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On the dimensionality of humorous conduct and associations with humor traits and behaviors

Abstract: The aim of the present study is to explore higher-order dimensions of humorous conduct derived from 100 non-redundant and comprehensive statements. These dimensions are validated in self- and other-reports and their criterion validity is assessed by relating them to other humor concepts (temperamental basis of the sense of humor, attitudes towards laughter and being laughed at, humor appreciation and creation). Four broad dimensions (mean-spirited/earthy, entertaining, inept, and reflective/benign) were supported in self- and other-reports, and two narrower dimensions (laughter and canned) were found in self-reports. These dimensions covered affective, cognitive, and dysfunctional aspects of humorous conduct and spanned across humorous temperament, attitudes towards laughter and being laughed at as well as humor appreciation and creation. These six dimensions can serve as a reference framework and higher-order categories to which humor scales could be assigned. Future studies need to test the comprehensiveness of these dimensions and conduct further validation studies.

Keywords: humorous conduct, factor analysis, dimensions, individual differences, HBQD

1 Introduction

A personality approach to humor refers to individual differences in characteristic patterns of thinking, feeling, wanting, and behaving with respect

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to humor. The study of a humorous personality focuses on two areas: (1) identifying and understanding individual differences, in particular humor-related personality characteristics, such as laughing at oneself or humor production; and (2) understanding how the various parts of a person come together as a whole; that is, identifying a persons' humor profile. Some researchers use the term "sense of humor" to refer to this profile, but others maintain that this expression should be reserved for a subset of humor traits (for a discussion, see Ruch 2007). Since its beginning, psychological humor research has put forward a plethora of individual characteristics or humor traits, and occasionally these were related to each other in an attempt to build a more complete model (e.g., Köhler and Ruch 1996). Such attempts will always remain preliminary unless a comprehensive list of humor-related personality characteristics is developed as well as a framework that integrates them into a holistic model. Humor research has not yet proposed such a model, which could be used to locate all proposed humor traits. The present study adds to this endeavor by investigating higher-order dimensions derived from a comprehensive list of humorous conduct and by locating other humor constructs in these dimensions.

In the past 40 years, many proposals for important humor traits and a few comprehensive approaches have been put forward (for overviews, see Martin and Ford 2018; Ruch 2008). These approaches, by individual researchers or research teams, were then used to investigate relationships with other variables, such as personality traits, or health and well-being. However, as personality and intelligence research have shown, it takes more effort to arrive at a comprehensive sustainable model, which transcends individual researchers' periods of activity. One crucial issue in arriving at such a model is to start with a comprehensive list of indicators. While personality research primarily relied on the lexicon to extract such a list of trait terms, the most comprehensive approach to everyday humorous conduct (Craik et al. 1993, 1996) started with non-redundant descriptive statements derived from various sources, such as everyday observations as well as humor theories. The main aim of the present study is to support and extend the approach of Craik et al. (1996) by exploring higher-order dimensions of humorous conduct derived from those 100 descriptive statements and to validate these dimensions in self- and other-reports. Furthermore, a first test of the exhaustiveness of the derived framework is conducted by examining whether preceding humor concepts could be located in the model as well (i.e., temperamental basis of the sense of humor, attitudes towards ridicule and being laughed at, humor creation and appreciation).

1.1 Styles of everyday humorous conduct

Craik et al. (1996) distinguish between humor experience and the sense of humor as a psychological construct. They argue that the sense of humor as a psychological construct refers less to the ability to experience humor but rather to the existence of specific qualities in a person's everyday humorous conduct. Everyday humorous conduct may be neutral or positively or negatively valued and might be aggregated to styles of everyday conduct. The authors argue that the sense of humor will refer only to the very specific subset of positively valued humorous conduct. By contrast, the main aim of research should be to arrive at a comprehensive approach comprising all forms of humorous conduct, independent of their valence.

Within their approach, Craik et al. (1996) gathered 100 non-redundant statements, which they derived from both theoretical and empirical literature on the psychology of humor while adopting an act-frequency perspective. They devised the *Humorous Behavior Q-sort Deck* (HBQD), which ranks the statements into nine categories (*very uncharacteristic* to *very characteristic*) according to a pre-specified normal distribution. The authors were also interested in providing a comprehensive portrait of a person's style of humor by aggregating the individual statements. This was achieved by a principal component analysis of the statements, which yielded five slightly correlated (*Mdn r* = 0.14) bipolar factors that were described as follows (based on Craik et al. 1996: 281–282): (1) *socially warm v. cold humorous styles* (socially constructive v. asocial and socially distant displays of humor), (2) *reflective v. boorish humorous styles* (recognizing humor v. being competitive and rude in humor) (3) *competent v. inept humorous styles* (ability v. inability for wit and joke-telling), (4) *earthy v. repressed humorous styles* (enjoying v. inhibition toward jokes about taboo topics)*, and* (5) *benign v. mean-spirited humorous styles* (enjoying harmless but mentally stimulating humor v. laughing at and making fun of others).

The number of factors in the HBDQ is not entirely clear. Craik et al. (1996) acknowledged that solutions of four or six factors might also be feasible, although the five factors were considered to be more conceptually coherent. To our knowledge only Müller and Ruch (2011) replicated the bipolarity of the five styles with the exception of mean-spirited humor, which was more highly correlated with earthy v. repressed humor than with benign humor.

The next important question is whether the derived dimensions may serve as a frame of reference for all humor traits; that is, could they provide a framework for identifying a persons' humor profile comprehensively? In the study by Craik et al. (1996), a set of self-ratings representing an overall sense of humor index correlated with only two of the factors derived from the behavioral domain of

everyday humorous conduct, namely socially warm and competent styles, and it was orthogonal to the other three factors. Later studies used questionnaires to integrate the HBQD with other conceptualizations of humor (e.g., Müller and Ruch 2011; Ruch et al. 2011). Different measures of the sense of humor correlated rather consistently with both the socially warm (large effect) and competent styles (medium effects). When multidimensional measures of humor were used, also the other three bipolar HBQD factors showed some validity; for example, the reflective v. boorish style correlated positively with finding humor in everyday life and negatively with enjoying humor stimuli, and aggressive humor correlated with the mean-spirited style (for more details, see Müller and Ruch 2011; Ruch et al. 2011).

