the target person in each situation is thinking or saying in the empty balloon.

Initial experience with this test (with fifteen adults) showed from the "answers" given that at least occasionally the test taker assumed the target person was being laughed at. Some test-takers wrote for example: "why are they laughing at me?" or: "are they laughing at me?" Other test-takers gave more cheerful answers containing no reference to ridicule, laughing at or mockery, but rather quite the opposite; the target person expressed something cheerful. The assumption made in this semi-projective test was that the test-taker would use her/his everyday knowledge about the world to generate her/his reaction to the situation represented in the drawings and thus demonstrate her/his reaction to the ambiguous social situations. A five-point answer scale was developed on the basis of 300 questions and typical answers for each of these five steps of the scale were compiled and used as reference in the main study. The assumption of the Geloph is that the captions that the gelotophobes create will more often contain indications that the target person is being laughed at and less often captions expressing enjoyment or mirth expressing in a non-threatening social situations. It is also expected that the percentage of negative answers (1-and-2) can be used to estimate the number of gelotophobes in the sample.

1.4. *Present study*

The aim of the present study was twofold. First, it presented the possibility that, the phenomenon of the fear of being laughed could be derived from domains other than self-reports and second, it presented the possibility of demonstrating that some people perceive the laughter of third persons significantly more negatively than others do, thereby darkening their moods via the presumption of their being the objects of mockery. Finally, the question was asked whether or not gelotophobes (but not the low scorers in the Geloph) would be more frequently among the ones showing the above-mentioned effects.

2. Method

2.1. *Research participants*

Participants were chosen from a pool of 225 adult volunteers between the ages of 16 to 75 years (M = 38.90, SD = 13.6; 47 males, 178 females) that completed a series of questionnaires in a research project of which the present study was only a part. The Geloph⟨46⟩, a list of statements for the subjective assessment of gelotophobia (cf. Ruch and Proyer 2008b) was administered to these subjects as well. A subgroup of individuals with extreme scores in gelotophobia were contacted via phone and asked whether they would be willing to participate in a further research project which would take part in the laboratory. The final sample consisted of 35 females and 9 males between 20 and 68 years (M = 41.59; SD = 14.48). [The higher number of females in the sample was due to the higher percentage of females participating in the overall project and does not imply a gender difference in the incidence of gelotophobia.] In prior studies, gelotophobia was correlated with neither age (initial sample: $r = .03$; final sample: .15) nor gender (initial sample: $r = -.05$; final sample: $-.07$). All subjects were paid 7.50 Euro for their services.

2.2. *Instruments*

The Geloph⟨46⟩ (Ruch and Titze 1998) is a list of 46 statements in a four-point answer format (1 = strongly disagree; 2 = moderately disagree; 3 = moderately agree; 4 = strongly agree) describing the experiential world of gelotophobes.

The *Picture-Geloph* is a 20 item, semi-projective test assessing the degree of positive (i.e., joyful) vs. negative (i.e., laughing at) feelings, which the participants give to pictured social situations relevant to laughing at but differing in degrees of ambiguity. The pictures show situations in which: two persons might be mocking a third one (4 pictures); a person is called to a situation in which he or she might make a fool out of him- or herself (5 pictures); a person is in an unpleasant situation and might be laughed at by another person (9 pictures); and a person is envious of others because they amuse themselves and he or she is not taking part (2 pictures).

Participants were instructed to fill their own text into an empty balloon to express what the person might be thinking or saying. When the text supplied by the participants was phrased like "they are laughing at me!" the answer was coded as −2 (very negative; i.e., "indicating fear of being laughed at"). A typical −1 ("negative"; i.e., possibly indicating fear of being laughed at) answer was "who are they laughing at?" A +2 (very positive; i.e., indicating enjoyment of the situation; possibly interpreted as a laughing with situation) answer might be "look at those youngsters; they really know how to have fun," and a +1 (positive; i.e., situation is perceived as joyful and fun, but less so than a "+2" situation) was given to answers like "what a friendly couple." When no negative or positive motives were attributed, the outcome was considered to be "neutral" and scored as "0". Two trained experts rated all answers on a five-point scale from −2 (= very negative) to +2 (= very positive) separately.

Cronbach Alpha for the 20-item test was .68, which seemed to be sufficient for group comparisons. Interrater agreement between the two raters was .50 and .62 ($p < .001$), depending on the measure. For further analyses the coded data were averaged across the two raters. A total score was derived by adding the responses to the 20 items. Furthermore, frequency of very negative, negative, neutral, positive and very positive answers were derived by summing up how often a participant gave answers that were coded with the five answer steps.

Two *laughter perception tasks* were aimed at assessing how gelotophobes perceive (or misperceive) the affective nature of laughter. All participants listened to 20 different laugh acts played from a CD at a rate of two per minute. After each presentation of laughter, participants used the *Laughter-Evaluation-Form* to stipulate the nature of the affective-motivational state that they thought that the laughing person was in (part I) and how they perceived the laughter. They did this by using three nine-point scales (part II). Care was taken that the laughter was very diverse and represented a variety of different motivational–affective states (e.g., happy, silly, amused, heartily, mean-spirited, malicious, relieved, contemptuous, mocking, bashful, contrived, embarrassed, hilarity). Eleven of the 20 laugh acts were taken from the CD "Laughter Meditations" (Draeger 1998) and nine types of laughs were provided by a student actress (mirthful, embarrassed, silly, mean-I, mean-II, contemptuous, mocking, friendly, and dirty laughs). To produce the laughter, she imagined situations in which she witnessed such a type of laugh and imagined herself to be the laughing person. Three raters screened the

material produced and if they agreed on the nature of the putative type of laugh, this recording was added to the final list of 20 laugh acts used for the CD.

