Article

SAGE Open
April-June 2015: 1–12

DOI: 10.1177/21582440155811 91
sgo.sagepub.com
SAGE

Individual Differences in Gelotophobia Predict Responses to Joy and Contempt

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Abstract

In a paradigm facilitating smile misattribution, facial responses and ratings to contempt and joy were investigated in individuals with or without gelotophobia (fear of being laughed at). Participants from two independent samples (N_1 = 83, N_2 = 50) rated the intensity of eight emotions in 16 photos depicting joy, contempt, and different smiles. Facial responses were coded by the Facial Action Coding System in the second study. Compared with non-fearful individuals, gelotophobes rated joy smiles as less joyful and more contemptuous. Moreover, gelotophobes showed less facial joy and more contempt markers. The contempt ratings were comparable between the two groups. Looking at the photos of smiles lifted the positive mood of non-gelotophobes, whereas gelotophobes did not experience an increase. We hypothesize that the interpretation bias of "joyful faces hiding evil minds" (i.e., being also contemptuous) and exhibiting less joy facially may complicate social interactions for gelotophobes and serve as a maintaining factor of gelotophobia.

Keywords

FACS, gelotophobia, joy, laughter, smiling

Broad personality traits such as extraversion and neuroticism have been shown to influence the expression and interpretation of facial expressions of emotions and display rules (e.g., Fok, Hui, Bond, Matsumoto, & Yoo, 2008; Riggio & Riggio, 2002; Rogers & Revelle, 1998). For example, extraverts habitually display smiling and laughter more intensely and more often compared to introverts (Ruch, 2005; see also Hofmann, Platt, Ruch, Niewiadomski, & Urbain, 2015). Extraverts also tend to lessen the expressive control over joy, while increasing the expressive control over contempt (Fok et al., 2008). Within the extraversion–neuroticism quadrant, one stable inter-individual differences variable is known to account for biases in the processing of joy, humor, and laughter: gelotophobia (the fear of being laughed at; Ruch & Proyer, 2008a).

Individuals with gelotophobia describe themselves primarily as introvert-neurotics (Ruch & Proyer, 2009). They express less smiling and laughter (Platt, Hofmann, Ruch, & Proyer, 2013; Ruch, Hofmann, & Platt, 2015), report experiencing less joy in a variety of situations (see Ruch, Hofmann, Platt, & Proyer, 2014 for a review), and others' positive laughter is experienced as malicious (Ruch, Altfreder, & Proyer, 2009). Also, they respond with a marked heart rate deceleration toward hearing laughter (indicating a "freezing-like" response; Papousek et al., 2014). Gelotophobes interpret laughter as a weapon utilized for putting them down and falsely attribute it to mockery directed toward them (Ruch & Proyer, 2008b). Consequently, they respond fearfully to benevolent laughter (Ruch & Proyer, 2009), implying a possible bias in interpreting joy and emotions potentially going along with laughter/ridicule (i.e., contempt).

Thus, while extraversion and neuroticism partially predict responses toward joy and contempt, gelotophobia is a specific trait that biases joy responses and their interpretation (see Ruch et al., 2014). As gelotophobia goes beyond global personality dimensions and is also sufficiently different from lower order concepts such as shame-proneness, timidity, and social anxiety (Ruch et al., 2014), it is necessary to investigate its relation to responses and interpretation of joy and contempt smiles. Therefore, the present research investigated how individuals with or without gelotophobia respond toward facially expressed types of smiles (with a special focus on smiles of joy and contempt). This is important, as a bias in perceiving smiles and laughs might lead to important consequences in social interactions (see Fredrickson, 1998; Johnston, Miles, & Macrae, 2010; Papa & Bonanno, 2008). It is expected that gelotophobes have a specific bias in interpreting facially expressed smiling

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and laughter, as those displays are linked to being laughed at (or misattributed ridicule).

The perception of being laughed at may go along with at least two kinds of laughs and feeling states. First, amused laughter (equivalent to joyful laughter in its expression; see Ruch & Ekman, 2001) occurs, when mirthful people are amused about something or someone, while the "target" is excluded from the joke, that is, because he or she does not get the punch line or does not have the in-group knowledge to understand the joke. This could consequently be misperceived as ridicule, though this is not directly laughing at, but the others are not laughing with the person. In line with this, Ruch et al. (2009) demonstrated that auditory-presented laughs of a positive quality were misperceived by gelotophobes. Joyful laughs where perceived as more malicious by gelotophobes than individuals with no fear, and listening to the laughter did not lift the cheerful mood from pre to post the task. Thus, we expect that gelotophobes misinterpret joyful laughter as contemptuous, as those displays of joy are misinterpreted as laughing at, while individuals with no fear distinguish between joy smiles and contempt displays.

Second, contemptuous laughter occurs when people are laughing at somebody else maliciously (as a form of aggression; Poyatos, 1993). Typically, this would elicit negative emotions in the person being laughed at (e.g., shame or anger; Papousek et al., 2014). We expect that expressions of contemptuous laughter are perceived as such by individuals with no fear of being laughed at and gelotophobes (i.e., containing contempt), but we also expect that gelotophobes assign those displays more joy, as they infer that people *enjoy* laughing at them (see Ruch & Proyer, 2008a).

Aims of the Present Study

For an empirical test of the hypotheses on joy and contempt smiles, photos of facially expressed joy and contempt smiles, as well as expressions of emotions, ambiguous expressions, and other kinds of smiles were studied (based on the works of Bänninger-Huber, 1996; Ekman, 1985).[1] By adding further smiles and emotion expressions beyond joyful and contemptuous smiles,[2] it could be tested whether the gelotophobes' bias in the perception is specific to joy and contempt and not a general inability to judging smiles and emotion expressions. The basic emotion and ambiguous expressions were included to conceal the main aim of the study. Two studies were conducted to investigate responses (verbal ratings of emotions and facial responses) toward facially expressed smiles and laughs in individuals with and without gelotophobia.

In Study 1, ratings of nine emotions toward photos of joy and contempt smiles, and other smile types were investigated. The hypotheses stated that gelotophobes misperceive the joy smile and rate the perceived joy lower than the no fear group, while individuals with no fear of being laughed at would assign joy (and only joy) to photos of joy smiles (H1a). Also, it was assumed that gelotophobes perceive joy smiles as more contemptuous (due to their anticipation of ridicule; H1b). For contempt displays, it was expected that gelotophobes would rate contempt high, like individuals with no fear (H2a). Moreover, gelotophobes would differ from individuals without gelotophobia by rating joy higher, as they attribute others to gain enjoyment from ridicule (H2b). For the rating of other expressions (basic emotions, smiles, ambiguous expressions), it was expected that individuals with no fear and gelotophobes would not differ in the emotion assignment, as gelotophobes do not generally lack the ability to rate facial expressions of others (see also Papousek et al., 2009), but have a specific bias in joy and contempt.

