Running Head: DAILY HUMOR BEHAVIORS

Putting a spotlight on daily humor behaviors: Dimensionality and relationships with

personality, subjective well-being, and humor styles

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Abstract

Although psychological humor research has expanded in the last decades, the humor behaviors that people show in their everyday lives are still poorly understood. To fill this gap, this diary study explores the dimensionality of 45 daily humor behaviors and their relationships with the Big Five personality traits and subjective well-being. Furthermore, the humor behaviors were utilized to investigate the criterion validity of the Humor Styles Questionnaire. A hierarchical factor analysis of the humor behaviors ($N = 123$) revealed seven dimensions: Cheerful, witty, deriding, amused, sarcastic, self-directed, and canned. These humor behavior dimensions correlated with emotional stability, extraversion, lower agreeableness, and culture/openness. Also cheerful, amused, and self-directed humor behaviors correlated positively with subjective well-being, even when personality and the humor styles were controlled for. The criterion correlations of the humor styles to their constituting humor behaviors were medium to large for affiliative and self-enhancing, and small to medium for aggressive and self-defeating. Overall, investigating humor behaviors seems a promising venue for future research and applications of individual differences in humor.

Keywords: Humor Behaviors; Personality; Big Five; Subjective Well-Being; Humor Styles Questionnaire; Criterion Validity; Daily Diaries

1. Introduction

Individual differences in humor can be measured with various approaches, with self-report questionnaires and tests being most prevalent. By contrast, we know little about the actual humor behaviors that people show in their day-to-day lives. This research gap is important to be filled, however, as individual differences in humor need to have everyday behavioral consequences to be relevant for people`s lives (as Furr, 2009, argued for personality psychology in general). For example, if someone endorses an aggressive humor style, one would expect this person to show more corresponding behaviors (like laughing at, making fun of, and teasing others) on a daily basis than a person scoring lower in this humor style. Understanding individual differences in daily humor behaviors and their relationship to personality and well-being is vital for two reasons: First, it allows disentangling the role of humor and additional elements that are often present in trait-based humor questionnaires (e.g., situations, evaluations, attitudes, functions, motives) and thereby allows a more direct test of the role that humor itself plays in personality and SWB. Second, it can help to develop and improve humor-based interventions and trainings by highlighting the humor behaviors that should best be practiced (or maybe decreased) to potentially enhance SWB.

Thus the present paper uses a longitudinal daily diary design (five consecutive days) to explore the dimensionality of 45 different humor behaviors as well as their relationships to the Big Five personality traits and subjective well-being (SWB), which represents the hedonic side of well-being. Additionally, assessing humor behaviors allows testing the criterion validity of humor measures. This is exemplified with the Humor Styles Questionnaire (HSQ; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003) by investigating to what extent the HSQ can predict the humor behaviors it entails.

1.1 Everyday humor behaviors

A frequently employed measure of individual differences in humor, especially everyday functions of humor related to psychosocial well-being, is the HSQ (Martin et al.,

2003). It measures four trait-like humor styles (Martin et al., 2003): Affiliative (enhancing

one`s relationships with others while being benign to oneself), self-enhancing (enhancing

oneself while being benign to others), aggressive (enhancing oneself while being detrimental

to others), and self-defeating (enhancing one`s relationships with others while being

detrimental to oneself). The first two are considered to be adaptive to psychosocial well-

being, while the two latter ones are considered to be potentially maladaptive.

Notably, two diary studies assessed everyday humor styles with adapted items from

the HSQ in two specific contexts, namely work (Guenter, Schreurs, Van Emmerik, Gijsbers,

& Van Iterson, 2013) and romantic relationships (Caird & Martin, 2014). However, these

only partly measured actual humorous behaviors, as the HSQ items entail further elements

that are neither related to humor nor to behavior (see Ruch & Heintz, 2013, for a more

detailed discussion). Also the overlap of the HSQ with these diary assessments (i.e., criterion

validity) was not tested.

As this is–to our knowledge–the first diary study assessing humor behaviors, it was

aimed to explore a broad and varied, albeit not all-encompassing, sample of humor behaviors.