In *part I* of the laughter perception task, the participants had to classify each laugh according to the following twelve categories: happy, mischievous, embarrassed, silly, mean-spirited, cold-hearted, dirty, bashful, hearty, triumphant, contemptuous, or friendly. Additionally, free space was provided if the subject wanted to name another category, which was not mentioned. Participants were instructed to use one or more such attributes to describe the nature of the laughter. The frequencies of the nominations were summed up for positive laughs, negative laughs and shy laughs separately. Furthermore, the nominated laughter qualities were divided into positive (i.e., happy, hearty, and friendly) and negative attributes (i.e., dirty, mischievous, triumphant, mean-spirited, contemptuous, and cold-hearted). Moreover, bashful and embarrassed represented attributes of a shy quality.

Part II of the task consisted of evaluating the 20 laugh acts on two nine-step, bipolar rating scales for ''pleasant vs. unpleasant'' and ''dominant vs. submissive.'' Furthermore, a rating on the nine-point bipolar dimension of ''spontaneously vs. artificially'' was undertaken, depending on the degree to which the respective laughter was considered to be realistic (spontaneously) or acted (artificially). Three subgroups of laughter seemed to be apparent: positively motivated, negatively motivated and shy laughter. These subgroups will have to be verified empirically in the group of non-gelotophobes.

The Multidimensional Mood Inventory (BSKE; Janke et al. 1998) is measure of the current psychological state of the subject and utilizes 44 items in a seven-point answer format (0 = not at all; 6 = very strong). It is based on a hierarchical model of mood (Janke and Debus 1978) that distinguishes positive and negative moods at the uppermost level and eight domains at an intermediate level (general relaxation, general well-being, performance-oriented activation, excitation, hostility, anxiety/depression, general deactivation, and extraversion). In the BSKE 20 domains (with 2 or 3 items each) are established. Eight of these can be combined to yield the general dimensions of positive mood and 10 can be combined to form negative mood. Additionally, the domains of extra/introversion and somatic well-being can be measured. The BSKE was used immediately before and after the laughter perception task.

2.3. *Procedure*

2.3.1. *Selection of participants.* The selection was based on the original Geloph⟨46⟩. When all 46 items are considered, the total scores can range from 46 to 184. The mean of the present sample was 75.4 (i.e., 1.64) and the standard deviation was 20.2 (i.e., 0.44). Two samples were created. The group of non-gelotophobes was comprised of the individuals with total scores between 46 and 68 (i.e., average scores ranging from 1 to 1.50; i.e., strongly disagreeing to half of the symptoms and disagreeing to the other half). The group of high scorers had total scores between 78 and 134. Actually, this group of high scorers can be divided into two subgroups: a group of borderline fearfuls (scores between 78 and 111; 1.70 to 2.41) and a group of gelotophobes (scores between 116 and 134; i.e., item mean scores from 2.52 and 2.91). Based on several criteria (e.g., interest in participating, distance from university), a subgroup of about 60 people was contacted via the phone with the aim of recruiting a minimum of 20 high and low scorers. Of the participants contacted, 44 persons agreed and finally took part in the present study.

As the experiment was conducted, before the classification system for scores on the gelotophobia scale was developed (Ruch and Proyer 2008b), the total score with 46 items was used for selection. As the total scores for all 46 items and the final 15 items were highly correlated ($r = .95$, $n = 225$) in the present sample, it became apparent that the classification was done sufficiently. However, it might also be instructive to estimate, in retrospect, the number of gelotophobes by applying the 15 items key (Ruch and Proyer 2008b). Based on this scoring key, one could say that the initial sample comprised 25 (11.1%) gelotophobes. Among them were 8.0% and 3.1% with slight and marked expression of gelotophobia, respectively. No one could be considered to have extreme gelotophobia. After the selection of participants, the final sample involved 11 gelotophobes (25%; 11 and 2 with slight and marked gelotophobia, respectively). Another 10 can be considered borderline fearfuls (i.e., item means between 2.0 and 2.5). Therefore, it seemed to be necessary to distinguish between different intensities.

2.3.2. *Experiment.* Each of the participants was given a cover story and a short overview of the experiment. The cover story included the statement that parts of the experiment were designed as tests of "emotional intelligence." This helped to make the administration of the laughter per-

ception tests plausible. Then the questionnaires were handed out. First the subjects filled in the BSKE mood scale. Afterwards a CD with 20 laugh acts was played to them. Using the *Laughter-Evaluation-Form*, ratings on all laughs for the three dimensions (i.e., pleasant vs. unpleasant, dominant vs. submissive, and spontaneously vs. artificially) were determined by the subjects. After this experimental part, the BSKE was filled in again. Subsequently, the Picture-Geloph was administered. One single experimenter tested all subjects. Overall, the whole experiment lasted approximately 90 minutes for one participant.

3. Results

3.1. *Gelotophobia and the (mis-) perception of the emotional-motivational quality of laughter*

In order to test whether the *a priori* classification of the laughter qualities was valid, total scores were computed for positive laughter (qualities such as amused, heartily, relieved, and happy) and negative laugher (qualities such as laughing at, mean-spirited, contemptuous, malicious) using the pleasure-displeasure and dominant-submissive scores. ANOVAS confirmed that positive laugh qualities ($M = .57$) were perceived as more pleasant than the negative laugh qualities ($M = -2.73$), $F(1, 43) = 235.658$, $p < .0001$. However, the laugh qualities were not perceived as different in terms of the dominant vs. submissive dimension, $F(1, 43) = 2.733$, ns. The three laugh qualities that were expected to be low on the dominance dimension (bashful, faked, restrained) were, indeed, perceived lower ($M = -.23$) in dominance than the rest ($M = 1.09$), $F(1, 43) = 47.214$, $p < .0001$. However, they were also more negative ($M = -1.60$) than the average of the others ($M = -.54$), $F(1, 43) = 32.441$, $p < .0001$. Means for the 20 laugh acts were computed for the group of the non-gelotophobes ($N = 23$) and the gelotophobes separately ($n = 8$). Figure 1 offers a graphic representation of the different laugh acts in a space defined by the two dimensions of "pleasant vs. unpleasant" and "dominant vs. submissive."