Study 2 included the rating of photos of joy and contempt in a laboratory setting where also the participants' facial responses were filmed and coded by the Facial Action Coding System (FACS; Ekman, Friesen, & Hager, 2002), giving insight into the facial responses toward joy and contempt. Studies have shown that facial mimicry of smiling increases the correct interpretation of smiles (e.g., Maringer, Krumhuber, Fischer, & Niedenthal, 2011). As gelotophobes have been shown to express joy less frequently and less intensely (Platt et al., 2013), it was assumed that they show less frequent joy responses toward photos of joy smiles (H3). Also, it was expected that they show more contempt responses toward joy smile photos, as they misattribute joy smiles to being contemptuous and respond accordingly (H4). Also, gelotophobes were expected to show more contempt responses toward contempt expressions (compared with individuals without gelotophobia), as they are more sensitive to perceiving this emotion (H5). Beyond the methods utilized in Study 1, Study 2 further accounted for trait positive affect (PA) and negative affect (NA) to control for any habitual tendency to rate positive emotions lower in low-trait PA or to rate negative emotions higher in high-trait NA. This was important because gelotophobia has been shown to go along with lower levels of joy on a state and trait level (Ruch et al., 2014). Participants' mood scores before and after the experimental task were evaluated. It was expected that by engaging with social stimuli entailing smiling and laughter, the mood of non-fearful individuals would lift, while gelotophobes would not experience the same increase (H6).

Study 1

Method

Participants. The sample consisted of 83 adult volunteers (68 females, 15 males, age range = 18-62, $M = 33.06$, $SD = 11.72$). The fear group consisted of 15 participants exceeding the empirically derived cut-off point for gelotophobia at 2.50 (see Ruch & Proyer, 2008b; $M = 2.85$, $SD = 0.29$, minimum = 2.53, maximum = 3.53; three males, 12 females). Of the 15, 10 were classified as slight, 4 as marked, and 1 as

extremely fearful of being laughed at. The no fear group's gelotophobia scores had a mean of 1.54 (*SD* = 0.26, minimum = 1.07, maximum = 1.93) and consisted of 68 participants (age = 18-62, *M* = 33.24, *SD* = 11.98; excluding individuals with borderline gelotophobia *n* = 32; valued between 2.00 and 2.49 on the GELOPH<15>; 12 males, 56 females). The gelotophobia mean of the no fear group was lower than the mean of the gelotophobes, $F(1, 82) = 287.68$, $p < .001$, $\eta_p^2 = .78$.

Instruments. The GELOPH<15> (Ruch & Proyer, 2008b) is a 15-item standard measure for the subjective assessment of gelotophobia ("when others laugh in my presence I get suspicious"). All items are positively keyed and utilize a 4-point answer scale (1 = *strongly disagree*, 4 = *strongly agree*). Internal consistency was high ($\alpha = .86$) in the present sample. Ruch and Proyer (2008b) derived empirical cut-off points for slight gelotophobia (2.50-2.99), marked gelotophobia (3.00-3.49), and extreme fear of being laughed at (3.50-4.00).

The smiling face may hide an evil mind paradigm. This paradigm was developed to assess individuals' perceptions of joy and contempt smiles. First, participants were given the cover story that lay actors were asked to pose certain facial expressions while being in different states of mind. In detail, the participants were told that the presenters had undergone the task of getting into one of three predefined frames of mind (mean-spirited, neutral, benevolent) and then displaying certain facial configurations of emotions (e.g., joy, fear, surprise) that they had practiced before. The participants were made aware that the emotional state a presenter displays may (but also may not) match the frame of mind the presenter was in. The instruction, thus, facilitated gelotophobia by activating the notion that the actor might be concealing their true emotional state when displaying facial expressions. Second, a selection of 16 photos was then rated for their emotion content.

The 16 photos contained expressions of joy smiles, contempt smiles, other smile types (phony smiles, "Chaplin," masking smiles) based on the work of Bänninger-Huber (1996) and Ekman (1985), as well as distractor stimuli (surprise, a happy–surprise blend, a photo of "beginning of fear," "concentration," and two photos with no facial action unit [AU; Ekman et al., 2002] present). The latter ambiguous emotion expressions were considered "noisy" stimuli and served as distractor stimuli. They facilitated the interpretation of the frame of mind of the presenter diverging from the emotion displayed, as the face contained ambiguous information. Those photos of ambiguous emotion displays needed to be included to make the cover story plausible by implying that the presenters might "leak" their true frame of mind and to distract from the stimuli of interest, the joy and contempt smiles (and counteracting any hypotheses building by the participant). The photos included five presenters of both genders and were shown individually on a 21-inch computer screen, head and shoulder close-up view. The participants rated the perceived intensity of eight emotions to the photo (anger, contempt, disgust, fear, joy, sadness, shame, surprise) on a 6-point scale (1 = *not at all*, 6 = *a lot*).

Procedure

Generation of the photos. Five FACS-trained presenters (two males) posed the 16 different smiles, basic emotions, and ambiguous expressions that were finally selected for the experiment. The pool of photos was coded with the FACS (Ekman et al., 2002) by two trained FACS coders to ensure the convergence between the intended and expressed display. Three photos were joy smiles in different intensities (Duchenne displays [DDs], two times AU6 + 7 + 12; 6 + 12 + 25 + 26[3]; open mouth implied laughing), three contempt smiles (AUR14; L6 + L14; 14), two masking smiles (AU6 + 7 + 12 + 17 + 24; 6 + 12 + 24), one phony (AU12) and "Chaplin smile" (AU13) each. The distractor stimuli consisted of one photo for surprise (AU1 + 2), happy surprise (AU1 + 2 + 6 + 12 + 25), beginning of fear (AU20), beginning of anger/concentration (AU7), and two neutral photos with no AUs present.

Study procedure. Participants were recruited through a newspaper article, which contained a link to the study website, announcing for a study in personality psychology. On the study website, participants were first asked to fill in the GELOPH<15>, and then asked to complete a "rating task on judging faces" (Smiling Face May Hide an Evil Mind Paradigm). To end the session, participants were debriefed and thanked for their participation. All participants participated voluntarily, and individual feedback on selected personality variables was offered as incentive.