The humor behaviors were comprehensively taken from the HSQ to allow testing its criterion

validity. Two additional sources were included to add further humor behaviors that were not

covered in the HSQ (e.g., relating to irony and satire or reflective and earthy conduct). The

first were the ten styles of humorous conduct presented by Craik, Lampert, and Nelson

(1996), which are aligned along five bipolar dimensions (socially warm vs. cold, reflective vs.

boorish, competent vs. inept, earthy vs. restrained, and benign vs. mean-spirited). Second,

Schmidt-Hidding (1963) proposed the eight comic styles of fun, (benevolent) humor,

nonsense, wit, irony, satire, sarcasm, and cynicism. It is first of interest how many dimensions

underlie the 45 different humor behaviors derived from these three sources using a factor-

analytic approach, which can be interpreted as the minimum amount of dimensions needed to

describe individual differences in everyday humor behaviors.

Research Question 1 (RQ1): How many dimensions underlie the 45 daily humor behaviors?

1.2 Humor, personality, and subjective well-being

Previous research has frequently studied the relationship between individual differences in humor and broad personality traits. The HSQ usually correlated with the Big Five personality traits in a small to large range (for a meta-analysis, see Mendiburo-Seguel, Páez, & Martínez-Sánchez, 2015). Thus some significant correlations might also emerge between personality and the daily humor behavior dimensions, indicating who tends to show which kinds of humor behaviors in their everyday lives.

RQ2: How do the humor behaviors relate to the Big Five personality traits?

Besides personality, research on humor and SWB has been very active throughout the last decades. Consistent relationships were found especially with the HSQ (e.g., Kuiper, 2014; Martin et al., 2003), supporting the notion that some humor styles might be more adaptive (affiliative and self-enhancing) and others more maladaptive (mainly self-defeating) in terms of SWB. Thus the question arises if the daily humor behaviors are also related to SWB and what the direction of these relationships is.

RQ3: How do the humor behaviors relate to subjective well-being?

Given that both personality (for an overview, see Stones, Worobetz, & Brink, 2011) and the HSQ relate to SWB, it is of interest to test if any relationship of the humor behaviors with SWB remains once personality and the HSQ are controlled for. If so, the frequencies with which people exhibit humor behaviors on a day-to-day basis would capture information relevant for SWB that goes beyond the broad personality dimensions and the specific humor styles. This would further highlight their relevance of considering humor behaviors in future research and applications of humor and SWB.

RQ4: Can the humor behaviors explain variance in subjective well-being over and above the Big Five personality traits and the four HSQ scales?

1.3 Criterion validity of the Humor Styles Questionnaire

Despite its popularity, the psychometric properties of the HSQ, specifically its

validity, remain understudied. While the criterion validity of the HSQ in terms of

psychosocial well-being received support in many studies (e.g., Kuiper, 2014; Martin et al.,

2003), its criterion validity in terms of everyday humor behaviors is unknown. As all humor

behaviors entailed in the HSQ were entailed in the diary assessment, they lend themselves as

external criteria against which the HSQ can be tested; that is, the scores of the HSQ scales

should predict the humor behaviors entailed in them. At least medium-sized, but no perfect

overlaps are expected to support criterion validity, as the humor behaviors represent one of

two central aspects entailed in the HSQ (humor and its specific functions/uses).

RQ5: To what extent can the four HSQ scales predict their everyday humor behaviors?

2. Materials and methods

2.1 Participants

Overall 123 German-speaking participants filled in at least three of the five daily

diaries in time (i.e., on the same evening). The median age of the sample was 24.00 years (M

$= 27.68$, $SD = 10.37$) ranging from 18 to 68 years (30.9% men, 69.1% women). Participants

were primarily Swiss (65.9%) and German (25.2%). Most participants were well educated,

with 47.2% being college/university students, 23.6% having passed tertiary education, 24.4%

having A-levels, and 4.8% having < 12 years of education.

Before and after the daily diary assessment, participants were invited to fill in several

questionnaires (same questionnaires and same procedure for both Assessment 1 and

Assessment 2). The sample of Assessment 1 was the same as for the daily diaries, and 107

participants (31.8% men, 68.2% women) completed Assessment 2. Their median age was

24.00 ($M = 27.93$, $SD = 10.95$) ranging from 18 to 68 years.

