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[Willibald Ruch](#), [Jennifer Hofmann](#), [Sandra Rusch](#), [Heidi Stolz](#)

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Willibald F. Ruch*, Jennifer Hofmann, Sandra Rusch
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Keywords: cheerfulness, intervention, sense of humor, positive psychology, satisfaction with life, training

***Corresponding author: Willibald F. Ruch**, Department of Personality and Assessment, Institute of Psychology, University of Zurich, Zurich, Switzerland, E-mail: w.ruch@psychologie.uzh.ch
Jennifer Hofmann, Department of Personality and Assessment, Institute of Psychology, University of Zurich, Zurich, Switzerland, E-mail: j.hofmann@psychologie.uzh.ch
Sandra Rusch, Department of Personality and Assessment, Institute of Psychology, University of Zurich, Zurich, Switzerland, E-mail: humortraining@gmx.ch
Heidi Stolz, Department of Personality and Assessment, Institute of Psychology, University of Zurich, Zurich, Switzerland, E-mail: humortraining@gmx.ch

1 Introduction

Having a sense of humor or “using humor” has been claimed to be beneficial to the adaptive coping with stress, enhancing social interactions, life satisfaction and well-being, increasing creativity, as well as the absence of depression, anxiety, and negative emotions (see Ruch and Hofmann 2017 for an overview). Thus, humor does not only induce positive emotions and builds personal resources, but it may also help to reduce negative emotions and stress. Usually, conceptualizations of the sense of humor assign it trait-like qualities (i.e., stability over time and situations; e.g., Ruch 2007, 2008). Yet, in the early nineties of the past century the voice was gradually raised that humor may be trained and individuals may change their use of humor in their daily lives. During this time, McGhee (1994) was the first to decompose the sense of humor into a set of habits that can be acquired, namely enjoyment of humor, laughter, verbal humor, finding humor in everyday life, laughing at yourself, and humor under stress. McGhee sees humor as a form of play (i.e., the play with ideas) and while every child has the capacity to play the seriousness of life might kick in (when children go to school or when work starts) leading to what is playfully called the “Acquired Amusement Deficiency Syndrome (AADS)” or even “terminal seriousness” (McGhee 1996, 2010). No diagnostic criteria were proposed but it is evident that these are opponents to cultivating one’s sense of humor, which is seen as a “survival tool for the stressed-out world”. Thus, McGhee’s program is not only suited to increase playfulness and cheerfulness as states and the sense of humor as a trait, but also to decrease seriousness. McGhee offered a matching program (called the “8-step humor development program”) aimed at developing these habits and a matching instrument for the assessment of pre and post levels in these habits and other outcome variables (the Sense of Humor Scale; SHS, McGhee 1996). The program was not developed for a specific audience, but best suitable for individuals who discover challenges in being playful, want to foster their sense of humor or feel having become too serious. Subsequently, there were first evaluations of the entire program, elements of the program (in 2010 renamed into “seven humor habits program”) but also other interventions and trainings were developed, and also the list of measured outcomes was extended beyond the assessment of the sense of humor (see McGhee 2010 for an overview). Generally, such interventions and trainings may differ on three dimensions: Target group (individual use vs. groups), type of administration (offline vs. online) and the level of standardization (manualized/guided vs. ad-hoc; i.e., tools and strategies are defined but the procedure of the session is open; e.g., clinic clowns working in groups and responding to the situation without an a priori schedule; see Ruch and Hofmann 2017).

The 7 Humor Habits Program (7HHP) focuses on key humor habits and skills matching the components of McGhees sense of humor scale. The 7 steps are ordered hierarchically, with increasing difficulty. The steps cover establishing a playful attitude, laughing more often and heartily, creating verbal humor, looking for humor in everyday life, laughing at yourself, and finally finding humor in the midst of stress. The 7HHP is a standardized training, which can be completed individually through a manual, or guided by an instructor in a group. Both forms of application are accompanied by individual “Home Play” exercises (targeting the behavioral component of the humor habit) and “Humor Log” exercises (targeting the cognitive/reflective component of the humor habit). These accompanying exercises help consolidating the new knowledge and may assist the transfer into all-day life. Table 1 gives an overview on the rationale for each step, the contents of the training sessions and the related consolidation exercises.