Data analysis strategy. In this quasi-experimental study, the level of gelotophobia group (gelotophobia vs. no fear) was the independent variable and the emotion ratings were the dependent variables. Aggregated scores for emotion ratings of photos with the same content (e.g., all joy smiles) were computed, leading to one composite score for each emotion rating for the three DDs, one for the three contempt displays, and one score for the two masking smiles. The other smiles were analyzed individually. Photos of basic emotions and ambiguous expressions were used as distractor items.[4] The following analysis strategies were applied for hypotheses testing: First, for displays with a target emotion (i.e., joy and contempt), it was of interest whether the target emotion (i.e., the emotion displayed, for example, joy for DDs) would be highest for the respective stimuli. For this, contrasts of the target emotion against the other relevant emotions (if any) were computed. An empirical cut-off point for "relevant emotions" was established. Only emotions with an overall mean rating indicating at least "slight presence of the emotion" were considered (i.e., overall mean of at least 2.00). Those are reported in each respective section of the

analysis. The consideration of emotions that were at least slightly present allowed for targeted testing of group differences in relevant ratings (and not comparing the groups on ratings which were not chosen to be relevant). Second, group differences (no fear vs. gelotophobia) were investigated for the target emotion. Third, it was of interest whether other emotions were assigned in the rating (with a special focus on group differences). Differences were investigated with repeated-measures ANOVAs (gelotophobia group as independent, intensity of emotion as dependent, and the emotions above the cut-off as repeated-measures factors; in the following only referred to as repeated-measures ANOVA). The main focus lay in the analysis of joy, contempt, and variants of smiles.

Results

Joy smiles. The aggregated ratings of the three joy smiles were evaluated for the intensity of the target emotion joy. Means and standard deviations are presented in Table 1.

Table 1 shows that joy had the highest mean rating across all eight emotions, and only the contempt rating exceeded the cut-off in the group of gelotophobes. As expected, a contrast comparing joy against contempt showed that joy was rated more intense than contempt in both groups, $F(1, 79) = 202.49$, $p < .001$, $\eta_p^2 = .72$. In line with the expectations, the interaction between the type of emotion and gelotophobia group, $F(1, 79) = 5.39$, $p < .05$, $\eta_p^2 = .06$, showed that gelotophobes rated joy lower than the no fear group; $F(1, 80) = 4.29$, $p < .05$, $\eta_p^2 = .05$, confirming H1a. Contempt toward the joy photos was rated higher in gelotophobes than in the no fear group, confirming H1b; $F(1, 80) = 8.16$, $p < .01$, $\eta_p^2 = .07$.

Contempt smiles. Contempt, joy, and anger were analyzed (they exceeded the cut-off). The intensity of the contempt rating was compared to the other two emotions, showing that contempt did not differ from the rating of anger, but both were higher than the ratings of joy, $F_{emotion}(2, 162) = 9.16$, $p < .001$, $\eta_p^2 = .10$; $F_{contrast}(1, 81) = 14.37$, $p < .001$, $\eta_p^2 = .15$. Contrary to the expectation, the interaction (Emotion × Gelotophobia group) was not significant, $F(2, 226) = 1.17$, $p = .354$. This disconfirmed H2a. Still, in line with the expectations, gelotophobes rated contempt numerically more intense than the no fear group. Also joy was rated numerically more intense in gelotophobes than in the no fear group (in the direction of H2b), and the fearful individuals rated anger less intense. Nevertheless, the results failed to reach statistical significance, disconfirming H2a and H2b.

Phony, masking, and Chaplin smiles. In the phony smile, joy and contempt exceeded the cut-off. The ANOVA showed no group differences for the level of gelotophobia, $F(1, 72) = 0.29$, $p = .586$, occurred. As the masking smiles and the Chaplin smile had no a priori emotion assignment, they were analyzed for differences between the two groups in the emotions being at least slightly present. For ratings of masking smiles, joy, shame, and surprise exceeded the cut-off. The repeated-measures ANOVA showed that the emotion ratings differed from each other, with joy being the highest, $F(2, 146) = 46.08$, $p < .001$, $\eta_p^2 = .39$, but the interaction level

Table 1. Descriptive Statistics of Emotion Ratings Toward the Photographs (Study 1, $N = 83$).

		No fear		Gelotophobia	
Type of photo	Emotion	*M*	*SD*	*M*	*SD*
Joy smile	Anger	1.30	0.46	1.89	1.06
	Contempt	1.50	0.67	2.16	1.29
	Disgust	1.34	0.64	1.53	0.79
	Fear	1.34	0.44	1.53	0.60
	Joy	5.06	1.15	4.73	1.41
	Sadness	1.30	0.54	1.36	0.62
	Shame	1.75	0.98	1.81	0.81
	Surprise	1.82	0.96	1.82	0.87
Contempt	Anger	2.61	1.08	2.48	1.24
	Contempt	2.47	1.09	2.62	1.21
	Disgust	1.63	0.71	1.93	0.87
	Fear	1.56	0.65	1.69	0.61
	Joy	2.40	1.11	2.88	1.02
	Sadness	1.79	0.89	1.73	1.00
	Shame	1.78	0.80	2.02	1.03
	Surprise	1.70	0.89	1.96	1.03
Phony smile	Anger	1.54	1.04	1.87	1.36
	Contempt	1.67	1.25	1.87	1.51
	Disgust	1.57	1.25	1.60	0.99
	Fear	1.62	1.04	2.07	1.39
	Joy	4.02	1.79	3.50	1.56
	Sadness	1.35	0.79	1.80	1.37
	Shame	1.94	1.24	2.00	1.11
	Surprise	1.94	1.31	1.47	0.83
Masking smile	Anger	1.40	0.64	1.87	1.38
	Contempt	1.57	0.81	1.50	1.12
	Disgust	1.33	0.79	1.63	1.06
	Fear	1.43	0.75	2.00	1.30
	Joy	4.43	1.54	3.89	1.71
	Sadness	1.24	0.50	1.60	0.87
	Shame	2.57	1.54	3.07	1.22
	Surprise	2.29	1.38	2.40	1.78
Chaplin smile	Anger	3.13	1.84	3.21	2.08
	Contempt	2.43	1.68	3.13	1.81
	Disgust	2.60	1.75	3.00	2.10
	Fear	3.29	1.85	3.13	1.85
	Joy	1.79	1.18	2.33	1.29
	Sadness	1.80	1.17	2.00	1.46
	Shame	2.72	1.86	2.60	1.80
	Surprise	2.46	1.66	2.53	1.81

Note. . No fear = low gelotophobia scores, <2.0 on the GELOPH<15> (Ruch & Proyer, 2008b). Gelotophobia = gelotophobia scores > 2.5 on the GELOPH<15>.

of Gelotophobia group × Emotion was not significant, $F(2, 146) = 2.19$, $p = .116$, and neither was the effect for the level of gelotophobia, $F(1, 73) = 0.01$, $p = .984$. For the Chaplin smile, the anger, fear, shame, disgust, contempt, and surprise ratings exceeded the cut-off point, but did not differ in intensity, $F(5, 395) = 2.18$, $p = .063$, and no group difference, $F(1, 79) = 0.27$, $p = .681$, nor interaction occurred, $F(5, 395) = 0.29$, $p = .919$.