Figure 1 shows that the laughs are well spread out over the two-dimensional plane and most often at the places where they were expected. Derisive laughter, for example, was expected to be rated as unpleasant

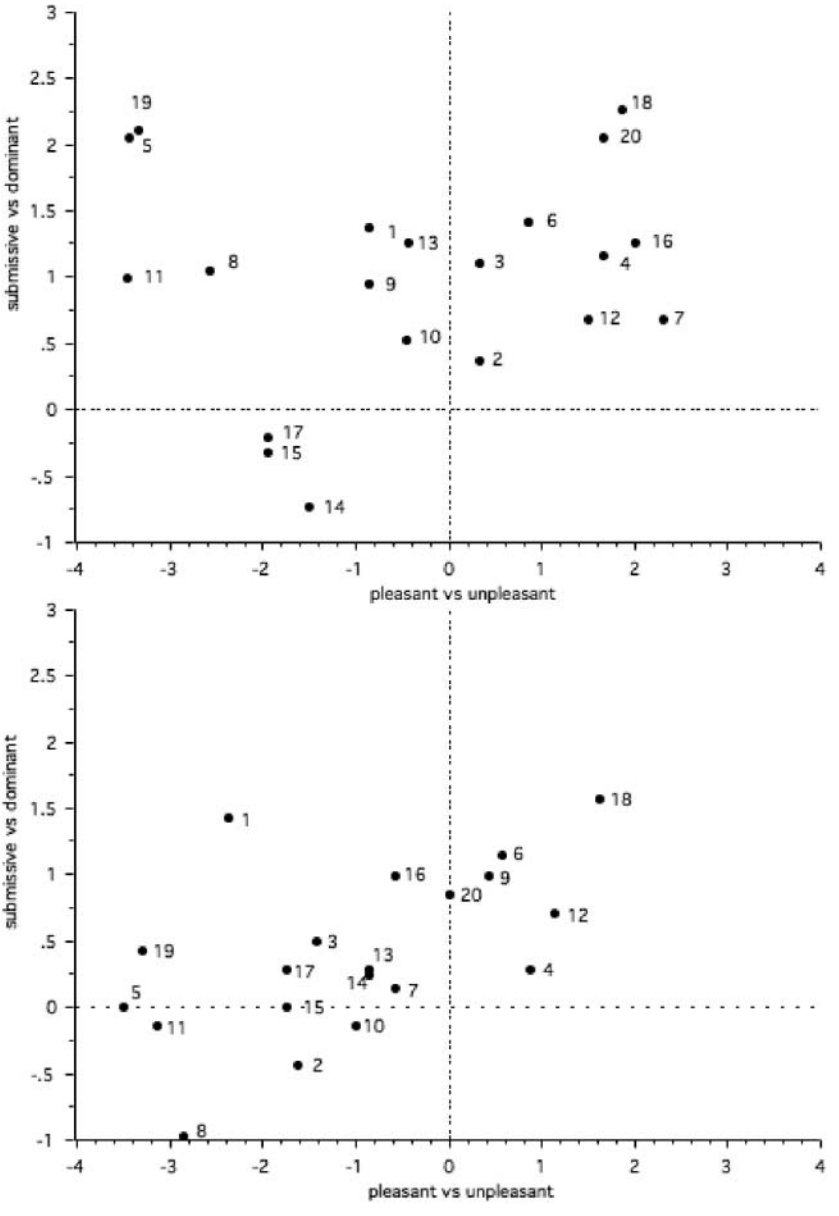

Figure 1. *Location of the 20 laugh acts in a two dimensional space defined by "pleasant vs. unpleasant" and "dominant vs. submissive" (upper half: non-gelotophobes; n = 23; lower half: gelotophobes; n = 8)*

and dominant; this could indeed be found for the laughs pre-classified as mean-spirited (Nr. 5) and contemptuous (Nrs 8, 11, 19). However, three laughs from the CD, which were originally considered to represent malicious laughter (Nr. 10), and laughing at (Nr. 4, 9) did not end up where expected. One presumed event of laughing at (4) was rated as pleasant and most often perceived as "happy" (followed by "hearty"). The other (9) was perceived as "silly" (followed by "happy" and "malicious"); however, the unpleasantness and dominance were comparatively low. While the malicious laughter was indeed most frequently perceived at "malicious" and "dirty," and located in the dominant and pleasant quadrant, it ended up close to the scale midpoints.

While all laughs pre-classified as representing one or the other facet of positive laughter (2, 3, 6, 7, 12, 13, 16, 18, 20) were located in the pleasant-dominant quadrant, there were some plausible differences within this group too. For example, happy laughs (7, 12, and 16) were low in dominance and were perceived as "friendly" and "happy" (12), "happy" and "heartily", and "happy", "friendly" and "heartily" (16). The laugh acts highest on the dominance score were preclassified as hearty (18) and happy/silly (20) and were both most highly perceived as "happy" and "silly". However, also "dirty" (20) and "heartily" and "friendly" (18) were mentioned. Another more heterogeneous cluster consisting of "relieved" (6), "full-hearted" (3), "hearty" (13), 1 ("silly"), and "amused" (2) was located on the dominant side and were more neutral with regard to the pleasant vs. unpleasant dimension.

As a comparison, the distribution of the laugh acts is quite different among the group of gelotophobes. Most strikingly, there are fewer laughs located in the pleasant dominant quadrant; and the mean ratings on those scales are lower. Furthermore, there are also fewer laughs in the unpleasant-dominant quadrant. This seems to be due to lower scores in dominance, but not necessarily lower scores in unpleasantness.