Usually, the habits are first trained on “good mood days”. After a minimum of one week of repetition and consolidation, the same habits may be applied in “bad mood days” (i.e., in the midst of stress, or when angry, anxious, depressed, etc.).

The key achievements of the training program are fivefold (summarized by Ruch and McGhee 2014): Firstly, the program aims at demonstrating the malleability of humor. In terms of an evaluation of the program, this may be assessed by a report of the individual’s sense of humor, which may increase from pre to post the training. Secondly, the program aims at boosting humor in the individuals’ life. This may be assessed by an increase in the self-reported sense of humor, as well as an increase in amusement and cheerful mood in the individuals’ daily life. Thirdly, it aims at increasing the frequency of positive emotions. As for the second point, this may be measured by increased reports of amusement and cheerful mood in the individuals’ daily life. Forth, the program aims at decreasing the frequency of negative emotions (i.e., a decrease of bad moods and seriousness), and fifth, to increase emotional resilience and the ability to cope with stress (see Ruch and McGhee 2014: 182). This last goal may be evaluated by assessing resilience and perceived stress levels. We hypothesize that aim 5 would also be reflected by assessing an individuals’ general evaluation of his or her life (i.e., life satisfaction). Research has repeatedly shown correlations between humor and life satisfaction and hence it was justified to examine directed causality (Ruch and McGhee 2014).

Some studies have tested the 7 Humor Habits Program by evaluating a subset of the five goals postulated. While the exact procedures vary across studies, all studies trained the 7 Humor Habits in a group setting with adults, either healthy, clinically depressed or while being in a rehabilitation clinic (Crawford and Caltabiano 2011; Falkenberg et al. 2011; Sassenrath 2001). Differences across the studies are found in the number of trainers, the setting in which the training took place, the exact

Table 1: Overview on the 7 Humor Habits Program.

Step 1: Surround yourself with humor (and think about the nature of your sense of humor)	Rationale	Many individuals simply do not have humor “on their radar” in everyday life. They rarely seek out humor and fail to find humor in situations considered by others to be funny. Increasing the amount of time and focus people spend actively thinking about humor contributes to the gains made.
	Training	Introduction of the theoretical background, exercises to “loosen up”. Exposure to different types of humor and different media to transport humor. Show individuals how they can surround themselves with humor in all-day life. Development of a humor biography.
	Home Play	Provides specific guidelines for 1) immersing oneself in humor and 2) thinking about both the strengths and weaknesses of his or her current sense of humor and influences on its development. For example: Watch several sitcoms and decide which programs you like the best. Use these as a basis for thinking about your sense of humor.
Step 2: Cultivate a playful attitude	Rationale	An essential component of humor is the joy and fun that comes from play. Humor can be thought of as a form of mental play, playing with ideas. A playful attitude refers to a prevailing frame of mind characterized by a general receptiveness to any form of play or fun.
	Training	Discussion and input on playfulness vs. seriousness, differentiation between carelessness and non-seriousness, etc.
	Home Play	Participants collect things they have fun doing and then do as many of these as possible every day for two weeks. For most people, physical forms of play are very effective in “jump starting” mental play and the mental/emotional frame of mind where humor thrives. For example: Make a list of things you have fun doing and do two each day. Keep a prop (silly nose, toy, etc.) handy that puts you in a playful mood.