2.2 Humor behavior assessment

HSQ Humor Behaviors. The daily HSQ humor behaviors were created by rephrasing the 32 HSQ items. A humor behavior was defined as a single concrete behavior that involved humor and/or laughter, and that can be performed by the participants. These criteria resulted in an overlap of several behaviors across different humor styles; for example, the behavior "Said funny things" was described in the HSQ affiliative, aggressive, and self-defeating items. Also some HSQ items entailed more than one behavior, which was then measured with two or more humor behaviors (e.g., the item "I laugh and joke a lot with my friends" was turned into the behaviors "laughed" and "joked around").

However, four of the HSQ items could not be transformed into humor behaviors, as they did not fulfill the criteria: Two self-enhancing items were too abstract and one aggressive and one self-defeating item did not contain active behaviors that participants could perform. Overall, affiliative was represented with seven behaviors, self-enhancing with six, aggressive with nine, and self-defeating with seven (29 overall). As several behaviors were present in two or more HSQ items, 20 *different* humor behaviors were sufficient to cover the HSQ.

Other humor behaviors. Additionally, 14 humor behaviors were extracted, in a similar fashion as was done for the HSQ, from the five bipolar styles of humorous conduct (1–5 humor behaviors each), and 11 humor behaviors were derived from the eight comic styles (1–3 humor behaviors each). The focus was on selecting humor behaviors that were non-redundant and that supplemented the HSQ humor behaviors. All 45 humor behaviors are listed in Table S1 in the supplementary materials.

Participants indicated the frequency with which they showed these humor behaviors on the present day on a five-point scale. The answer options were pre-tested to capture realistic daily frequencies to allow for sufficient variance in the behaviors: 1 = *Not at all (0 times)*, 2 = *rarely (1–2 times)*, 3 = *sometimes (3–5 times)*, 4 = *often (6–10 times)*, and 5 = *very often (11+ times)*.

2.3 Questionnaires

*Humor Styles Questionnaire (HSQ; Martin et al., 2003; German version by Ruch &
Heintz, 2016).* The HSQ consists of 32 items measuring four humor styles (affiliative, self-
enhancing, aggressive, and self-defeating) with eight items each. Internal consistency
(McDonald`s omega) ranged from .71–.89 and test-retest reliability ranged from .74–.88.

Inventory of minimally redundant scales 25 (MRS-25; Schallberger & Venetz, 1999).
The 25-item version of the MRS employs bipolar adjectives to assess the Big Five personality
traits extraversion, agreeableness, conscientiousness, emotional stability, and culture (with
five items each). McDonald`s omega ranged from .74–.90 and test-retest reliability ranged
from .90–.94.

Satisfaction with life scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The
five-item SWLS measures life satisfaction as the cognitive component of SWB (Diener, Suh,
Lucas, & Smith, 1999). McDonald`s omega was .91 for Assessment 1 and .89 for Assessment
2, and test-retest reliability was .93.

*Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988;
German version by Krohne, Egloff, Kohlmann, & Tausch, 1996).* The PANAS consists of 20
adjectives, with 10 adjectives each for positive and negative affect, which constitute the
affective component of SWB (Diener et al., 1999). McDonald`s omega ranged from .85–.90
and test-retest reliability was .79 and .63 for positive and negative affect, respectively.

2.4 Procedure

The data were collected in an online survey. The 45 humor behaviors were presented
in a randomized order for each participant and for each day. The daily diaries had to be
completed on five consecutive evenings. The humor behavior scores were obtained by
replacing the missing values (ranging from 8.9–17.9% for each behavior and missing
completely at random as indicated by Little`s MCAR test) using the expectation maximization
algorithm, and then averaging the daily scores over the five days. The resulting humor

behavior scores were internally consistent, as indicated by McDonald`s omega ranging from .62 to .90 (median = .84; see Table S1 for more details).

Participants were recruited via several means, including mailing lists, social media platforms, and bulletins at several Swiss universities. They were offered personalized feedback and/or course credit in psychology for their participation. The study was conducted in compliance with the local ethical guidelines.