The 100 statements are also used in the HBQ-Rating Form (HBQ-RF), which is an adapted version that is scored normatively instead of ipsatively; that is, participants freely respond to each statement on a Likert-like scale and do not rank and weigh the statements against another. One may expect that the different scoring will affect the factor structure, as the ipsative answer format forces the same mean scores across people. Ipsative scoring facilitates the emergence of bipolar factors and hence it is important to investigate the factor structure of the HBQ-RF.

As a first inquiry, Kirsh and Kuiper (2003) investigated a version of the HBQ-RF that employed the 60 statements that had the highest loadings on the five bipolar factors. They found seven unipolar factors: (1) *Socially warm/ general sense of humor* (being confident to generate humor spontaneously and effortlessly in social situations), (2) *boorish humor* (showing vulgar and grotesque content that is usually less accepted in social situations), (3) *inept humor* (having difficulties to communicate humor and laughing indiscriminately at humorous remarks), (4) *deliberate humor* (gaining approval from others by humorous remarks), (5) *intellectual humor* (enjoying challenging humor like witticisms and puns), (6) *mean-spirited humor* (generating humor at the expense of others), and (7) s*ocially compensatory humor* (being sarcastic and poking fun at others). This study suggests that the bipolarity of the factors depends on the ipsative format and that not all 10 styles can be replicated reliably. However, the lack of additional information on these factors (e.g., explained variance) makes this factor solution difficult to interpret. Therefore, the main aim of the present study is to evaluate the factor structure of the 100 statements in the HBQ-RF. This version is more compatible with other humor instruments, which are also normatively scored, and hence might provide a better frame of reference for mapping humor scales.

1.2 The present study

For the present study we chose four approaches that entail basic and broad concepts related to humor and laughter, including those that assess self-descriptions of traits (i.e., one's typical humor- and laughter-related conduct) as well as behavior tests (i.e., reactions to humorous stimuli). One approach is the state-trait model of cheerfulness, which consists of the components cheerfulness, seriousness and bad mood, and which forms the temperamental basis of the sense of humor (Ruch et al. 1996). We expect that all factors derived from the HBQ-RF that reflect playfulness, good mood, and humor competence correlate positively with cheerfulness and negatively with seriousness and bad mood, while the opposite pattern of correlations is expected for factors reflecting humorlessness or humor ineptness.

Further relevant concepts are *gelotophobia*, the fear of being laughed at, *gelotophilia*, the joy of being laughed at, and *katagelasticism*, the joy of laughing at others (Ruch and Proyer 2008, Ruch and Proyer 2009). These concepts were chosen because they bridge the gap between humor and laughter and because they include a concept that represents a form of humorlessness, namely gelotophobia (for a recent model, see Ruch et al. 2014). Gelotophobia is expected to relate to the factor comprising inept humor.

Finally, these two approaches to humor- and laughter-related traits are supplemented by behavior tests of humor appreciation and creation. In these tests, participants are usually presented with different humorous stimuli (such as jokes and cartoons). For humor appreciation, they are asked to rate how funny and aversive they find these stimuli (reflecting their degree of humor appreciation). For humor creation, they are usually asked to create punch lines to caption-removed cartoons or pictures. There are conceptual overlaps between both humor creation and humor appreciation with the list of 100 statements of everyday humorous conduct (e.g., "displays a quick wit and ready repartee", "fails to see the point of jokes," "is more responsive to spontaneous humor than to jokes"), so these specialized tests should be related to some of the derived factors. Behavior tests and self-reports were found to exhibit only moderate overlap (see Köhler and Ruch 1996) and thus the relationships of the higher-order dimensions of humorous conduct with humor appreciation and creation are expected to be small. As a first test of the comprehensiveness of the higher-order dimensions derived from the HBQ-RF, we relate them to other humor constructs. Furthermore, we locate the sense of humor index (as introduced by Craik et al. 1996) in the higher-order dimensions to see where a narrower conception of the sense of humor (as positively valued humorous conduct) would fit in.

2 Method

2.1 Participants[1]

2.1.1 Self-reports

Overall, $N = 434$ participants provided valid responses in the study; participants were excluded if (a) they did not complete the HBQ-RF ($n = 105$), (b) if they indicated an age < 18 years ($n = 6$), and (c) if they indicated that German was not their native language ($n = 28$). The average age of the participants was 34.32 years ($SD = 13.74$, range 18–74 years), and 63.6% were women. The sample was highly educated: 23.9% held a degree from a university or a college of higher education, 35.3% finished high school, and 37.6% finished an apprenticeship. Participants were either Swiss (94.2%) or German (5.8%).

2.1.2 Other-reports

Each participant was asked to invite a friend/family member to complete the other-report. The other-reports consisted of $N = 144$ participants ($n = 2$ were excluded because they indicated an age < 18 years). Their average age was 36.09 years ($SD = 14.98$, range 18–81 years), and 59.7% were women. About one third were close friends (34.0%), spouses/romantic partners (33.3% each), or other close family members (31.3%). The observers indicated that they knew the target person on average for 18.62 years ($SD = 12.50$; range 1.00–54.20 years).

2.2 Measures

The *Humorous Behavior Q-Rating Form* (HBQ-RF; Craik et al. 1996; Ruch et al. 2009) is a 100-item questionnaire for the measurement of humorous conduct. It utilizes a seven-point scale from 1 *least characteristic* to 7 *most characteristic*. Besides the 10 unipolar styles or 5 bipolar styles that can be derived, a sense of humor index can be computed by averaging two items ("looks like someone with a strong sense of humor", "relative to other traits, displays a noteworthy sense of humor").

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1 Parts of the sample overlap with those reported in Müller (2016), Ruch (2012a), and Ruch and Heintz (2016). Preliminary results of the present data were presented in Müller (2016) and Ruch (2012a).