(continued)

Table 1: (continued)

Step 3: Laugh more often and more heartily	Rationale Training Home Play	Although, laughter per se is not a humor skill, it is included because the physical act of laughter might explain some of the benefits to physical health, happiness, and resilience resulting from humor. Basing on McGhee (1996), practical advice on when, where, and how to tell jokes and laugh are discussed and laughter is fostered with different exercises. Participants are instructed to spend more time in situations in which social laughter commonly occurs (e.g., comedy clubs, funny movies, parties, etc.), watch more television sitcoms or funny DVDs, etc. They are asked to laugh at times and in ways different than one's inclination – e.g., to laugh louder and longer than you normally would. For example: At some point, try forcing yourself to laugh when you are angry, anxious, or depressed. Notice the effect this has on your emotional state.
Step 4: Create your own verbal humor	Rationale Training Home Play	This is the first genuine humor skill – playing with language. Verbal humor is one of the most common forms of humor across cultures, and good verbal humor skills/habits are considered to play an important role in using humor to support a positive daily mood and life satisfaction. Various exercises to train verbal humor (finding words with a double meaning, “daffynitions”, metaphors, etc.) Verbal humor-building exercises begin with simple forms of word play. Many exercises center around the appreciation or generation of puns. Participants actively seek out puns and other forms of verbal humor in newspaper headlines, public signs, everyday conversations. For example: Look for ambiguous words or phrases in conversations and newspaper headlines and on signs. Write them down to build the habit of noticing them.
Step 5: Look for humor in everyday life	Rationale Training Home Play	Finding a funny side of one's own daily life is considered to be crucial to the ultimate goal of using humor to cope with stress. McGhee has heard many people in his own humor workshops say, “if I had your life, I'd be laughing too. Nothing funny ever happens in my life!” The goal here is to demonstrate that many opportunities for humor in daily life simply go unnoticed and to show participants how to start noticing them. Input on the conditions that can ease finding humor in all day life, exercises. Focuses on actively looking for humor at home, on the job, on the way to work, while waiting for a bus, etc. Visual props and other reminders are placed in key areas at home, at work, and in the car as reminders to look for a funny side of things at that moment. Specific requests are made to write funny observations down and share them with others (this is assumed to speed up the development of this habit). For example: When watching television sitcoms, relate funny situations that arise in the show to incidents in your own life.

(continued)

Table 1: (continued)

Step 6: Take yourself lightly: Laugh at yourself	Rationale	Being able to laugh at yourself – at one’s own mistakes, weaknesses, perceived flaws, etc. – promotes the use of humor to cope with stress. This is usually the most difficult skill to develop, because awkward or embarrassing incidents or being the butt of a joke (or otherwise being laughed at) typically elicits negative emotions that interfere with the ability to create and enjoy humor.
	Training Home Play	Theoretical input: benevolent and malevolent ways of laughing at oneself; exercises. Individuals make a list of their sensitive zones; i.e., areas of their life about which it is very difficult to “lighten up.” Items on the list are arranged from smaller or minor ones to major ones. Initial attention is given to minor items because they have less “emotional baggage.” Also, prior to joking about their sensitive zones, individuals are first asked to simply verbalize them to others. This is assumed to speed up progress in laughing at them. For example: Learn a few self-disparaging jokes. Some of these jokes should have nothing to do with your sensitive zones. Others should relate directly to your sensitivities. Practice telling them to others.
Step 7: Find humor in the midst of stress	Rationale	The key challenge here is to extend already-developed humor habits to stressful situations. This is an emotional skill, as much as an intellectual one, because most people find that their sense of humor abandons them in the midst of stress. Negative emotions (e.g., tension, anger, or depression) interfere with accessing the playful mood and mindset required for humor. A central tenet of the 7HHP is that strengthening every humor habit on good-mood days is essential to making the habit accessible in the midst of stress.
	Training Home Play	Theoretical input and exercises (e.g., role play). Individuals are asked to simply keep doing the kinds of things they have been doing, but focus special attention on doing them in stressful situations – initially focusing on regularly occurring (predictable) and mildly stressful situations and then moving on to more stressful ones. For example: Make a list of commonly occurring hassles and problems. Be determined to find a way to maintain a lighter attitude when these come up.