2.5 Data analysis

The 45 humor behavior scores were subjected to a hierarchical factor analysis (HFA; Goldberg, 2006) to derive their dimensionality (RQ1). This analysis not only arrives at a number of dimensions (as exploratory factor analysis does), but it traces their hierarchical emergence from top down. To this end, a series of principal component analyses are conducted, starting with the extraction of the first unrotated principal component and then subsequent varimax-rotated components until one component emerges on which no humor behavior has its highest loading.

The relationship of the humor behaviors with personality and SWB is investigated by correlating the humor behavior dimensions from the HFA with the MRS-25 (RQ2), SWLS, and PANAS (RQ3). The incremental prediction of the humor behaviors (RQ4) in terms of SWB was tested in hierarchical regression analyses, using gender and age as control variables in the first step, the MRS-25 in the second step, and the HSQ in the third step (both measured at Assessment 1). At step 4, each of the humor behavior dimensions were entered in separate regression analyses to avoid any confounding effects between them. Thus seven regressions each were conducted with life satisfaction, positive and negative affect (measured at Assessment 2) as criteria (21 regressions in total). The criterion validity of the HSQ scales (RQ5) was tested by correlating them with their homologous humor behaviors, which were derived by averaging the humor behavior scores of the six to nine humor behaviors belonging to each HSQ scale (McDonald`s omega ranging from .92–.95).

3. Results

3.1 Dimensionality of the 45 daily humor behaviors

The dimensionality of the humor behaviors (RQ1) was tested in the HFA, which suggested the retention of seven components. The process of the HFA is illustrated in Figure 1.

Insert Figure 1 about here

To analyze the meaning of the humor behavior dimensions, the rotated components matrix of the seven-components solution was investigated (shown in Table S1 in the supplementary materials). The first component (7/1) was marked by 13 humor behaviors that entailed basic and good-natured humor appreciation (e.g., recognized humorous things) and production (e.g., joked around). Due to its breadth it was labeled *cheerful*, referring to the general propensity to show good-natured humor behaviors. The second component (7/2) was marked by seven humor behaviors that related to wit and sophisticated humor production (e.g., told funny everyday episodes) and was labeled *witty* accordingly.

The third component (7/3) was marked by seven humor behaviors that entailed putting others down and making fun of them (e.g., laughed at someone). The label *deriding* was chosen to indicate a rather blunt and direct mocking of others. The fourth component (7/4) was marked by seven humor behaviors that mostly related to being amused (e.g., amused by absurdities), so this component was labeled *amused*. The fifth component (7/5) was marked by five humor behaviors that involved mockery, cynicism, satire, and irony (e.g., made cynical remarks). The label *sarcastic* was chosen to combine the sophistication of the humor behaviors with the critical component. In comparison to the deriding humor behaviors, the sarcastic ones not only made fun of others, but embedded the criticism in stylistic devices (such as irony) and also aimed at improving the wrongdoings.

The sixth component (7/6) was marked by four humor behaviors that entailed humor directed at oneself (e.g., let someone make fun at my expense), labeled *self-directed*. The seventh component (7/7) was marked by four humor behaviors that mostly related to canned forms of humor (e.g., jokes, nonsense rhymes), and was thus labeled *canned*.

3.2 Relationships of the humor behaviors with personality and subjective well-being

Having established the dimensionality of the daily humor behaviors, the relationships of these seven dimensions with personality (RQ2) and SWB (RQ3) are of interest, shown in Table 1. (Table S2 in the supplementary materials also shows the correlations of the 45 humor behavior scores with age, sex, personality, SWB, and the HSQ.)

Insert Table 1 about here

As Table 1 shows, significant relationships occurred between emotional stability and extraversion and cheerful behaviors, between culture and amused behaviors, between (lower) agreeableness and deriding behaviors, and between emotional stability and witty behaviors (small to medium effects). In terms of SWB, the cheerful behaviors positively correlated with higher SWB (medium to large effects). Witty and amused behaviors showed small to medium positive correlations to life satisfaction and positive affect, respectively.