Discussion

Our results showed that gelotophobia biases the judgment of facially displayed joy smiles (and laughs). While individuals with no fear of being laughed at related only joy to the photos of joy smiles, gelotophobes responded to these joy smiles by assigning less joy and more contempt compared with individuals with no fear (H1a, H1b). This was in line with the expectation that gelotophobes misperceive the genuine expression of joy by assuming that the person is ridiculing them and hiding an "evil mind." Already Hobbes (1651/2010) related contempt to laughter and ridicule, and Darwin (1872) claimed,

> . . . in the case of derision, a real or pretended smile or laugh is often blended with the expression proper to contempt, and this may pass into angry contempt or scorn. In such cases the meaning of the laugh or smile is to show the offending person that he or she excites only amusement. (p. 224)

The expectations that contempt smiles are perceived as more joyful, as well as containing more contempt for gelotophobes compared with individuals with no fear failed to reach statistical significance (H2a and H2b were disconfirmed). Thus, the current result replicated the finding of Ruch et al. (2009), who found that gelotophobes and individuals with no fear did not differ in judging negative auditory laughter. To conclude, the bias of gelotophobes to assign more contempt to smiles was specific to genuine enjoyment displays, as no differences were found for other smiles. This is the first study to reveal contempt as a relevant emotion in gelotophobia, and a further assessment of emotion displays needs to verify the findings in an independent sample (by also controlling for trait PA and NA, and mood).

Study 2

Study 2 included the decoding of the 16 photos in the "Smiling Face May Hide an Evil Mind Paradigm" in a laboratory setting. A sample of independently collected participants rated the same photos, and their facial responses were filmed and coded by the FACS, giving further insight into the responses toward joy and contempt. Also, trait PA and NA and mood changes pre and post the task were assessed.

Method

Participants. The sample consisted of 50 adults (38 females, 12 males; age range = 18-72 years, $M = 39.76$, $SD = 15.19$). The fear group consisted of 25 adults (eight males; age range = 18-72 years, $Mdn = 38$ years) that exceeded the cut-off score for gelotophobia in an online screening (that led to invitations to an experiment), as well as at the beginning of the experiment. The double check helped make sure that the participants had at least a slight fear of being laughed at. Of the 25, 11 were classified as slight, 12 as marked, and 3 as extremely fearful of being laughed at. None of them were enrolled in therapeutic treatment or consumed psychotropic medication at the time of the experiment. The no fear group was formed of 25 participants (4 males; age range = 20-68 years, $Mdn = 44$ years) that reported no gelotophobia ($M = 1.79$, $SD = 0.40$). Their GELOPH<15> scores were lower than the ones of the fear group ($M = 3.00$, $SD = 0.24$), $F(1, 49) = 167.20$, $p < .001$, $\eta_p^2 = .78$.

Instruments. The GELOPH<15> (Ruch & Proyer, 2008b), as described in Study 1, was applied to assess the individual differences in gelotophobia. Cronbach's alpha was high ($\alpha = .90$).

The Positive Affect and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) assesses the independent dimensions of PA and NA with 20 items on a 5-point scale (1 = *not at all* to 5 = *very much*). In this study, PA and NA as traits and states' reliabilities (internal consistency) were higherthan ≥.85.

The smiling face may hide an evil mind paradigm. The 16 photos of Study 1 were used, but the analyses focused on joy and contempt smiles only. All other photos were used as distractor items in the assessment (and to ensure the comparability of the design with Study 1) but not evaluated. Converging with Study 1, photos with the same content were aggregated to composite scores for each emotion rating.

Facial measurements. The FACS (Ekman et al., 2002) is an anatomically based, comprehensive, objective technique for measuring all observable facial movements. It distinguishes 44 AUs. These are the minimal units that are visually distinguishable. FACS allows for measurement of the frequency and intensity of a facial movement. The intensities range from trace (coded A) to maximum (E; Ekman et al., 2002).

Procedure. Participants were recruited through newspaper articles, which contained a link to the study website. The website provided information on the procedure and the GELOPH<15>. Participants could leave their email address when interested in coming to the laboratory for a single session. When doing so, participants were sent a link to an online

calendar, where they could choose a date and were given a personalized login to a website. On the website, they completed the PANAS trait and the GELOPH<15> (for the second time). At the beginning of the study session, the participants were asked to complete the PANAS state. Then, participants were left to read the instructions and to complete the task on the computer. All participants completed the eight emotion ratings to an example photo. If the task was unclear, they had the opportunity to ask the experimenter for explanations. The cover story and presentation of the 16 photos, as well as the ratings, were the same as in Study 1. Participants completed the task in solitude with the experimenter waiting in an adjacent room. During the task, a computer-inbuilt camera unobtrusively videotaped the participant's face. Afterward, participants filled in the PANAS state measure again. To end the session, participants were debriefed and informed about the filming. No participants took the offer to have the video material deleted. Written consent allowed the use of the material that was collected. On average, the experimental session lasted 45 minutes. All participants attended voluntarily, and a personal feedback on the trait measures was offered. Procedures and interactions were standardized, and consent was obtained from the local ethic committee.

Facial action coding. Measurements provided full color, digital format films, which gave a close-up, head-on view of the participants' face. The facial responses toward photos were assessed using the FACS. Two FACS-certified researchers followed a designated procedure to scoring the AUs relevant for joy smiles (DDs; Ekman, Davidson, & Friesen, 1990), contempt, and masking smiles. The interrater reliability (Cohen's kappa) for the two coders was K = .88. Facial variables were formed for responses to each photo separately. Presence of a DD and its intensity was coded, defined by the symmetric and simultaneous presence of AU12 + 6. It may be accompanied by a tightening of the eyelids (AU7) and/or mouth opening (AU25, 26, 27), but no other AU. Intensity of DDs was based on the peak intensity of the AU12. Contempt smiles (unilateral AU14) were coded in both frequency and intensity. Masking smiles were coded as AU12 plus markers of any of five negative emotions (sadness, anger, fear, disgust, contempt; see Bänninger-Huber, 1996; Ekman & Friesen, 1982).

Results

Differences in the level of gelotophobia in trait PA and NA. Means and standard deviations of PA and NA are reported in Table 2. Univariate ANOVAs with the level of gelotophobia (gelotophobia, no fear) as independent and the respective trait as dependent variable showed that the gelotophobes reported less PA compared with the no fear group, $F(1, 49) = 5.52$, $p < .05$, $\eta_p^2 = .10$, and more NA compared with the non-fearful individuals, $F(1, 49) = 4.28$, $p < .05$, $\eta_p^2 = .08$.

Table 2. Descriptive Statistics of the Trait Variables and Emotion Ratings (Study 2; N = 50).