Several one-way ANOVAS were computed with the level of gelotophobia as an independent variable (no, borderline fear, slight gelotophobia) and pleasantness and dominance as dependent variables for positive, negative and the shy laugh acts. For positive laughter (i.e., all laugh acts preclassificed by a positive attribute: 2, 3, 6, 7, 12, 13, 16, 18, 20), there was no effect on dominance, $F(2, 38) = 1.612$, n.s., but on pleasantness, $F(2, 38) = 8.426$, $p = .0009$. Regarding the latter, only the non-gelotophobes perceived these laugh acts as pleasant ($M = 1.18$, $SD = .99$). The scores of both fearful groups were significantly lower

($p < .01$), and actually were not signifying any positivity at all (borderline fearful: $M = .05$, $SD = .98$; slight gelotophobes: $M = -.21$, $SD = .69$).

For negative laughter (5, 8, 9, 10, 11, 19; 4 was not included since it was considered as pleasant by all groups) gelotophobia had an effect on dominance ($F[2, 37] = 4.253$, $p = .0217$) but not pleasantness ($F[2, 37] = .518$, ns). Post-hoc tests revealed that those with no fear of being laughed at ($M = 1.28$, $SD = 1.18$) and with a borderline fear ($M = 1.30$, $SD = .78$) did perceive negatively motivated laughter as not differing in dominance, with both groups being significantly higher ($p < .05$) than the gelotophobes. The latter group, on average, did place negative laughter as neutral ($M = .02$, $SD = 1.11$) in terms of dominance vs. submission. The shy laugh acts (14, 15, 17) were perceived as unpleasant and on the submissive side for the non-gelotophobes. They were less unpleasant and even slightly dominant for the gelotophobes, but the ANOVA did not yield any significant effect (pleasant: $F[2, 38] = .485$, ns; dominant: $F[2, 38] = 1.306$, ns).

The nominations partly converged with the ratings. For example, laughs rated as pleasant more often received nominations of happy ($r = .93$), heartily ($r = .86$), and friendly ($r = .79$, all df = 18, $p < .0001$), and the ones rated more frequently as unpleasant yielded nominations of cold-hearted ($r = -.87$), malicious ($r = -.78$), mean-spirited ($r = -.75$), contemptuous ($r = -.69$, all $p < .001$), and triumphant ($r = -.56$; $p < .01$). Those high in dominance tended to be nominated as triumphant ($r = .40$, $p = .08$), and those low, were nominated as embarrassed ($r = .64$, $p < .01$), and bashful ($r = .69$; $p < .001$). Correlations across individuals were lower than the ones across laugh acts. Nevertheless, rating the laughs as more pleasant corresponded with higher scores in happy ($r = .52$, $p < .001$), heartily ($r = .42$, $p < .01$), and friendly ($r = .29$; $p = .06$), but there was no association with nominating more negative attributes, except for them being less often seen as embarrassed ($r = -.36$, $p < .05$). High scores in dominance went along with infrequent nominations of bashful ($r = -.36$, $p < .05$) and a tendency for a more frequent nomination of mean-spirited ($r = .27$, $p = .08$).

Gelotophobia correlated with a few nominations, but only for the positive laugh acts. For example, higher scores in gelotophobia corresponded with more frequent nominations of embarrassed ($r = .31$, $p < .05$) and less frequent nomination of happy ($r = -.43$, $p < .01$). There were no such effects for the negative laughs and the ones of shyness.

How often were positively motivated laughs perceived as negative? Fourteen of the 44 participants had a negative total score; i.e., about 44% rated positive laughs as neutral to unpleasant. Two out of 21 (9.5%) of those lacking any fear of being laughed at did perceive the laughs as negative. Their average was 1.15 (SD = .96). Seven out of 15 in the "borderline fear" group had negative scores. Finally, in the group of gelotophobes, only three out of the eight participants found the positively motivated laughs to be pleasant; i.e., had a positive score across the nine laugh acts. More specifically, only one of these three had a score higher than "1," and this score (i.e., 1.111) is still slightly lower than the average score of the non-gelotophobes. Thus, five (or 62.5%) of the gelotophobes do not find positive laughter pleasant.

An index of percentage of negative emotion words provided evidence that the nominations are indicative of the misperception effect as well. This index (negative emotion attributions / total number of positive and negative attributions) showed that, among the non-gelotophobes, none had more than 1/3 negative words. The percentage of those individuals was 26.67% and 62.50% in the borderline fear and slight gelotophobia group, respectively.

3.2. *Does gelotophobia moderate the effect of hearing laughter on mood?*

Four 3 × 2 ANOVAS with gelotophobia (no, borderline fear, slight gelotophobia) as a grouping variable, and pre-post mood scores on the repeated measurement factor, were separately computed for positive mood, negative mood, introversion-extraversion, and physical well-being. For positive mood, main effects were found for level of gelotophobia, $F(2, 41) = 10.165$, $p = .0003$ and time of measurement, $F(1, 41) = 4.195$, $p = .0470$. Post hoc tests showed that slight gelotophobes had lower scores than both the "borderline" and "not fearful" ($p < .001$). The "borderline" and "not fearful" groups did not differ from each other. Most importantly, there was also an interaction, $F(2, 41) = 6.441$, $p = .0037$, which is displayed in Figure 2.