Given that some significant correlations emerged, how do the humor behavior dimensions perform in explaining SWB over and above personality and the HSQ (RQ4)? Standard hierarchical regression analyses predicting SWB showed that, consistent with previous studies, personality explained a large amount of variance in the three aspects of SWB ($.41 \leq \Delta R^2 \leq .45$), while the incremental validity of the HSQ was in a medium range ($.05 \leq \Delta R^2 \leq .07$). Importantly, three of the seven humor behavior dimensions explained a small, yet significant amount of variance beyond personality and the HSQ ($.02 \leq \Delta R^2 \leq .04$): The self-directed humor behaviors positively predicted life satisfaction ($\beta = .22$, $p < .01$), and

the cheerful ($\beta = .26$, $p < .01$) and amused humor behaviors ($\beta = .17$, $p < .05$) positively

predicted positive affect.

3.3 Criterion validity of the HSQ scales in predicting daily humor behaviors

The criterion validity of the HSQ scales (RQ5) was tested by correlating them to their

homologous humor behavior scores, as presented in Table 2.

Insert Table 2 about here

Table 2 shows that the criterion validities, that is, the correlations between the

corresponding HSQ humor behavior scores and HSQ scales, were medium to large for

affiliative and self-enhancing, small to medium for aggressive, and small for self-defeating

scale. This indicates that the latter two HSQ scales were less able to predict their

corresponding humor behaviors. Interestingly, the HSQ affiliative scale showed medium to

large positive correlations to all HSQ humor behavior scores, which were even larger than the

criterion validities of the other three HSQ scales. Note that this pattern of correlations was

neither due to the overlap of humor behaviors across the HSQ scales nor due to the imperfect

mapping of the humor behaviors and the HSQ items. Correlations of the unique humor

behaviors of each HSQ style with the HSQ and with a subset of HSQ items that were matched

with the unique humor behaviors of each HSQ scale yielded similar results (see Table S3 in

the supplementary materials for details).

4. Discussion

Regarding RQ1, seven higher-order dimensions of humor behaviors emerged in the

HFA: Cheerful, witty, deriding, amused, sarcastic, self-directed, and canned. Notably,

deriding and sarcastic humor behaviors loaded on separated dimensions, pointing to the

importance of distinguishing between blunt and direct versus more sophisticated critical

humor. Thus, aggressive or mean-spirited (vs. benign) humor should more appropriately be

split into at least two components, and further components might emerge if more humor

behaviors from this spectrum (e.g., derived from the comic styles irony, satire, sarcasm, and cynicism) were included. Also some humor behaviors proved to be complex, as they loaded on two dimensions (e.g., "teased someone" had loadings on both cheerful and deriding).

The relationships between the seven humor behavior dimensions and personality (RQ2) supported the notion that the Big Five personality factors (except for conscientiousness) were relevant for four of the seven humor behavior dimensions. Extraversion and emotional stability mainly played a role in humor production (cheerful and witty behaviors), and culture/openness played a role in humor appreciation (amused behaviors). Interestingly, only deriding behaviors significantly correlated with lower agreeableness while the sarcastic ones were unrelated, which further supports the need to distinguish different aspects of mockery.

In terms of SWB (RQ3), cheerful, witty, and amused humor behaviors positively correlated with one or more aspects of SWB. The cheerful and amused behaviors mostly stemmed from the HSQ affiliative and self-enhancing scales, providing a direct explanation for their relationships with SWB. The witty behaviors, by contrast, were mainly derived from the styles of humorous conduct and the comic styles, and they represent a novel dimension that can be explored in future research on humor and SWB. Importantly, none of the humor behaviors were negatively associated with SWB. This is relevant as the HSQ self-defeating scale was implied to be maladaptive (Martin et al., 2003), which could not be confirmed with the daily humor behaviors, although the self-directed humor behavior component was mainly loaded by humor behaviors from the HSQ self-defeating scale.

RQ4 investigated the incremental power of the humor behaviors over and above personality and the humor styles in predicting SWB. Although this admittedly constituted quite a challenging test, the importance of some of the humor behaviors (cheerful, amused, and self-directed) for predicting life satisfaction and positive affect was supported with small effects. Thus, three of the seven humor behavior dimensions covered unique aspects that are

relevant for SWB, which bears a potential for including them in humor trainings and interventions. Curiously, many of the ingredients in McGhee`s (2010) program of training humor habits were reflected in the humor dimensions identified in this study, namely cheerful (general sense of humor, laughter, playfulness), witty (verbal humor), amused (detecting humor in everyday life), and self-directed (laughing at oneself). Also in line with the positive effects elicited by the humor habits program (McGhee, 2010), these four humor behavior dimensions were the ones that were positively related to SWB in the present study.