	No fear		Gelotophobia	
	M	*SD*	*M*	*SD*
PA trait	3.80	0.61	2.70	0.80
NA trait	1.79	0.63	2.53	0.70
PA before	3.48	0.62	3.11	0.78
NA before	1.16	0.26	1.80	0.62
PA after	3.79	0.74	2.92	0.94
NA after	1.05	0.10	1.64	0.80
Joy smiles				
Anger	1.36	0.57	1.73	0.88
Contempt	1.67	0.65	2.72	0.92
Disgust	1.19	0.35	1.63	0.71
Fear	1.28	0.48	1.36	0.54
Joy	4.81	0.57	2.49	0.65
Sadness	1.26	0.41	1.40	0.65
Shame	1.50	0.69	1.76	0.95
Surprise	2.00	1.22	1.84	1.02
Contempt				
Anger	2.99	0.87	2.69	0.95
Contempt	3.28	1.02	3.31	1.31
Disgust	1.65	0.54	2.09	1.09
Fear	1.74	0.85	1.83	0.76
Joy	1.74	0.61	2.11	0.87
Sadness	1.54	0.71	1.83	0.96
Shame	1.56	0.57	1.73	0.77
Surprise	2.44	1.00	2.37	1.04

Note. No fear = low gelotophobia scores (n = 25). Gelotophobia = gelotophobia scores > 2.5 (n = 25). PA = positive affect; NA = negative affect.

Emotion ratings toward joy and contempt smile photos. Descriptive statistics for the emotion ratings toward the photos were computed (see Table 2). Only photos containing joy and contempt smiles were evaluated to replicate the findings of Study 1.

Table 2 shows ratings for each emotion, but only ratings that exceeded the cut-off point of being at least slightly present were utilized. The cut-off point was equivalent to Study 1 and ensured that only emotions were considered for analyses that were empirically relevant. Table 2 shows that the ratings of Study 2 replicate those of Study 1, with comparable means and standard deviations. Next, joy and contempt smile photos were analyzed for the emotions rated and group differences (level of gelotophobia; gelotophobia vs. no fear).

Joy smiles. For the joy smile photos, the intensity of the target emotion joy was compared with the only other emotion exceeding the overall cut-off, contempt. A repeated-measures ANCOVA with gelotophobia group as independent, intensity of rated emotion as dependent variable, PA and NA as covariates, and the two emotions as the repeated-measures factor

was computed. PA and NA were added to control for effects of habitual tendencies to positive and negative emotions, which might influence the emotion ratings. Results indicated a significant main effect for the factor Emotion Type (joy and contempt), $F(1, 44) = 57.77$, $p < .001$, $\eta_p^2 = .57$. The interaction, $F(1, 44) = 18.98$, $p < .001$, $\eta_p^2 = .30$, showed that the gelotophobes rated joy lower than the no fear group, in line with H1a, $F(3, 48) = 22.09$, $p < .001$, $\eta_p^2 = .60$, and contempt higher than the no fear group, meeting the expectations of H1b, $F(3, 48) = 8.34$, $p < .001$, $\eta_p^2 = .36$. With respect to the influences of PA and NA, both interactions of the Type of Emotion × PA, $F(1, 44) = 1.54$, $p = .221$, and NA, $F(1, 44) = 1.35$, $p = .251$, were not significant, indicating that the effect existed independent of PA and NA, respectively. Therefore, these traits were not controlled for in further analyses.

Contempt smiles. Contempt, surprise, and anger were analyzed. A repeated-measures ANOVA (gelotophobia group as independent, intensity as dependent variable, emotions as repeated measures) was computed. First, a contrast showed that the contempt ratings differed from both surprise and anger, $F(2, 46) = 10.69$, $p < .001$, $\eta_p^2 = .32$; $F_{contrast}(1, 47) = 19.81$, $p < .001$, $\eta_p^2 = .30$. No interaction occurred, showing that both groups perceived contempt to equal extents (*ns*, disconfirming H2a).[5] Next, the joy rating was tested for group differences as it was hypothesized that gelotophobes would attribute joy to contempt smiles and Study 1 revealed a numerical difference in the expected direction of H2b. The gelotophobes showed a tendency to rate joy more intense than the no fear group, $F(1, 48) = 3.04$, $p < .05$, one-tailed, $\eta_p^2 = .07$.

Facial responses towards the photos

Overview. Aggregated scores for the frequency of the DDs, contempt smiles, and masking smiles[6] towards all 16 photos, as well as scores for responses towards photos showing DDs and contempt smiles, were computed. Non-parametric analyses were applied for the data on types of photos as criteria for normal distribution were violated.

Convergence of facial expressions displayed to different smiles. It was evaluated whether appropriate mimicry occurred toward the emotion displayed on the photos (e.g., DDs mimicked by DDs). A non-parametric-related sample Friedman's two-way ANOVA was used to compare the facial responses toward the DDs. Only the no fear group was considered for analysis, as a priori assumptions implied that the gelotophobes respond with less, and also counter-mimicry (i.e., facial expressions contrary to those shown in the photo; see Lanzetta & Orr, 1986). Thus, to confirm that the approach is suitable to induce convergent facial responses in participants without specific fears, all individuals without gelotophobia were chosen for an investigation of the mimicry toward the photos. The differences for the frequency of DDs (dependent variable) to joy photos and contempt photos (repeated measures) were computed. The results yielded a significant main effect, $\chi^2(df = 1) = 10.89$, $p < .001$, showing that the facial mimicry toward DDs differed. Wilcoxon rank-order comparisons showed that more DDs occurred toward joy photos, differing from contempt smile photos ($p < .001$). For the expression of contempt smiles, it was also shown that the facial expressions toward the two types of photos (joy smiles, contempt smiles) differed, $\chi^2(df = 1) = 4.46$, $p < .05$. The post hoc Wilcoxon rank-order comparisons showed that contempt was displayed most frequently toward contempt photos, differing from joy displays ($p < .05$).

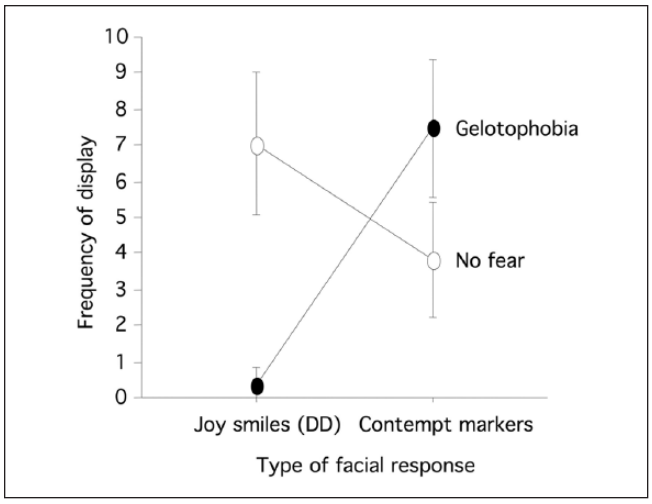

Figure 1. Frequency of joy (DD) and contempt smiles expressed toward all 16 photos by gelotophobes (fear group) and individuals without gelotophobia (no fear).
Note. DD = Duchenne display.