The short version of the *State-Trait-Cheerfulness Inventory* (STCI-T <30>; Ruch et al. 1996) is a 30-item questionnaire with a four-point response scale from 1 *strongly disagre*e to 4 *strongly agree* for assessing the temperamental basis of humor. It measures the traits cheerfulness (Cronbach's alpha = 0.88), seriousness (α = 0.74), and bad mood (α = 0.91).

The *PhoPhiKat-30* (Ruch and Proyer 2009) is a 30-item questionnaire utilizing a four-point response scale from 1 *strongly disagree* to 4 *strongly agree* for assessing the degree of gelotophobia (α = 0.80), gelotophilia (α = 0.81), and katagelasticism (α = 0.83).

The adapted short version of the *3 Witz Dimensionen Test* (3 WD; Ruch 1992) assesses the appreciation of nine jokes and cartoons of the three humor categories incongruity-resolution (INC-RES), nonsense (NON), and sexual (SEX) humor. They are rated for funniness (α = 0.71) and aversiveness (α = 0.77) using two seven-point scales from 0 *not funny/aversive* to 6 *very funny/aversive*.

An adapted short version of the *Cartoon Punchline Production Test* (CPPT-K; Köhler and Ruch 1993; Ruch and Heintz 2019) with four cartoons was employed. The CPPT-K assesses the quantity and quality of verbal humor creation and covers the three humor categories INC-RES, NON, and SEX. The participants created as many punch lines as possible (without time limit). Participants could skip a cartoon if nothing came to their mind. The *total number of punch lines* (NP) created forms the CPPT NP score (quantity of humor creation). The CPPT was also scored for the quality of humor creation. These ratings were provided by a group of 32 adults, and each punch line was rated independently by four raters (three females and one male, including two university students and two adults without an academic background). For each participant, they first selected the best punch line for each cartoon and rated its wittiness on a 10-point response scale from 1 *not at all witty* to 10 *extremely witty*, and its originality on a 10-point response scale from 1 *not inventive at all* to 10 *extremely inventive*. As the wittiness and originality scores correlated highly (0.91) with each other, they were combined to form the overall quality score of humor creation (CPPT quality), for which the intra-class correlation (as an index of inter-rater agreement) was 0.54.

2.3 Procedure

Participants completed all instruments in an online study. They were recruited via newspaper reports and flyers. After completing the self-reports, participants were asked to recruit a close other to complete the other-reports online. Self- and other-reports were matched by an anonymous individual code. Participants

could receive a feedback on their results and they were included in a voucher raffle. The study was conducted in line with the local ethical guidelines.

2.4 Analyses

A principal component and a hierarchical factor analysis (Goldberg 2006) were employed to derive the higher-order dimensions of the HBQ-RF. Exploratory rather than confirmatory factor-analytic approaches were chosen as the number of factors as well as the assignment of items to these factors could not be determined a priori due to the differences in the scoring format and the number of items in previous studies. In the principal component analysis, the scree test, parallel analysis, the minimum average partial test, the convergence of self- and other-report factors, and factor interpretability were used as criteria for factor extraction. In the hierarchical factor analysis, the analysis starts from the top by extracting the first unrotated principal component (FUPC), then two components (which are rotated orthogonally), then three, and so forth. The factor scores extracted at each level are correlated with the factor scores of the next level to determine which factors remain stable across the different steps in the hierarchy and which ones change (e.g., by splitting into two smaller components). Overlaps of the component scores of the resulting humor dimensions with the other humor- and laughter-related constructs were assessed with Pearson correlations (or, if normal distribution was violated, Spearman's rank correlations).

3 Results

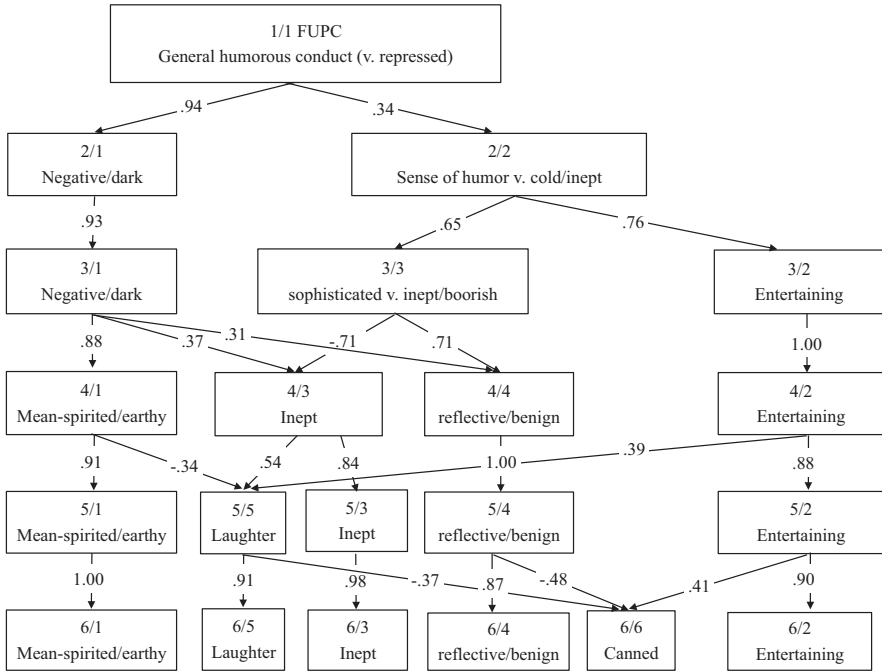## 3.1 Analysis of the factor structure of the HBQ-RF

Several analyses (although with imperfectly matching results) suggested that there are six components to retain, with four larger and two smaller ones. A principal component analysis of the 100 statements was conducted (the first ten eigenvalues were 13.14, 9.17, 4.81, 3.58, 3.00, 2.50, 1.99, 1.89, 1.80, and 1.70), and the scree test suggested retaining six factors, while the parallel analysis and the minimum average partial test suggested retaining 9 factors. Ten factors were also initially extracted from the other-report data (eigenvalues 12.86, 8.72, 5.12, 4.19, 3.25, 3.08, 2.75, 2.52, 2.18, and 2.07). The FUPC in the other-reports correlated highly with the FUPC from the self-reports ($r = 0.58$). There was also a clear correspondence for the next five factors (i.e., the off-diagonal correlations were

close to zero) with three large correlations (0.47, 0.60, 0.42), and two medium-sized correlations (0.30, 0.33). From the seventh unrotated factor onwards, the factors in the two sets were not corresponding to each other and yielded low correlations (0.10–0.23).