Figure 2 shows that for those with no or only borderline fear of being laughed at, the level of positive mood increased from pre- to post-laughter ($p < .05$), while the scores for the gelotophobes did not change significantly (they even dropped numerically). For negative mood, the converse effect was found. There were main effects for level of gelotophobia,

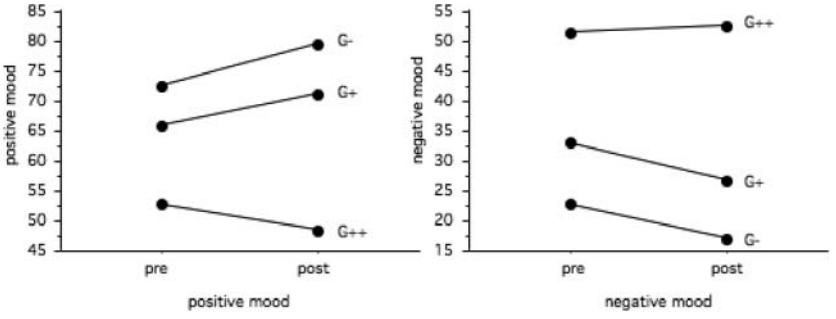

Figure 2. *Pre/post changes in positive (left) and negative (right) mood for gelotophobes (G++) and those with no fear (G−) and the borderline fearful (G+)*

$F(2,41) = 10.1$, $p = .0003$ and time of measurement, $F(1,41) = 8.27$, $p = .0064$. Gelotophobes had higher scores than both the "borderline fearful" and the "non-gelotophobes" ($p < .001$), which did not differ from each other. The expected interaction failed to reach significance, $F(2,41) = 2.90$, $p = .0669$. Inspection of Figure 2 shows that negative mood tended to decrease from before and after hearing the recordings for all groups ($p < .05$) except for the gelotophobes (which showed a numerical increase).

For extraversion/introversion as a mood state, only the main effect of level of gelotophobia was significant, $F(2,41) = 16.546$, $p < .0001$. Those without fear of being laughed at were higher on the extraverted mood scale, followed by the "borderline fearful," which were, in turn, higher than the gelotophobes. There was no effect of time of measurement, $F(1,41) = .157$, ns, nor an interaction, $F(2,41) = .380$, *ns.* Finally, for physical well being, a main effect was found for level of gelotophobia, $F(2,41) = 9.20$, $p = .0005$. "Non-gelotophobes" had higher scores than both the "borderline fearful" and gelotophobes ($p < .001$), which were not differing from each other. Where time of measurement was not significant ($F[1,41] = 2.376$, $p = .1309$), the expected interaction narrowly failed to reach significance, $F(2,41) = 2.70$, $p = .0794$.

For the borderline fear group, there was an increase in somatic well-being when the pre- to post-laughter ($p < .05$) states were compared, whereas the other two groups tended to numerically increase (non gelotophobes) or decrease (gelotophobes), but not significantly so.

The percentage of people with an increase in positive and negative mood seemed particularly telling. Overall, 72.7% exhibited an increase in

positive mood, but 20.5% exhibited a decrease and their distribution was unequal for the groups differing in their degrees of gelotophobia. There were 90.5% and 66.7% with positive score changes in the group of non-gelotophobes and "borderline fearful," respectively. However, only 37.5% of the gelotophobes showed an improvement in their moods. Conversely, 22.2% showed worsened moods. Whereas 50.0% of gelotophobes showed increases in their negative moods from prep to post laughter, among the group of "non-gelotophobes" and "borderline fearful," the percentage of people with higher negative mood scores after hearing laughter were only 14.3% and 20.0%, respectively.

3.3. *Gelotophobia and the perception of mockery in the Picture-Geloph*

In order to see the nature of the responses elicited by the Picture-Geloph, the means and standard deviations for the total scores and for the frequencies of the five answer steps were computed. Furthermore, the correlations of these responses with gender and age with the Geloph were examined. The results are presented in Table 1.

Table 1 shows that the Picture-Geloph elicited a fair amount of responses reflecting the "being laughed at" theme. Indeed, about one quarter of the responses were interpreted as expressing gelotophobic tendencies, with more of the answer being slightly negative (i.e., "slight

Table 1. *Distribution statistics for the Picture-Geloph (including some variants), and their correlations with the Geloph⟨46⟩, age and gender*

Picture Geloph	Mean	SD	Geloph	Age	Gender
Frequency of answers					
Total Negative	5.24	2.10	.54***	−.08	.00
+2 (= very negative)	1.83	1.34	.24	−.12	.00
+1 (= slightly negatively)	3.41	1.47	.56***	.00	.01
0 (= neutral)	8.12	1.80	.33*	.38*	−.04
Total positive	6.62	2.57	−.67***	−.19	.02
−1 (= positive)	4.18	1.48	−.52***	−.13	.16
−2 (= very positive)	2.44	1.74	−.56***	−.18	−.10
Picture Geloph					
Total score	2.00	6.55	−.64***	−.08	−.02
Total unambiguous	−2.17	2.84	−.46**	−.14	.03

N = 44

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

tendency = +1'') than very negative (''strong tendency = +2''). While the frequency of these answers correlated positively ($r = .54$) with the Geloph⟨46⟩, there were no differences with respect to age or gender. The positive answers (expressing relaxed, happy responses to potentially mockery situations) yielded even higher correlation with gelotophobia, and the frequency of such answers is again orthogonal to age and gender. Such answers were slightly more frequent, with the slightly positive answers being more frequent than the extremes. A neutral answer was given more often by the older subjects, and even this category is more frequent among the gelotophobes.

The total score indicated that the Picture-Geloph elicited slightly more positive answers. There is sufficient variation in the answers. The correlation with the Geloph was extraordinarily high and approaching reliability of the scale. An analysis of the groups at the level of individuals was even more telling. In the group of gelotophobes, every single participant had a negative score; i.e., averaged across the 20 cartoons, these subjects gave answers reflecting a fear of being laughed at. In contrast, in the group lacking that fear, only one had an average score less than zero and 20 gave answers between slightly positive to very positive. Thus, only one person that described himself as a non-gelotophobe in the Geloph, gave decisively gelotophobic answers in the Picture-Geloph. The group of ''borderline fearful'' consisted of seven subjects giving gelotophobic answers and eight that did not. All in all, 17 subjects had scores < 0. Thus, if one considers any negative total score as an indicator of gelotophobia, the Picture-Geloph yielded a higher number (38.64%) of gelotophobes in the sample than did the Geloph.