Differences in level of gelotophobia in overall frequencies of facial displays. The frequency of all facial responses over the 16 photos ranged between 0 and 14 ($M = 4.46$, $SD = 2.54$), implying that some participants did not show any displays of DDs or contempt smiles, whereas others responded with one of those facial events to 87.5% of the photos. More specifically, the occurrence of DDs over all 16 photos ranged from 0 to 7 ($M = 1.58$, $SD = 2.02$), and contempt ranged from 0 to 8 ($M = 2.58$, $SD = 1.94$). No photo elicited more than one facial response. A repeated-measures ANOVA was computed to reveal general differences in the frequency of joy and contempt shown by the two groups (see Figure 1).

Figure 1 shows that with respect to the total frequency of DDs (joy smiles), the no fear group exhibited more DDs than the gelotophobes, $F_{facial\ display}(1, 48) = 7.99$, $p < .01$, $\eta_p^2 = .14$; $F_{interaction}(1, 48) = 56.24$, $p < .001$, $\eta_p^2 = .54$; $F_{joy}(1, 49) = 46.36$, $p < .001$, $\eta_p^2 = .49$, while contempt was elicited more frequently in gelotophobes in comparison with the no fear group, $F(1, 49) = 9.29$, $p < .01$, $\eta_p^2 = .16$, in line with the expectations.

Group differences in facial expressions displays to different types of smiles. Next, it was evaluated whether the two groups differed in the facial expressions shown toward one type of emotion displayed in the photos. χ^2 tests comparing the frequency of occurrence of two types of facial responses (DD, contempt smile) with two types of smiles (joy and contempt) presented in photos were computed. First, the no fear group's frequency of mimicked DD responses toward joy photos was higher than that in the gelotophobia group, in line with H3, $\chi^2(df = 1) = 23.27$, $p < .001$. For joy smiles toward photos entailing contempt, the assumption of having at least five cases in each cell was violated. Second, the gelotophobes differed from the no fear group in the frequency of showing contempt in response to the joy smile photos, with gelotophobes showing higher numbers of contempt smiles, in line with H4, $\chi^2(df = 1) = 10.27$, $p < .001$. In respect to contempt smiles toward contempt photos, the gelotophobes did not differ from the no fear group in the frequency of responses, $\chi^2(df = 1) = 0.32$, $p = .571$ (disconfirming H5).

Convergence of subjective and objective data. The convergence between verbal emotion ratings and facial responses was examined by Spearman's rank-order correlations. Higher ratings of joy toward joy photos went along with more intense DDs ($r = .54$, $p < .01$). Also, higher joy ratings toward joy photos went along with less expressed contempt ($r = -.44$, $p < .01$). Contempt ratings toward joy photos went along with less intense responses of DDs ($r = -.37$, $p < .01$) and more expressed contempt ($r = .19$, $p = .19$), showing moderate convergence of objective and subjective data.

Participants' mood. Means and standard deviations of PA and NA are reported in Table 2. The descriptive statistics of the state scales indicated high skewness values for NA (i.e., generally low levels of NA were reported). To analyze the mood changes in the two groups, a repeated-measures ANOVA for PA was computed, as well as a Friedman two-way ANOVA for NA, to account for the violated normality assumptions. For PA, the two groups (gelotophobia vs. no fear) differed, $F(1, 48) = 9.82$, $p < .01$, $\eta_p^2 = .17$, with the gelotophobes being lower in PA than the no fear group. The interaction showed that the no fear group increased in PA, while the gelotophobes decreased, in line with H6, $F(1, 48) = 6.48$, $p < .05$, $\eta_p^2 = .12$. The Friedman ANOVA with the Wilcoxon rank-order comparisons for NA showed a significant overall effect, $\chi^2(df = 1) = 11.91$, $p < .001$; NA differed from pre to post ($T = 195.50$, $p < .05$). Also, the two groups differed in the pre- and post-measures ($U = 531.00$, $p < .05$), but no interaction occurred. As expected, looking at the photos did not lift PA of the gelotophobes, but lifted PA in no fear individuals (confirming H6). NA was higher in the gelotophobes to start with, but decreased from pre to post the rating task.

To test whether the increase in PA was mediated by the amount of facially expressed joy, a repeated-measures ANCOVA was computed for PA (with the frequency of expressed DDs as covariate). Results indicated that the frequency of expressed joy, indeed, mediated PA, as the significant results disappeared for the interaction of Gelotophobia group × Measurement time; main effect PA $F(1, 47) = 0.18$, $p = .669$, Measurement time × Gelotophobia group, $F(1, 47) = 3.49$, $p = .068$, Measurement time × Frequency DD, $F(1, 47) = 0.04$, $p = .949$.

Discussion

As in Study 1, gelotophobes rated joy displays more contemptuous compared to the no fear group (in line with H1b). Both groups rated the contempt photos as contemptuous. Also, the contempt photos contained tendentially more perceived joy for the gelotophobes than the no fear group (in line with H2b); though this finding needs to be treated with caution (i.e., failed to reach statistical significance in Study 1). Overall, the results for the emotion ratings were replicated in Study 2, but the findings were also extended to the effect of the rating task on the mood, as well as the spontaneous facial responses to the photos. Although the gelotophobes were habitually lower in PA and higher in NA compared to individuals with no fear (supporting the earlier findings of gelotophobes being habitually lower in joy), these scores did not influence the ratings.

In line with the expectations, the gelotophobes expressed less joy smiles toward joy photos, compared to the no fear group (H3). This might be due to the elicitation of shame through (attributed) ridicule or contempt. According to Tomkins (1969), one of the facial response pattern in shame is the

> . . . frozen face, in which the entire facial musculature is kept under sufficient tight control, so that shame, along with all other affects is interfered with at the site of expressivity. This may be a chronic of a transient defense against shame and other affects. (p. 365)

The generally lower levels of facial responses are supportive of Tomkins's (1969) claim that individuals with an inclination to shame may display a "frozen face." Perhaps the reduced facial expressivity of joy generalizes for gelotophobes over situations, in line with the findings of Papousek and colleagues (2009) who reported that gelotophobia predicted the control over the expression of emotions. Furthermore, the gelotophobes showed more contempt toward joy photos, compared to the no fear group (H4). This implies that they attribute negative emotions to facially displayed joy.