Finally, the criterion validity of the HSQ scales (RQ5) was supported for affiliative and self-enhancing and to a lesser extent for aggressive and self-defeating. The lower criterion validities of the HSQ aggressive and self-defeating scales were not caused by general impediments with the prediction of their humor behaviors, as they were all measured reliably and as the HSQ affiliative scale showed medium to large correlations with them. One possible explanation of these findings could be the discrepancy between the humor behaviors and the non-humorous elements (such as evaluations, functions, needs, and motives) entailed in the HSQ scales (see Ruch & Heintz, 2013, for more details). These non-humorous elements (such as going overboard, putting oneself down excessively, or not being able to stop oneself from saying something) might be more relevant to these HSQ scales than the humor entailed in them, thus potentially accounting for the smaller overlap between the scales and their behaviors. These ideas could be tested in future studies.

In sum, the present findings highlight the importance of studying daily humor behaviors, both for theoretical (criterion validity of humor measures) and practical purposes (role of humor behaviors in personality and SWB). The seven dimensions identified in the HFA can be taken as a starting point for future investigations of individual differences in humor behaviors.

4.1 Limitations and suggestions for future research

First, the list of humor behaviors was not comprehensive, and future studies should include more humor behaviors to investigate if additional dimensions emerge, also by using additional approaches to generate humor behaviors (like the act frequency approach, as already proposed by Craik & Ware, 2007). Second, the diary methodology employed enabled retrospective daily reports. Employing experience samplings would help to reduce the memory load (and thus potential biases) by prompting participants several times a day to report the humor behaviors they have shown. Additionally, future studies could assess more closely the situations in which the humor behaviors occurred. Third, no causal inferences can be drawn as correlations (albeit in a longitudinal setting) were investigated. Clearly, experimental evidence is necessary to understand the role that humor plays in SWB. Fourth, the sample was not representative of the general population, so replications with more balanced samples and in other cultures and languages are desirable.

4.2 Summary and conclusions

The present paper adds to previous research by suggesting that at least seven dimensions are needed to describe individual differences in daily humor behaviors. Some of these humor behaviors overlapped with the Big Five personality traits and were adaptive in terms of SWB. Importantly, they could uniquely predict SWB once personality and the humor styles were controlled for. The criterion validity of the HSQ was supported for affiliative and self-enhancing, and to a lesser extent for aggressive and self-defeating. Overall, investigating individual differences in everyday humor behaviors can be meaningfully employed to validate humor measures, to better understand their impact on our daily experiences, and to develop and extend humor trainings and interventions to potentially foster people`s life satisfaction and positive experiences.