For a closer inspection of the dynamics of positive and negative answers, the three groups were compared for the frequency of each answer using a one-way ANOVA, with subsequent post-hoc tests (Fisher's PLSD; only effects $<.05$ are reported). The results are given in Table 2.

In terms of very positive and positive answers, the non-gelotophobes were higher than both gelotophobic groups, which did not differ from each other. The non-gelotophobes were lower than both gelotophobic groups in terms of slightly negative answers. However, for the very negative answers the gelotophobes exceeded the ''borderline fearful'' and non-gelotophobes (which did not answer from each other). Thus, genuinely gelotophobic answers were given mainly by the group of gelotophobes. The ''borderline fearful'' had more ''neutral'' answers than the non-gelotophobes (but were not different from the gelotophobes).

Table 2. *Frequency of positive and negative answers to the Picture-Geloph as a function of level of gelotophobia*

		Very positive	Positive	Neutral	Negative	Very negative
Gelotophobia level						
low	M	3.52[a]	5.02[a]	7.29[a]	2.52[a]	1.64[b]
($n = 21$)	SD	1.76	1.43	1.62	1.15	1.26
borderline	M	1.57[b]	3.37[b]	9.33[b]	4.13[b]	1.57[b]
($n = 15$)	SD	1.07	1.16	1.64	1.11	1.27
slight&marked	M	1.25[b]	3.50[b]	8.06	4.38[b]	2.81[a]
($n = 8$)	SD	.80	.96	1.29	1.60	1.41
$F(2, 41)$		11.763	8.879	7.393	10.623	2.865
p		$<.0001$	.0006	.0018	.0002	.0685

[a,b] Means of one column having different superscripts differed from each other

3.4. *Convergence between the laugher perception tasks and the Picture-Geloph*

In order to see how results from the laughter perception task and the Picture-Geloph overlap, intercorrelations among selected parameters of both tests were computed. Only the groups of positive laugh acts and negative laugh acts were selected (discarding the acts of shy laughter). For these the pleasant vs. unpleasant ratings and the designations (positive attributes for positive laughs; negative attributes for the negative laughs) were considered. The results are presented in Table 3.

Table 3 shows that on the whole, the responses to the positive laughs correlated with the responses to the Picture-Geloph. The pleasantness of the positively-motivated laugh acts exhibited a very high positive correlation with the relaxed joyous answers in the semi-projective tests. They gave less frequently a negative response. More importantly, those subjects who did not rate positively-motivated laughter as pleasant, were the same ones that more frequently gave answers in the Picture-Geloph that expressed the theme of someone's (the target person's) being laughed at. The frequency of designated positive attributes to positive laughter yielded a similar correlational pattern; the correlation coefficients, however, were lower. Thus, "misperceiving" happy laughter and the affective nature of the responses to the ambiguous situations overlapped quite well.

For the "negative laughter," no such effect could be found. The pleasant vs. unpleasant ratings of negative laughter just failed to correlate with

Table 3. *Correlations between the laughter perception task and the Picture-Geloph*

	Positive laughter		*Negative laughter*		*Mood state post laughter perception task*			
	pleasant	nomination	pleasant	nomination	positive mood	negative mood	extraversion/ introversion	physical well being
Picture-Geloph								
Total Negative	−.47***	−.48***	−.10	−.30*	−.40**	.53***	−.36*	−.32*
+2 (= very negative)	−.21	−.25	−.15	−.19	−.33*	.32*	−.40**	−.17
+1 (= slightly negatively)	−.48***	−.45**	−.01	−.26	−.27	.47***	−.15	−.30*
0 (= neutral)	−.47***	−.22	.07	−.22	−.06	−.05	.04	−.19
Total positive	.71***	.53***	.04	.40**	.37*	−.40*	.27	.40***
−1 (= positive)	.52***	.44**	−.01	.31*	.24	−.36**	.24	.31*
−2 (= very positive)	.61***	.41**	.07	.32*	.35*	−.29*	.19	.32*
Picture Geloph	.64***	.52***	.09	.38*	.44**	−.47***	.35**	.38**
mood scales (post)								
positive mood	.16	.30*	−.09	.19				
negative mood	−.16	−.27	.11	.12				
Extraversion	.20	.35*	−.07	.16				
physical well being	.32*	.29*	.18	−.14				

N = 44
$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

the total score of the Picture-Geloph. The frequency of assigning negative laugh qualities to negative laughter did yield a few significant correlations. Identifying more negative qualities went along with more positive and fewer negative answers in the Picture-Geloph.

Furthermore, the scores in the Picture-Geloph were good predictors of the mood state after the laughter perception task. Those with high total scores felt themselves to be in a more negative and less positive mood, and exhibited lower scores in measurements of extraverted mood and physical well-being after being exposed to laughter. Interestingly, the gelotophobic answers (negative and very negative) were no less predictive than the positive ones.

4. Discussion

The two aims of the present study were: first to detect whether anomalies relating to the perception/evaluation of laughter exist, and then, to examine whether or not these anomalous phenomena were empirically related to gelotophobia (i.e., correlate with the existing questionnaire measure). The two aims of the present study were achieved, albeit with different degrees of success.

In the Picture-Geloph, the fear of being laughed at manifested itself as a more frequent perception of events of mockery in the depicted social situations. About 26.2% of the answers did refer to one person being laughed at by the others, and 38.6% of all participants had negative scores overall. In the laugher perception task, the fear of being laughed at manifested itself more indirectly, in that those laugh acts representing positive emotions were perceived as neutral to unpleasant by 44%, and 20.4% gave a higher amount of negative emotion attributions. While laughter is typically considered to be contagious and "mood enhancing," about a fifth of the participants decreased in positive mood and increased in negative mood after hearing the laugh acts. Thus, there was a considerable percentage of people that reacted clearly to laughter in more negative ways, whereas the majority responded favorably. Therefore, it seems safe to conclude that goal one was achieved: there are some laughter-related anomalies that need further explanation.