As laughter and smiling are known to be contagious (e.g., Bourgeois & Hess, 2008), it was expected that looking at the photos would induce state PA in participants with no fear. Indeed, the engagement with the smiling and laughter photos lifted the PA of participants with no fear, but did not lift the PA of the gelotophobes, confirming H6 and replicating the findings of former studies (Ruch et al., 2009). The present study suggests that this effect is mediated through the expressed

enjoyment, as the mood changes differed when they were controlled for the frequency of expressed DDs. Likewise, a study by Papousek and colleagues (2009) showed that when gelotophobes are exposed to the affective states of others, they show less emotional contagion to cheerful stimuli but a high degree of contagion to negative stimuli, in line with the PA not increasing in the gelotophobia group. Moreover, differences also occurred for NA: The gelotophobes' NA was higher pre and post the rating task compared to individuals with no fear.

General Discussion

The aim of the present research was to investigate how gelotophobia biases the perception of and responses to facially displayed joy and contempt. Gelotophobes perceive joy displays to contain more contempt compared with individuals with no fear (next to joy) and show more frequent contempt displays toward such displays than individuals with no fear of being laughed at. Also, gelotophobes express less joy toward joy displays and rate the joy lower compared with individuals with no fear. Next, we discuss the potential impact of those findings in the broader contexts of (a) the emotional experience of gelotophobes, (b) the potential impact of the bias on social interactions, (c) supporting evidence for the bias from broad personality traits (extraversion and neuroticism), and (d) possible implications on well-being and social support of the tendency of gelotophobes to express less joy compared with individuals with no fear.

First, the present findings lead to more insight into the emotional life of gelotophobes. While shame, fear, and (low) joy seem to be the emotions forming the core of the experience of fearful individuals (see Ruch et al., 2014), contempt seems to be the emotion assigned to the "offenders" (i.e., the persons smiling and laughing). This is in line with the descriptions of emotion clusters, which bring contempt, ridicule, and shame together. The contemptuous person ridicules the person who is disliked, and the ridicule goes along with the laughter of the contemptuous person, which, in turn, elicits shame in the victim (e.g., Tomkins, 1969; "the laugh becomes a vehicle of contempt," p. 367). Interestingly, Tomkins (1969) stated in his work on shame that this emotion might be accompanied by different expressive behaviors: " . . . another specific anti-shame posture is the use of the contempt response, either as a transient or chronic posture with which to combat one's own readiness to feel ashamed" (p. 365). This "anti-shame expression" in the form of contempt might explain the frequent occurrence of contempt expressed by gelotophobes and they might show contempt smiles to counteract the emergence and expression of shame (which they are very sensitive too). This is of particular importance, as the induction of shame might be due to a misinterpretation, as gelotophobes have been shown to misinterpret laughter-related situations, auditory laughter, as well as ridicule and teasing situations (Ruch et al., 2014). Therefore, it might be that shame is induced in gelotophobes by making them feel ridiculed although no ridicule was intended. While different authors have stated that "mutual laughter" can release feelings of shame by putting the shameful situation in perspective and find some irony in it (e.g., Retzinger, 1987), it is hypothesized from the current results that gelotophobes could not interpret these signals of mutual smiling and laughter as benevolent, as the effect of misjudgment is already apparent in context-free photos. Therefore, mutual laughter would not be perceived as relieving, as the underlying misperception is not solved (laughter is seen as a social rejection cue; see also Papousek et al., 2014). In this case, it would be necessary to train gelotophobes to re-evaluate laughter, its elicitors, and the underlying feeling state of the laughing person first.

Second, the findings help generate new hypotheses on the difficulties gelotophobes experience in social interactions. Misperceiving joy as contemptuous and responding with more contempt, in general, might lead to a feedback loop of misunderstanding, as not only the gelotophobe will misperceive the "offender" but also the "offender" will be signaled contempt on the behalf of the gelotophobe. This might leave both parties with perceived contempt of the other. Still, this might depend on relationship closeness too. Kashdan and Roberts (2006) showed that for highly socially anxious individuals, small talk interactions lead to greater NA compared with low socially anxious, whereas no difference was found for interactions in intimate relationships. This suggests that also for gelotophobes, intimacy might foster the mutual understanding of the partners and might help overcoming unusual responses.

Third, the present results lead to the hypothesis that gelotophobes apply specific expressions when dealing with joy and contempt, by generally showing more contempt and less joy. This is also interesting in the context of the findings of Fok et al. (2008), as they reported that extraverts lessen the control over expressing happiness, but increase the control over disgust, surprise, and contempt. They argued that in distant relationship, the display of emotions that communicate discomfort or disapproval with the current situation may be perceived as impolite. Also, extraverts think that it is more appropriate to express contempt and disgust in close relationships, because they are more competent in their ability to repair and maintain relationships (e.g., Watson, Clark, McIntyre, & Hamaker, 1992). Gelotophobes generally report being (neurotic) introverts; therefore, the findings for introversion might also apply to gelotophobic individuals. Gelotophobes may lack competences to repair and maintain relationships, but at the same time express contempt more often toward joy and contempt than individuals without gelotophobia. This is likely to lead to misunderstandings in social interactions.

For introverts, Fok and colleagues (2008) stated that they are less socially responsive and less likely to modulate their emotion expression (even when uncomfortable with the public attention). This may partially explain the higher number of expressed contempt in gelotophobes compared with individuals with no

fear. Still, in the present studies, participants were unobserved and the results cannot solely be explained by these findings (unless the participants imagined a relationship with the individuals shown in the photos). Furthermore, gelotophobes also report higher scores in neuroticism than individuals with no fear (see Ruch et al., 2014, for a review). Kashdan (2002) showed that individuals high in neuroticism are more socially anxious and hypothesized that they would express their emotions less often to avoid unwelcome attention of others. For gelotophobes, this may be specific to avoiding the laughter of others.

Fourth, it has been postulated that genuine displays of positive emotions and mimicry elicit positive responses in other people, thus encouraging social affiliation, improving the quality of interactions, and making social resources available for coping with adversity (Fredrickson, 1998; Johnston et al., 2010; Papa & Bonanno, 2008). Furthermore, positive expressions are used on an everyday basis, for example, when individuals respond with polite smiles to social partners, leading to advantages in cooperation and communication. If gelotophobes fail to mimic those expressions and empathize with their meaning, they will be likely to lose out on social reinforcement and cooperation, leading to less social affiliation and less social resources (as well as providing less of those resources to others). Consequently, the lack of social support might be a factor that makes gelotophobes even more vulnerable to misinterpreting people's behavior and situations, as they get less help in re-evaluating situations, talking about experiences, and thereby less getting external validation on their (mis-)perceptions. Furthermore, DDs influence well-being by fostering self-regulation and helping reduce the physiological and emotional consequences of NA (Fredrickson, 1998). This intrapersonal function of smiling will also receive less importance in gelotophobes as they generally display less joy facially.