Notes: Table adapted from Ruch and McGhee (2014).

contents of the meeting, as well as the time points of the follow-up measures and the number of follow up measurement time points. In general, the results confirm that the 7 Humor Habits increases playfulness, positive emotions/mood/affect, subjective well-being, optimism, perceived sense of self-efficacy, and sense of control over one's internal states (goal 1, 2, 3, 5). Moreover, it decreases seriousness, negative mood, anxiety, perceived stress and depression in healthy adults, verifying goal 4 and 5 (Crawford & Caltabiano, 2011; Falkenberg et al. 2011; Sassenrath 2001). Due to the inclusion of not only self-report measures, but also peer-reports, this study will add to knowledge on the “observable” effects of such a humor intervention. Moreover, we included a traditional waiting control group but also an “alternative humor group” which also gets an intervention. Including the latter group allows investigating whether the training by McGhee outperforms a group that also regularly meets and also gets in touch with humor (though not with a systematical approach) and may thus be seen as a more conservative comparison as opposed to a waiting control group.

The current study aims at evaluating the effectiveness of the 7 Humor Habits in a randomized controlled trial (two intervention groups receiving the 7 Humor Habits Programm in a group setting with or without skill consolidation at home, and a humor placebo control group and a waiting control group). To evaluate aim 1 and aim 2, the Sense of Humor Scale (SHS, McGhee 1996) was assessed before and after the eight-week intervention to measure changes in the reported humor. For the SHS, a peer-rating was obtained to complement the self-reported humor. To evaluate aim 3 and 4, state measures of the State-Trait-Cheerfulness Inventory, assessing cheerfulness, seriousness, and bad mood as states were assessed pre and post every group session. To evaluate aim 5, life satisfaction was assessed before and after the intervention, as well as at a two-month follow up time point.

We tested five hypotheses for aim 1, aim 2 (self and peer-reports) and aim 5. First, we expected that the two intervention groups would lead to higher scores in the sense of humor and life satisfaction after the intervention compared to the two control groups (tested for each dependent variable separately with an a priori contrast; hypothesis 1). Secondly, we assumed that each intervention group separately would also differ from the two control groups (hypothesis 2 and 3; tested for each dependent variable separately). Thirdly, we checked whether the two intervention groups differed from one another (i.e., whether additional Home Play would make a change), assuming that the training with Home Play might outperform the training without skill consolidation (hypothesis 4). Forth, we tested whether the two control groups differed from each other (i.e., whether being in a placebo humor group made a change to being in a waiting control group; contrast 4 and 5).

2 Method

2.1 Participants

The initial sample consisted of 110 German-speaking adults (32 males, 78 females) with a mean age of $M=47.53$, $SD=11.75$. For the analyses, we only included individuals that completed at least six of the eight training units. The participants distributed to the four groups as follows: Intervention group 1 (IG1) consisted of 20 individuals (age: $M=41.85$, $SD=13.14$; 2 males, 18 females); the intervention group 2 (IG2) consisted of 24 individuals (age: $M=45.50$, $SD=11.98$; 9 males, 15 females), the alternative humor group (CGH) consisted of 16 individuals (age: $M=45.06$, $SD=13.89$; 4 males, 12 females), and the waiting control group consisted of 50 individuals (age: $M=51.56$, $SD=8.92$; 17 males, 33 females). At baseline, a MANOVA indicated no gender differences in the trait measures (all $p>0.274$). A MANOVA for the dependent measures (T2, T3) did not reveal any gender differences (all $p>0.120$), nor an interaction between gender and group membership (IG1, IG2, CGH, CGW; all $p>0.197$).

In total, 173 individuals completed the peer-ratings (one or two close friends for each participant). Ninety-eight (56.6%) were male and 74 (40.8%) female (one person did not indicate the gender). On average, the peer-raters were $M=44.70$ years old ($SD=14.10$).