We thus extracted six factors from the self- and other-reports (explaining 36.2% and 37.2% of the variance, respectively) and subjected them to a Varimax rotation. This low amount of explained variance is to be expected, as the 100 statements were designed to be non-redundant and thus to share relatively little common variance. Tucker's phi (see Lorenzo-Seva and Ten Berge 2006) was computed to compare the two rotated loading matrices. Factor 1 was essentially equivalent ($\varphi = 0.95$), and Factors 2 ($\varphi = 0.86$) and 4 ($\varphi = 0.92$) were fairly similar (i.e., convergence of ≥ 0.85). The convergence was lower for Factors 3 ($\varphi = 0.61$), 5 ($\varphi = 0.64$), and 6 ($\varphi = 0.51$). Next, the factor scores from both six-factor solutions were correlated with one another. The convergent correlations were 0.68, 0.55, 0.41, 0.39, 0.41, and 0.23 for Factors 1–6, respectively (all ps < 0.001), and they were always higher than the discriminant correlations to the other factors (except for Factors 5 and 6). Overall, Factors 1, 2, 4, and, to some extent, Factor 3 could be well replicated in the other-reports, while Factors 5 and 6 were less supported by the other-reports.

The hierarchical structure of one- to nine-factor solutions was investigated in a hierarchical factor analysis of the self-reports (Goldberg 2006). The analysis showed that the factor loadings on Factors 7 to 9 were constituted by only a few items, suggesting that they rather represent "bloated specifics" (see Cattell 1973). In agreement with the criteria proposed by Goldberg the number of factors was finally set to six. The resulting hierarchical structure as well as marker items loading higher than > |0.30| are displayed in Figure 1. Additionally, the six factors were related to the 10 HBQ-RF styles (average scores across items) to see which mixture of the 10 styles defined the newly derived factors (see Table 1).

Twenty-three items loaded highest on Factor 6/1 (9% explained variance; 2 negative loadings). This factor was primarily based on items from the earthy (e.g., "Makes jokes about the macabre and the grotesque") and mean-spirited styles (e.g., "Jokes about other's imperfections"), as also evidenced by the high average loadings of the items of these styles (.52, and 0.42, respectively). Based on these items one can say that the high scorer transgresses boundaries by mocking (needling, laughing at, poking fun, joking and being sarcastic about) others, and by disrespecting conventions by indulging in "bad taste" (bawdy, bathroom, coarse, vulgar, macabre, and grotesque) humor. In doing so, the high scorer disregards the feelings of the target and of the surrounding audience. Thus, this factor was labeled *mean-spirited/earthy*.

Figure 1: Hierarchical display of the emergence of the first six Varimax-rotated principal components derived from the self-rated items of the HBQ-Rating Form. Correlations between the factors of adjacent levels are shown for correlations > |0.30|. Additionally, the marker items (loadings > |0.30|) for each factor of the four and six-factor solution are listed, sorted from highest to lowest (item numbers correspond to Craik et al. 1996). FUPC = first unrotated principal component.

Twenty-three items loaded highest on Factor 6/2 (8% explained variance; 2 negative loadings). High loadings on this factor came primarily from the socially warm (e.g., "Maintains group morale through humor"), competent (e.g., "Has the ability to tell long complex anecdotes successfully"), and boorish styles (e.g., "Has a reputation as a practical joker"), as also shown in the high average loadings of 0.48, 0.43, and 0.33, respectively. The high scorer is a skilled

Table 1: Mean factor loadings of the items of the 10 HBQ-RF styles on the factors of all solutions (from first unrotated principal component, FUPC, to the final six factors).

Factors	Warm	Cold	Reflective	Boorish	Competent	Inept	Earthy	Repressed	Benign	Mean-spirited
6/1 Mean-spirited/earthy	0.03	0.14	0.12	0.17	0.23	0.12	0.54	-0.12	0.04	0.42
6/2 Entertaining	0.48	-0.19	0.11	0.33	0.43	0.00	0.14	-0.07	0.16	0.15
6/3 Inept	-0.09	0.37	0.00	0.19	-0.06	0.44	0.13	0.27	-0.04	0.26
6/4 Reflective/benign	0.13	0.03	0.36	0.07	0.15	-0.09	0.06	0.06	0.37	0.06
6/5 Laughter	0.19	-0.09	0.01	0.13	-0.08	0.27	0.11	0.04	0.00	-0.04
6/6 Canned	-0.01	0.05	-0.17	0.20	-0.02	0.00	0.05	-0.10	0.16	-0.09
5/1 Mean-spirited/earthy	0.05	0.14	0.11	0.19	0.26	0.13	0.55	-0.12	0.02	0.44
5/2 Entertaining	0.44	-0.12	0.06	0.41	0.36	0.07	0.15	-0.06	0.24	0.11
5/3 Inept	-0.16	0.40	-0.03	0.15	-0.14	0.43	0.11	0.27	-0.05	0.22
5/4 Reflective/benign	0.17	0.01	0.41	0.02	0.20	-0.06	0.07	0.10	0.27	0.14
5/5 Laughter	0.19	-0.11	0.01	0.07	-0.06	0.27	0.09	0.07	-0.11	0.01
4/1 Mean-spirited/earthy	0.02	0.22	0.09	0.24	0.29	0.12	0.52	-0.09	0.09	0.45
4/2 Entertaining	0.51	-0.25	0.08	0.35	0.35	0.05	0.16	-0.10	0.18	0.06
4/3 Inept	-0.02	0.27	0.00	0.17	-0.13	0.51	0.15	0.26	-0.08	0.20
4/4 Reflective/benign	0.15	0.00	0.41	0.00	0.19	-0.07	0.07	0.09	0.26	0.14
3/1 Negative/dark	0.03	0.31	0.20	0.26	0.24	0.27	0.52	0.05	0.12	0.51
3/2 Entertaining	0.51	-0.24	0.08	0.37	0.36	0.07	0.19	-0.09	0.18	0.09
3/3 Soph. v. inept/boorish	0.14	-0.19	0.30	-0.11	0.25	-0.40	-0.03	-0.13	0.25	-0.02
2/1 Negative/dark	0.15	0.26	0.15	0.37	0.27	0.36	0.55	0.05	0.11	0.50
2/2 SoH v. cold/inept	0.48	-0.32	0.24	0.19	0.41	-0.23	0.08	-0.16	0.29	0.01
1/1 FUPC	0.30	0.13	0.22	0.41	0.40	0.26	0.54	-0.01	0.20	0.48