It goes without saying that, as of now, it is not possible to estimate the percentage of people demonstrating the effect in terms of absolute

numbers. The experimental tasks described above are rather gross indicators for those effects and need refinement. For example, in the picture-Geloph, the percentage of individuals giving an answer referring to someone's being laughed at is *higher* for those pictures where laughter words are transcribed in the speech balloon (33%) compared to those pictures where no "ha ha" or "hee hee" is involved (22%). While the presence of laughter in the picture clearly enhances the rate of answers that are designated as having induced the fear of being laughed at, one can still see that, even when cues to laughter are missing, one fifth of the people still mentioned this theme in their answers. Further ways to improve these two tasks will be discussed below.

The second aim of these studies was to investigate whether the above-mentioned effects were more prevalent among the gelotophobes (as assessed by the questionnaire) and less frequent among the low scorers on the Geloph, confirming the convergent validity of the measures. This convergence was clearly demonstrated for most of the measures. Gelotophobia, as measured by the Geloph, did correlate very highly with the Picture-Geloph total score, and it was the gelotophobes that more frequently saw mockery in these situations and less often gave joyful answers. This could be interpreted as a general inclination to an extreme fear of being laughed at. Furthermore, the high scorers in the Geloph failed to rate positively-motivated laughter as pleasant and they also listed negative attributes to this laughter more frequently than positive attributes. It was also the case that their positive mood declined and their level of negative mood increased after hearing the laugh acts. Thus, the questionnaire measurement of gelotophobia appears properly designed to predict the laughter-related peculiarities. The fact that these indicators of the fear of being laughed at form an intercorrelated cluster can be seen in Table 3, which shows that the Picture-Geloph measure of gelotophobia is predictive of the perceptual and affective responses to the laughter perception task. The exact extent of the validity of the convergence will be answered more definitely later when these experimental tasks will have been turned into psychometric tools.

The Picture-Geloph can be improved in several ways. In the present study, all 20 pictures were included in the analysis. A quick psychometric analysis indicated that it would be possible to optimize the test by discarding the eight items with corrected item total correlations of $<.25$. The remaining 12 items version would yield an Alpha of .74, which is a considerable increase from the current value (i.e., .68). Furthermore, a

larger pool of representative statements for the five steps on the rating scale should be developed. This would facilitate the coding process, but also enhance objectivity. Likewise, prior training of the coders seems to be advisable. It should be noted that a separate analyses of the two coders gave different results in the present study. When the total score in the Picture-Geloph was derived from one coder, more familiar with the concept the correlation with the Geloph, it was higher ($r = .72$; $df = 42$; $p < .0001$) than the coefficient found for the second coder ($r = .34$; $df = 42$; $p < .05$). However, the latter is still significant, which underscores the robustness of the effect. The second coder differed mainly by choosing more ''0'' answers in the coding, which resulted in a lower variance in the scores. Thus, while the present study confirms that the underlying principle of the Picture-Geloph is valid and promising, several steps still need to be taken before it can be used as a routine method for the assessment of gelotophobia.

The laughter perception task leaves room for improvement as well. First, work needs to be done on establishing a valid classification of types of laughter. The current task is based on the dimensions found by Kori (1987) and these seemed to be valid. Whether or not, more dimensions are needed to be determined. Inspection of databases representing the spoken German language gave more than 50 words related to the emotional-motivational nature of laughter (Huber and Ruch 2007), thus offering a challenge to the exhaustiveness of the present classification. Secondly, more work needs to be invested into deriving pure samples for the different laugh qualities. In the present study three individuals were involved in selecting the laugh acts according to their affective nature and overall they were quite accurate. Only one of the laugh acts was misplaced on the ''pleasant'' vs. ''unpleasant'' dimension. A laugh act considered to be affectively negative was rated as pleasant by all three subgroups. Thirdly, it will need to be determined how many clusters can be distinguished. In the present study it was decided to keep positive, negative and shy laughter apart. Future studies need to examine how many laugh-types humans typically can distinguish. This might then serve as a standard, and marked deviations in accuracy might be used as a criterion for determining gelotophobia. Finally, once there are established (semi-projective and performance) measures of gelotophobia, work will be dedicated to deriving valid ''cut off'' points for the different intensity levels of the fear of being laughed at as has been done for the Geloph (Ruch and Proyer 2008b). All in all, as these experimental tasks passed the first

examination of validity, they may now be turned into psychometrically sound instruments for the assessment of gelotophobia.

There were several unexpected outcomes too. Contrary to expectations, negative laughter was not perceived as more unpleasant or more dominant by the gelotophobes. Maybe there was a ceiling effect for the subjective rating of unpleasantness, which prevented detecting a difference. The laughs apparently were very prototypical and yielded high averages among the non-gelotophobes. Maybe the negative reaction to mocking laughter transcends the experiential domain. It might be expressed in higher psycho-physiological distress upon hearing the laughter, rather than in a further increase in the feeling state. Therefore it might be worthwhile to use behavioral and psycho-physiological measures in future studies to demonstrate possible differences between gelotophobes and non-gelotophobes. Most strikingly, the gelotophobes did not find negative laughter dominant, whereas subjects lacking any fear of laughter did. It is difficult to explain this finding at the moment. Maybe gelotophobes referred to their own inner state when producing this type of laughter, and this is less dominant. Future studies will need to examine whether the effect of misinterpreting the nature of laughter is restricted to only to failing to see the playful-happy quality in positively-motivated laughter.