Appendix A. Supplementary data

Supplementary data to this article can be found online at

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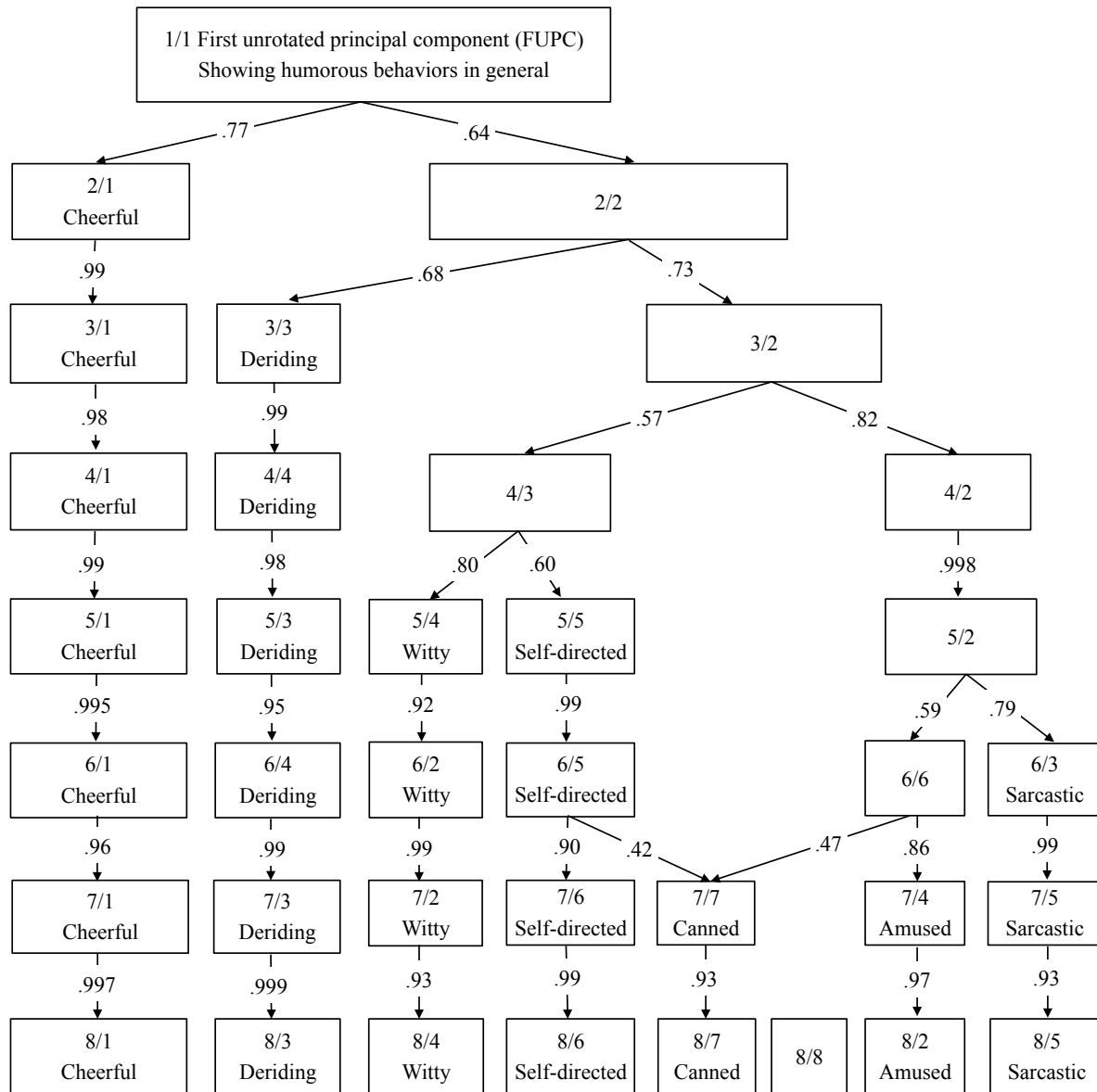
Figure 1. Hierarchical factor analysis of the varimax-rotated components derived from the 45 daily humor behaviors scores.

Table 1

Correlations of the Seven Humor Behavior Dimensions with Personality and Subjective Well-being

Humor behaviors	Big Five personality traits					Subjective well-being		
	A	C	ES	E	Culture	LS	PA	NA
7/1 cheerful	.14	.04	.24**	.30***	.09	.31***	.34***	-.35***
7/2 witty	-.04	-.04	.18*	.15	.14	.19*	.17	.01
7/3 deriding	-.19*	-.14	.09	.07	.02	.10	-.08	-.07
7/4 amused	-.02	-.02	.02	-.05	.30***	.10	.22*	.10
7/5 sarcastic	-.11	-.11	.05	-.03	.04	-.11	-.06	.06
7/6 self-directed	.03	.07	.05	.04	-.03	.17	.07	-.01
7/7 canned	-.14	.08	.00	.00	.12	-.06	.07	.03

Note. $N = 123$. A = agreeableness, C = conscientiousness, ES = emotional stability, E = extraversion,

LS = life satisfaction, PA = positive affect, NA = negative affect.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Correlations of the Humor Styles Questionnaire Humor Behavior Scores with the HSQ Scales

HSQ scales	HSQ humor behaviors scores			
	AF	SE	AG	SD
Affiliative	**.54*****	.44***	.51***	.48***
Self-enhancing	.29***	**.40*****	.28**	.26**
Aggressive	.16	.10	**.25****	.13
Self-defeating	.01	.06	-.05	**.07**

Note. *N* = 123. Criterion validities (diagonal) marked in bold.

** *p* < .01. *** *p* < .001.