Notes. $N = 320$. HBQ-RF = HBQ-Rating Form, SoH = sense of humor, Soph. = sophisticated.

entertainer (doing comic impersonations, using dialect and animated facial expressions, varying intonation in speech, playing the clown), resourceful (ability to do clever retorts and long complex anecdotes, displaying quick wit and ready repartee, good timing) and keen to be seen as funny (imitating professional comedians, being competitively humorous, wanting to impress others, being a practical joker). Thus, this factor was labeled *entertaining*.

Twenty-two items loaded highest on Factor 6/3 (7% explained variance; no negative loadings). High loadings on this factor came primarily from the inept (e.g., "Habitually covers anxiety with a nervous snicker") and socially cold styles (e.g., "Only with difficulty can laugh at personal failings"), but there were also contributions from the repressed ("Chuckles appreciatively to flatter others") and mean-spirited styles (e.g., "Becomes humorous when uncomfortable or ill at ease"). This was also supported by mean item loadings of 0.44, 0.37, 0.27, and 0.26, respectively. Based on the items the high scorer is not able to laugh at own shortcomings and misreads the humor of others, displays smiling and laughter inappropriately, is not humorous in a larger group, and initiates humor and wit in a wrong way. Thus, this factor was labeled *inept*.

Fifteen items loaded highest on Factor 6/4 (5% explained variance; no negative loadings). This factor combined the benign (e.g., "Finds intellectual word play enjoyable") and reflective styles (e.g., "Uses humor to express the contradictory aspects of everyday events"), which is emphasized by the high average loadings of 0.37 and 0.36, respectively, and no other style loaded substantially. Thus, the high scorer perceives the incongruities of daily life in a humorous manner (based on observed or experienced situations, events, and interactions with humans and animals) and enjoys the humor encountered in various forms that are intellectually challenging (limericks, nonsense rhymes, witticisms, puns, wordplays, humorous behavior of others). Thus, this factor was labeled *reflective/benign*.

The last two factors were not representations of one or more of the 10 original humor styles but nevertheless drew upon them. Twelve items loaded highest on Factor 6/5 (4% explained variance; 4 negative loadings), and 8 of these items also had substantial (> |0.30|) second loadings on Factors 1–4. This factor captured the laughter-related aspects of the HBQD as found in the inept (e.g., "Laughs at the slightest provocation") and socially warm styles (e.g., "Laughs heartily, from head to heel, not just with face and diaphragm"). A high scorer on this factor has a low threshold for laughter and laughs intensely. He or she has an infectious laugh, displays hearty laughter, also using gestures, laughs before jokes are finished, and cannot suppress laughter. Thus, this factor was labeled *laughter*.

Six items loaded highest on Factor 6/6 (3% explained variance; 2 negative loadings), and three of these items also had substantial (> |0.30|) second loadings on Factors 1–4. It mostly captured contents related to jokes v. spontaneous humor from the boorish and benign styles (e.g., "Enjoys exchanging topical jokes and keeps up to date on them") and (negatively) from the reflective style (e.g., "Recounts familiar, stale jokes"). The high scorer enjoys routines of standup comedians, imitating others, humor reflecting cultural/regional origin, is more responsive to jokes than to spontaneous humor, and prefers telling jokes rather than comic episodes from real life. Thus, this factor was labeled *canned*.

Figure 1 and Table 1 show that the composition of the factors changed strongly between levels 1 and 4, but thereafter the factors got purer (i.e., passed on items to the new factors) and only smaller factors emerged. Looking at the hierarchical emergence of the six factors yields a few additional insights. The FUPC was loaded by items from all styles except from the repressed style but most strongly so by the earthy/mean-spirited styles (see Table 1). At the second level, the FUPC split up and two factors of negative/dark (loaded by items of the negative styles, primarily by earthy and mean-spirited but also inept and boorish) and sense of humor v. socially cold/inept humor (loaded by items of all positive styles, most highly by socially warm, reflective, benign, and competent) were distinguished. At the third level, the sense of humor split up into sophisticated v. inept/boorish (loaded by items of the reflective, inept, and benign styles) and entertainment (loaded by items from the socially warm, competent and boorish styles), and this factor mostly retained its meaning further on. At the fourth level, the sophisticated v. inept/boorish factor split up into inept (with contributions from cold and repressed) and reflective/benign, and both factors also received positive loadings from the negative/dark factor, which remained stable after this level. At the fifth level, laughter (Factor 5) split from inept to form a small factor that remained stable at the sixth level. Canned humor (Factor 6) emerged at last level, derived from low reflective/benign humor, entertaining humor, and laughter.