Future studies will show whether the perception of other types of laughs is impaired as well. The results of the present study are in line with the findings by Platt (2008) and Ruch, Beermann, and Proyer (this issue). Platt found that pronounced gelotophobes reacted to good-natured teasing emotionally as if it were mean-spirited ridicule. Teasing did not lead to surprise and joy, but instead shame and fear were felt. Likewise, Ruch, Beermann, and Proyer (this issue) found that gelotophobes scored low in socially warm and competent humor styles. They seemed to lack experience with cheerful states and were higher in "bad mood." Although they do not necessarily lack wit, they were also not witty in social situations. It might be telling to investigate further hedonic activities and emotions (e.g., sex, pride) and see whether gelotophobes enjoy those less as well (and perhaps whether they are easily blocked by shame), or whether this reduction in enjoyment is limited to humor and laughter.

One limitation of the present study is that there were only a few individuals with pronounced fear and virtually none with extreme fear. It might well be that some effects not found in the present study (but reported by others) are contingent on the presence of individuals with

higher levels of gelotophobia. For example, in the study by Platt (2008) shame and fear were expected to be the emotions most frequently elicited by ridicule, but — only for gelotophobes — it was teasing. However, among the participants with pronounced gelotophobia, were shame and fear the most intense negative emotions. This effect was not observed for individuals with slight gelotophobia, although for them other negative emotions (e.g., anger, sadness) were pronounced as well. Thus, it would be desirable to study the responses to negative laughter more closely for a group of genuine high scorers before any conclusion on negative laughter is drawn.

Overall, this study indicates that gelotophobia can be linked to laughter-related peculiarities in an experimental setting and in a semi-projective test. This contributes to the methodological approaches for the assessment of gelotophobia. In earlier studies (Ruch and Proyer 2008a, 2008b) gelotophobia was studied by means of a questionnaire and ratings by therapists. Demonstrating that the phenomenon of the fear of being laughed can be revealed by means other than those of self-description contributes to the presumption that the concept is a valid and psychologically relevant. Further evidence is needed, however, to more closely characterize and understand the gelotophobe's altered perception of (positive) laughter and blurred interpretation of social cues.

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Notes

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The German words used were: *lustig, schadenfroh, peinlich, albern, bösartig, kaltherzig, dreckig, verlegen, herzlich, triumphierend, verächtlich,* and *freundlich*.

References

Darwin, Charles D.
1872 *The Expression of the Emotions in Man and Animals.* London: Murray.

Draeger, Tom
1998 *Lachmeditation* [Meditation on laughter]. Berlin: Filmproduktion Cikon.
Eibl-Eibesfeldt, Irenäus
1989 *Human Ethology*. New York: Aldine de Gruyter.
Heller, Herman Vinzenz
1902 *Grundformen der Mimik des Antlitzes* [Basic forms of facial expression]. Vienna: Anton Schroll.
Huber, Tania and Willibald Ruch
2007 Klassifikation verschiedener in der Alltagssprache unterscheidbarer Arten des Lachens [Classification of types of laughs in natural language]. Unpublished manuscript, Department of Psychology, University of Zurich, Switzerland.
Janke, Wilhelm and Gerd Debus
1978 *Die Eigenschaftswörterliste (EWL) — Ein Verfahren zur Erfassung der Befindlichkeit.* Göttingen: Hogrefe.
Janke, Wilhelm, Gerd Debus, Gisela Erdmann, Michael Hüppe, and Michaela Holler
1998 Befindlichkeitsskalierung anhand von Kategorien und Eigenschaftswörtern (BSKE). Unpublished manuscript, University of Würzburg, Department of Psychology, Würzburg, Germany.
Kori, Shiro
1987 Perceptual dimensions of laughter and their acoustic correlates. *XIth International Congress of the Phonetic Sciences* 4, 255–258.
Lersch, Phillip
1932 *Gesicht und Seele. Grundlinien einer mimischen Diagnostik* [Face and the psyche. Foundations of facial assessment]. Munich: Ernst Reinhardt.
Piderit, Theodor
1919 *Mimik und Physiognomik* [Facial expression and physiognomics]. Detmold: Verlag der Meyerschen Hofbuchhandlung.
Platt, Tracey
2008 Emotional responses to ridicule and teasing: Should gelotophobes react differently? *Humor: International Journal of Humor Research* 21 (2), 105–128.
Ruch, Willibald
1997 State and trait cheerfulness and the induction of exhilaration: A FACS-study. *European Psychologist* 2 (4), 328–341.
Ruch, Willibald and Paul Ekman
2001 The expressive pattern of laughter. In Kaszniak, Alfred W. (ed.), *Emotion, Qualia, and Consciousness*. Tokyo: Word Scientific Publisher, 426–443.
Ruch, Willibald, Gabriele Köhler, and Helmut Kujath
1995 Is the cheerful mood of others "contagious?" On the validity of an audiotape based experimental mood induction procedure. The Thirteenth International Humor Conference, Birmingham.
Ruch, Willibald and René T. Proyer
2008a The fear of being laughed at: Individual and group differences in Gelotophobia. *Humor: International Journal of Humor Research* 21 (1), 47–67.
2008b Who is gelotophobic? Assessment criteria for the fear of being laughed at. *Swiss Journal of Psychology* 26 (1), 19–27.
Ruch, Willibald and Michael Titze
1998 Geloph⟨46⟩. Unpublished questionnaire. Department of Psychology, University of Düsseldorf, Germany.

Titze, Michael
1996 The Pinocchio Complex: Overcoming the fear of laughter. *Humor & Health Journal* 5, 1–11.
van Hooff, Johan A. R. A. M.
1972 A comparative approach to the phylogeny of laughter and smiling. In Hinde, Robert A. (ed.), *Non-verbal Communication.* Cambridge: Cambridge University Press, 209–241.