The current study has several limitations. First and foremost, the stimuli utilized for the current investigation only included a small (and uneven) number of joy and contempt displays, as well as other smiles and posed expressions. The choice of displays was based on theoretical notions and their described putative facial expressions. Thus, the chosen displays were a good starting point to investigate individual differences in the perception of smiling and laughter, but further empirical validation of the smiles is needed. At best, an empirically validated classification of smiles and laughs would be used for such an investigation, but to date, no such classification is available. Also, the stimuli were not gender balanced. Thus, it was impossible to investigate effects of gender of the posing person and other variables (such as attractiveness of the poser) on the perception of the displays. Although we assume that gelotophobia biases the smiling and laughter perception independent of the gender and attractiveness of the poser, future studies might investigate possible influential poser features. Furthermore, the small number of stimuli did not allow for a complete randomization of the stimuli. This might be relevant, as it has been shown that gelotophobes show overreactions to fear-inducing stimuli (see Ruch et al., 2014), and it is possible that seeing a joyful face at the beginning of the series induced NA, which was carried over to the subsequent photos. Thus, a replication of the results with more stimuli and a complete randomization would be necessary.

Second, the "Smiling Face May Hide an Evil Mind Paradigm" needs to be more closely evaluated, as the emotion ratings do not allow for a judgment of the underlying feeling state of the presenter, as participants were explicitly asked to rate the facial displays. At best, the paradigm would be utilized with additional questions. Third, it is still unanswered whether gelotophobes misperceive joyful and contemptuous faces because of certain features of the displays. Therefore, features making smiles and laughs malicious need to be investigated by specifically asking participants what made the display contemptuous. Fourth, while the study by Ruch et al. (2009) focused on auditory presentation, this study has focused on visual presentation. Future studies should combine the two modes and investigate the differential effects of both, as well as their combination. Furthermore, physiological measures, that is, of tension could give further indications on the gelotophobes' responses to these displays. This might help shed light on the question why gelotophobes are prone to believing that "a joyful face may hide an evil mind."

To conclude, this is the first study investigating gelotophobia and emotions assigned to potential "offenders" displaying smiling and laughter. Although these results need further specification and replication, they might give an insight into why gelotophobes find dealing with smiling and laughter aversive (as they see them as rather contemptuous and less joyful compared with individuals with no fear). It is important to investigate and understand such mechanisms, as the expression of smiling and laughter serves important social functions beyond the communication of positive emotions. Also, the expression of contempt has an important prediction value in relationship processes (see Gottman, Levenson, & Woodin, 2001). If gelotophobes misperceive displays of joy and contempt, they may experience difficulties in social interactions and it needs to be assessed how this misperception can be addressed in training programs, maybe by applying cognitive reattribution strategies.

Acknowledgment

The authors would like to thank Fabian Gander and Tobias Wyss for helping with the data collection.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research and/or authorship of this article: The research leading to these results has received funding from a research grant from the Swiss National Science Foundation (SNSF; 100014_126967-1)

and the European Union Seventh Framework Program (FP7/2007-2013) under Grant Agreement No. 270780.

Notes

1. Based on the works of Bänninger-Huber (1996) and Ekman (1985), we utilized smile types with explicit descriptions of their putative facial expressions in Action Unit (AU) codes (in the Facial Action Coding System, FACS; Ekman, Friesen, & Hager, 2002). Joy smile, Duchenne display (DD): symmetric contraction of the zygomatic major muscle (AU12) and the outer part of the orbicularis oculi muscle (AU6). The DD has been related to the experience of joy, amusement, and the funniness of jokes (Ekman, Davidson, & Friesen, 1990; Messinger, Cassel, Acosta, Ambadar, & Cohn, 2008; Ruch, 2005). The Duchenne laugh consists of an open-mouth DD plus an audible, laughter-related vocalization (Ruch & Ekman, 2001). Contempt smile: unilateral action of the buccinator muscle (AU14; Ekman & Heider, 1988; Matsumoto, 2004). Although the universality of the contempt expression has been questioned (e.g., Russell, 1991; Wagner, 2000), there is a body of research suggesting that it is universally recognized (e.g., Keltner & Haidt, 1999), though not always correctly verbally labeled (see Rosenberg & Ekman, 1995). Phony smile: sole contraction of AU12 (Ekman, 1985). Masking smiles (actually a family of smiles): the combination of markers of negative emotions and AU12 (Ekman, 1985; Ekman & Friesen, 1982). Chaplin smile: sharp upward pulling of the lips due to the contraction of the caninus muscle (AU13).
2. Although comprehensive validations of smiling and laughter classifications are still outstanding, smiling and laughter types have been described according to their facial expression, offering a starting point to investigate the influence of gelotophobia on smiling and laughter perception.
3. AU1 = Inner Brow Raiser. AU2 = Outer Brow Raiser. AU4 = Brow Lowerer. AU5 = Upper Lid Raiser. AU6 = Cheek Raiser. AU7 = Lids Tight. AU9 = Nose Wrinkle. AU12 = Lip Corner Puller. AU14 = Dimpler. AU17 = Chin Raiser. AU20 = Lip Stretch. AU24 = Lip Presser. AU25 = Lips Part. AU26 = Jaw Drop. L, R = left, right side of the face.
4. Analyses of the distractor items indicated no differences between individuals with or without gelotophobia (all *ns*), or interaction between the Emotion ratings × Gelotophobia group, in line with our predictions (all *ns*). The surprise photo obtained highest ratings on surprise, which was rated more intense than all other emotions ($p < .001$). The happy–surprise emotion blend was rated most intensely as joyful and surprise, which did not differ from each other but from all other emotion ratings ($p < .001$). For the onset of fear, the ratings above the cut-off did not differ ($p = .055$). For the concentration, the highest ratings (anger, contempt) did not differ from each other but from all other emotions ($p < .001$). For the neutral photos, a repeated-measures ANOVA showed that the emotion ratings differed, $F_{emotion}(2, 148) = 30.08$, $p < .001$, $\eta_p^2 = .29$: Highest ratings were obtained in sadness (no fear group: $M = 2.63$, $SD = 1.55$; gelotophobes: $M = 2.63$, $SD = 1.56$), followed by contempt (no fear group: $M = 2.38$, $SD = 1.67$; gelotophobes: $M = 2.60$, $SD = 1.73$) and finally fear (no fear group: $M = 2.22$, $SD = 1.39$; gelotophobes: $M = 2.32$, $SD = 1.21$), $F_{contrasts}(1, 74) > 13.65$, $p < .001$, $\eta_p^2 > .16$. The groups (fear, no fear) did not differ, $F(1, 80) = 0.01$, $p = .914$, and no interaction occurred, $F(3, 240) = 0.21$, $p = .909$.
5. Repeating the analyses by controlling for positive affect (PA) and negative affect (NA) in a repeated-measures ANCOVA (gelotophobia group as a factor, the emotion ratings as repeated measures, intensity of emotion as a dependent variable, and PA and NA as covariates) showed that neither trait had a significant influence on the ratings ($p = .132$ and $p = .274$, respectively).
6. Too little masking smiles occurred for statistical analyses.

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