3.2 The six dimensions of humorous conduct as a frame of reference for other humor concepts

First, the sense of humor index computed similarly to Craik et al. (1996) was related to the different factor solutions. None of the six factors was labeled sense of humor but this label was assigned to a factor at a more general level. The FUPC, as a factor involving all styles, was clearly not a sense of humor factor ($r = 0.32$) as the positive elements only entered at level 2. While the two items

literally referring to sense of humor ("looks like someone with a strong sense of humor", "relative to other traits, displays a noteworthy sense of humor") were an essential part of Factor 2 at any level, there was evidence that the sense of humor was most closely related to Factor 2/2. This factor correlated most highly with the sense of humor index ($r = 0.69$), and it also contained most of the other items that related to the overall sense of humor items (e.g., "maintains group morale through humor") in the study by Craik et al. (1996). At the further levels, the loadings split up for Factor 3/2 ($r = 0.57$) and Factor 3/3 ($r = 0.40$). Beginning with level 4, sense of humor related to entertaining ($r = 0.58$), low inept ($r = -0.20$), and reflective/benign ($r = 0.34$). There were very small correlations with laughter ($rs = 0.16$ and 0.13) and canned ($r = -0.13$), but the correlation with mean-spirited/earthy tended to be zero at all levels ($rs = 0.02–0.09$). The results suggest that we should keep mockery/ridicule separate from the sense of humor and the elements into which it decomposes at progressive levels (see also Ruch 2012a; Ruch et al. 2018).

Table 2 shows the correlations between the six dimensions of humorous conduct (factor scores) and the measures of humor traits and behaviors. Each of

Table 2: *Correlations Between the Six Higher-Order Dimensions of Humorous Conduct and the Humor Measures.*

Humor measures	F6/1	F6/2	F6/3	F6/4	F6/5	F6/6
STCI-T <30>						
Cheerfulness	−0.16*	0.44***	−0.38***	0.08	0.39***	−0.10
Seriousness	−0.29***	−0.13*	0.16**	0.07	−0.21***	0.09
Bad Mood	0.16**	−0.27***	0.42***	−0.02	−0.20***	0.05
PhoPhiKat						
Gelotophobia	0.03	−0.25***	0.58***	−0.10	−0.06	0.08
Gelotophilia	0.27***	0.50***	−0.08	0.08	0.10	−0.13*
Katagelasticism	0.66***	0.16**	0.14*	0.01	0.00	0.01
3 WD						
Funniness	0.01	0.08	0.04	0.11	0.20**	0.24***
Aversiveness	−0.22***	0.10	0.17**	−0.02	−0.12	0.01
CPPT-K						
NP	−0.03	0.04	0.03	0.19**	−0.01	0.00
Quality	0.06	0.06	−0.05	0.15*	−0.05	−0.11*

Notes. $N = 206–320$. STCI-T <30> = Short version of the State Trait Cheerfulness Inventory Trait version, 3 WD = adapted 3 Witz Dimensionen Test, CPPT-K = adapted Cartoon Punch line Production Test, NP = number of punch lines, F6/1 = mean-spirited/earthy, F6/2 = entertaining, F6/3 = inept, F6/4 = reflective/benign, F6/5 = laughter, F6/6 = canned.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

the six dimensions had unique relationships with the other humor measures. Factor 6/1 (mean-spirited/earthy) was most strongly related to katagelasticism, followed by lower seriousness, gelotophilia, lower aversiveness of humor stimuli, bad mood, and lower cheerfulness. Thus, higher scores in this factor related primarily to a preference for laughing at others, but also for enjoying being laughed at and for being less offended and serious. Factor 6/2 (entertaining) was most strongly related to gelotophilia, cheerfulness, lower bad mood, lower gelotophobia, katagelasticism and lower seriousness. Thus, higher scores in this factor primarily went along with a temperamental disposition to appreciate and express humor and with making fun of oneself. Factor 6/3 (inept) correlated with gelotophobia, bad mood, lower cheerfulness, aversiveness of humor stimuli, seriousness, and katagelasticism. Thus, higher scores in this factor related to humorlessness both in terms of the fear of being laughed at and the temperamental basis of the sense of humor. Factor 6/4 (reflective/ benign) was unrelated to self-reports of humor and only showed positive relationships with the quantity and quality of humor creation. Thus, higher scores in this factor related to creating more and funnier punch lines in the CPPT-K.

Regarding the two smaller factors, Factor 6/5 (laughter) related to cheerfulness, funniness of humor stimuli, lower seriousness, and lower bad mood. While this factor shared the disposition to experience and express humor with Factor 6/2 (entertaining), higher scores additionally indicated the enjoyment of jokes and cartoons. Finally, Factor 6/6 (canned) related to the funniness of humor stimuli, lower gelotophilia, and lower quality of humor creation. Thus, higher scores on this factor related to finding canned humor funnier, but being less apt to laugh at oneself and to create funny punch lines on the spot.

4 Discussion

The prime objective of the present study was to explore higher-order dimensions of humorous conduct derived from 100 non-redundant and comprehensive statements in both self- and other-reports in order to set the foundations for a more complete humor model. A secondary aim was to use these dimensions as a frame of reference for other humor concepts. Based on principal component and hierarchical factor analyses, a six-factor solution consisting of four broad (mean-spirited/earthy, entertaining, inept, and reflective/benign) and two narrow factors (laughter and canned) was extracted. All factors were unipolar (except for inverted item content), which is in line with previous findings (Kirsh and Kuiper 2003; Müller and Ruch 2011).

Factor 6/1 merged the HBQD styles of earthy and mean-spirited, with some contributions from the competent style (having wit and salty humor). It covered different elements such as engaging in disparaging, macabre, and off-color humor targeted against others. The mean-spirited part of this factor resembles classical theories of humor, namely disparaging and superiority theories. Specifically, "disparagement humor refers to remarks that (are intended to) elicit amusement through the denigration, derogation, or belittlement of a given target" (Ferguson and Ford 2008: 283). We did not call this factor disparagement humor because of the earthy (taboo) part, which is an essential part of Factor 1. Other conceptualizations of individual differences in humor include similar constructs, such as aggressive humor (Martin et al. 2003) as well as sarcasm and cynicism (Ruch et al. 2018). These constructs were found to overlap with the mean-spirited and earthy styles (Ruch and Heintz 2016) and can thus be subsumed under this higher-order dimension of humorous conduct. Also, katagelasticism (the joy of laughing at others) was compatible with the mean-spirited/earthy dimension. This dimension resembles the mean-spirited and socially compensatory humor factor found by Kirsh and Kuiper (2003).

Factor 6/2 merged the original HBQD styles of socially warm, competent, but also boorish. A high scorer on this factor is apt at entertaining others with jokes, imitations, funny stories, and practical jokes, enjoys playing the clown, and effectively uses voice and gestures to support the humorous effect. This factor is mostly comparable to the socially warm/general sense of humor factor in the study of Kirsh and Kuiper (2003). The entertainment factor is narrower than the sense of humor (although the two items literally referring to sense of humor load on it), as the reflective and competent parts are missing.

Other conceptualizations of individual differences in humor include similar constructs, such as affiliative humor (Martin et al. 2003) and fun/good humor (Ruch et al. 2018). These were found to overlap with the socially warm and competent HBQD styles (Ruch and Heintz 2016) and can thus be subsumed under this higher-order dimensions of humorous conduct. Older factor analyses (Köhler and Ruch 1996) also produced such a factor. Trait cheerfulness was strongly related to entertaining humor since it resembles two of the five facets of cheerfulness (i.e., a generally cheerful interaction style and a low threshold for smiling and laughter). McGhee's (2010) conceptualization of the sense of humor might be related to this factor, but probably more strongly so with the level-2 factor of sense of humor.

We hypothesize that humor as a worldview that allows seeing the mishaps and adversities of daily life and smiling about them might involve lower levels of Factor 6/3 (not getting upset or overwhelmed by negative emotions) as well as higher levels of Factor 6/2 (maintaining a good mood and being able to laugh at

oneself) and Factor 6/4 (detecting the incongruities in one's life and treating them benevolently). Thus, a narrow conceptualization of the sense of humor might be located in three factors at the lower level or one factor at level 2, which was consequently labeled sense of humor v. cold/inept. In line with this notion, the sense of humor index related most strongly to the factor at level 2 in which these concepts were still combined. At higher levels, the largest correlation with this index was found with the entertaining factor. However, we hypothesize that the classical, philosophical approach to the sense of humor, which focuses on a humorous worldview and serenity rather than on being funny, would be more strongly related to Factor 6/4 than to Factor 6/2.

Factor 6/3 merged the original HBQD styles of inept (in reacting to humor or initiating it) and socially cold, and had some items from repressed and mean-spirited. A high scorer on this factor is uncomfortable with humor in social settings, shows indiscriminate laughter, has a need to be funny, and covers uncertainty with humor. Thus, inept describes an inappropriate and dysfunctional way of using humor, which fits to the strong correlation found with gelotophobia, but also transcends it. This factor resembles the inept humor dimension found by Kirsh and Kuiper (2003) and corroborates the notion that low humor competence should also be considered in a model capturing humorous conduct. Though one might infer that a person high in this style lacks humor in general, this is not necessarily the case because the person might make an effort to appear funny but might fail in this attempt. This interpretation is supported by the lack of significant negative correlations with humor creation performance; in other words, the self-reports of lower humor ability were not substantiated by an actual humor performance measure.

Factor 6/4 (reflective/benign) combined the original reflective and benign styles of the HBQD. A high scorer on this factor likes puns and intellectual joke work, creates humor spontaneously, has a humorous world-view, and expresses contradictory aspects of life by means of humor. This was the only humor dimension that showed positive relationships with the quantity and quality of humor creation, indicating that high scorers created more and better punch lines. Presumably, a playful frame of mind together with humor ability enabled the spontaneous creation of punch lines.

Previous studies (Köhler and Ruch 1996) suggested that performance tests of humor might probably form their own category besides self-report questionnaires. However, reflective/benign was usually not entailed in humor questionnaires, which might explain why the previously found overlaps were small and inconsistent. More recently, the ability-related construct wit was included in questionnaires, and relationships to verbal ability (Ruch et al., 2018) and humor creation performance (Heintz 2019) could be substantiated. Also,

McGhee (2010) described humor in everyday life and verbal humor as two trainable humor habits, which are part of his conceptualization of the sense of humor. Furthermore, intellectual humor was one of Kirsh and Kuiper's (2003) dimensions and can be considered as a part of the reflective/benign factor, though the latter is broader by including humor in everyday life, humor as a worldview, and spontaneous humor. This factor was independent from the state-trait model of cheerfulness and attitudes towards laughter and being laughed at.

Factor 6/5 (laughter) combined the laughter items from socially warm (having an infectious laugh, hearty laughter, using gestures) and inept (laughs at slightest provocation, before jokes are finished, can't suppress laughter), and represented expressiveness instead of a deadpan stance to humor. Laughter (entailing positive and negative reasons for laughter) split from inept at level 5 and was not present before. It involved cheerfulness (most likely because of the facet of a low threshold for smiling and laughter), low seriousness and low bad mood and also related to the funniness of humor stimuli. Thus, this dimension might capture an inclination to laugh when appreciating humor or other amusing things. This dimension was not recognized by Kirsh and Kuiper (2003), and it will supposedly only show partial overlap with the hearty laughter scale from McGhee (2010) due to the inclusion of nervous laughter, but should relate to laughter responses across different situations (Martin and Lefcourt 1984).

Finally, Factor 6/6 (canned) drew a few items from boorish (recounting familiar, stale jokes, enjoying routines of standup comedians, imitating others), benign (enjoying topical jokes, humor reflecting cultural/regional origin), and (low) reflective (being more responsive to jokes than to spontaneous humor, telling jokes rather comic episodes from real life). Thus, canned humor captured the preference of canned forms of humor (such as jokes) over spontaneously expressed humor, which is generally in accord with the finding that it related to a lower joy to laugh at oneself (gelotophilia) and a lower quality of created punch lines. Furthermore, it related to humor appreciation (specifically the funniness of canned humorous stimuli), which can be seen as a behavioral validation of this dimension. This dimension split from entertaining and (lower) reflective/benign humor, emerging only at level 6. This factor will supposedly relate to the enjoyment of humor subscale of McGhee (2010) and the cheerfulness facet of having a broad range of active elicitors of cheerfulness and smiling/laughter of the STCI (Ruch et al. 1996). Interestingly, the boorish style did not emerge as a separate dimension (as in Kirsh and Kuiper 2003) and it was also not subsumed under only one of the dimensions. Instead, parts of the boorish style were relevant for Factor 6/2 (entertaining) and Factor 6/6 (canned), which suggests that the boorish style contains different aspects that consequently spread across two higher-order dimensions. Subsequent studies will

show whether Factors 5 and 6 are replicated or will get dropped. It is possible that more humor contents will gather around these existing items, or that they already contain narrow factors that do not need further consideration.

It was expected that the factors found in scoring the 100 statements ipsatively (i.e., the HBQD) were slightly different from the present factors, as the scoring format facilitates or even brings about such differences in the correlation patterns. The inherent substance of the statements seems to be rather stable, as recently Lampert (2018) found similar types utilizing the Q-Factor method (allowing to derive person types as compared to deriving dimensions from variables). Interestingly, the HBQD prototypes (of persons) do match our factors; that is, 6/1 in the present study matches the wit/cynic type, 6/4 resembles the observer type, 6/2 corresponds to the jokester type, and 6/3 contains characteristics of the curmudgeon. This is no coincidence, as the decomposition of a matrix into eigenvectors and eigenvalues should lead to comparable results for Q-analyses (ipsative) and R-analyses (normative). In any case, these factors will need replication, using different cultures, age groups (e.g., children and adolescents), instruments, methods, and analyses (e.g., confirmatory approaches).

Though not derived from the HQBD, a recent study (Heintz 2017) investigated the hierarchical structure of 45 humor behaviors in a daily-diary study. Seven dimensions were distinguished, which bear similarities to the dimensions in the present study: Cheerful (similar to Factor 6/2), witty (Factor 6/4), deriding (Factor 6/1), sarcastic (Factor 6/1), and canned (Factor 6/6). No factors related to ineptness and laughter were found, which is not surprising as this was only entailed in very few behaviors. Additionally, this study found factors relating to amusement (which might be represented by laughter in the six dimensions) and to self-directed humor (which might represent a form of humor competence, or lower humor ineptness). Thus, it is likely that there are other humor behaviors that are not (sufficiently) represented in the 100 HBQD statements and that constitute separate dimensions. Another explanation for the diverging results is that the dimensionality differed because of the more state-like than trait-like assessment that focused on the aggregated daily frequencies of humor behaviors rather than on one's typical humorous conduct. Future studies should best employ experience sampling methods to assess humor behavior in the situations in which they occur in daily life and explore the resulting factor structure to combine both momentary states and stable traits.

Overall, the six higher-order dimensions of humorous conduct partly reflect previously established humor dimensions (i.e., mean-spirited/earthy, entertaining, and laughter), while others have been rarely studied (i.e., inept, reflective/ benign, and canned). Also, at a higher level the sense of humor emerged as positively valued conduct, which supports both folk concepts and modern

approaches to the sense of humor that denote only positively valued, and not all individual difference in humor as a "sense of humor" (see Ruch 2012a; cf. Kirsh and Kuiper 2003). Taken together, the six dimensions relate differentially to other humor constructs, including self-reports of the temperamental basis of the sense of humor and attitudes towards laughter and being laughed at, but also behavior tests of humor appreciation and humor creation. The latter findings are especially relevant as the funniness and aversiveness of humor appreciation was found to relate to four dimensions, and the quality and quantity of humor creation to one dimension, showing that a more comprehensive approach to humorous conduct relates to both questionnaire-based and performance-based measures of humor. However, this preliminary hierarchical structure needs independent confirmation and the development of items representing each dimension before it can serve as a general framework for humor traits, also using confirmatory approaches such as confirmatory factor analyses. Establishing such a model would not only ensure that all relevant dimensions of humorous conduct are studied, but it would also help to categorize existing approaches to individual differences in humor in the model (as we have shown with a small subset) as well as to unify the terminology in the field (as was exemplified with the differential usage of "the sense of humor") (see also Ruch in press as an initial step).

4.1 Limitations of the study

One limitation of the study refers to the appropriateness of the 100 statements of humorous conduct, which were written about 30 years ago. Technological changes (e.g., Internet, smartphones) influenced our lives significantly and thus also our humorous conduct changed; for example, visiting funny web-pages, watching funny videos, creating and sharing memes, sending e-mails with funny contents, and sharing funny contents on social media are not covered in these statements. Future studies should inspect whether updating the items would change the dimensionality found in the present study or if the dimensions of humorous conduct would be stable independent of the commu-nication style. It is unlikely that new factors might emerge, but the scope of factors might be broader. Second, in this study only four more humor scales were included. Locating further scales in the four or six higher-order dimensions of humorous conduct would be relevant as well (see also Ruch et al. 2018). Third, while the multi-method nature of this study already helped to validate the dimensions and to reduce common method variance, behavioral validation should be conducted as a next step; for example, participants could be recorded

in social situations and their amount of Duchenne displays and laughter as well as the humorous conduct they show in the interaction could be coded. Finally, as a further limitation a certain sample bias needs to be acknowledged. The sample consisted primarily of German-speaking and highly-educated Swiss and constitutes a convenience sample. Replications from other countries are needed as well as the study of children and adolescent samples to track the developmental trajectory of these dimensions. The development of an initial set of 24 markers for the four broad dimensions for both adults and adolescents (Ruch 2012b) can facilitate future research and allows an initial assignment of other humor measures.

4.2 Conclusions

The present study used a multi-method approach (self-reports, other-reports, and performance tests) to investigate the higher-order dimensionality of humorous conduct and to locate distinct individual differences in humor within a hierarchical model. Four broad dimensions (mean-spirited/earthy, entertaining, inept, and reflective/benign) were supported in self- and other-reports, and two narrower dimensions (laughter and canned) were identified in the self-reports. These dimensions covered affective, cognitive, motivational, and dysfunctional aspects of humorous conduct and spanned across humorous temperament, attitudes towards laughter and being laughed at as well as humor appreciation and creation. Also, the sense of humor was recovered at a more abstract dimension comprising positively valued humorous conduct. These higher-order dimensions can serve as a reference framework for future research on humor-related constructs, eventually allowing the classification into a unified model.

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