2.2 Instruments

The *Sense of Humor Scale* (SHS, McGhee 1996) is a 40-item questionnaire assessing the sense of humor after McGhee on a 4-point answer scale (1 “*strongly disagree*”; 4 “*strongly agree*”). It assesses the seven humor habits and allows building additional scores on the sense of humor, humor skills, negative/positive mood and serious/playful frame of mind. The scale has shown good reliability and validity (see Ruch and Carrell 1998; Heintz & Ruch in this issue). For the study purposes, the total sum score was used (humor skills plus the scale negative/positive mood and the scale serious/playful frame of mind; see Ruch and Carrell 1998 for a discussion), with an internal consistency of 0.93.

The *State-Trait Cheerfulness Inventory* (Ruch et al. 1996, 1997) assesses three habitual dimensions of the temperamental basis of the sense of humor (STCI-T60, cheerfulness, seriousness, bad mood) with 20 items each, using a 4-point answer scale (1 “*strongly disagree*” to 4 “*strongly agree*”). The state version (STCI-

S30) consists of 30 items (10 for each scale), assessing the respective states. The reliability and validity has been supported in several studies (see Ruch and Hofmann 2012 for an overview).

The *Satisfaction with Life Scale* (SWLS, Diener et al. 1985) assesses general satisfaction with life, constituting the cognitive aspect of subjective well-being. The scale employs a 7-point answer-scale from (1 “*strongly disagree*” to 7 “*strongly agree*”). For all scales, the German language versions were used.

2.3 Training and procedure

The training program used is a modified version of the first German adaptation of the humor training by Sassenrath (2001) that was evaluated in her Master’s thesis (supervised by the first author¹). Beginning with 2007, Sandra Rusch and Heidi Stolz adapted this translation for the use with Swiss adults. They conducted this evaluation study and consequently used the manualized program in seminars and workshops, as well as conducting several trainings for adults. This updated version was evaluated here. Participants were recruited via mailing lists and announcements on websites. After showing interest in the study, they participated an information event, were informed consent was obtained and participants were informed about the study procedure. Then, they were asked to complete the baseline measures (SHS, STCI-T60, SWLS²) and were randomly assigned to one of four groups. In intervention group one (IG1), they received the 7 Humor Habits in eight consecutive trainings sessions (weekly) of two hours length, with following themes of the group sessions (1: characterize your own sense of humor, 2: Become less serious and more playful about life, 3: Work on your belly laugh, 4: Improve your ability to tell jokes, 5: Create your own spontaneous humor, 6: Find humor in daily life, 7: Learn to laugh at yourself, 8: Use all of the above to cope with stress). In intervention group 2 (IG2), participants received the 7 Humor Habit group training without the skill consolidation (Home Play). In the placebo humor control group (CGH), participants were exposed to humor in eight sessions, without a systematic training (e.g., watching funny clips, theoretical presentations of “humor theories”, improvisation theatre

¹ Although the study by Sassenrath (2001) lead to similar results for the two training groups as reported in the current study, the results were not published as the selected control groups were not comparable to the experimental groups.

² At the Baseline assessment meetings, participants had the opportunity to take part in another broader assessment of humor measures unrelated to the current study.

and word play exercises, laughter yoga). There was no theoretical background for the program of the placebo humor group and the rationale was to expose individuals to humor, with as little overlap to the McGhee training as possible. The fourth group consisted of a waiting control group (CGW). The groups met weekly, each session started and ended with the STCI-S30. After the end of the training, the participants completed the trait measures again (SHS, STCI-T60, SWLS), as well as completing the trait measures after a two-month follow up. For the two intervention groups and the humor control group, peer-ratings (one or two close friends) of the SHS were obtained before the training and directly after the end of the training. Participants nominated one or two peer-raters that then received a paper-pencil peer-rating form of the questionnaires sent home. At the end, participants were debriefed and offered a personalized feedback and information on the study outcomes. All procedures were in compliance with the ethical guidelines of the APA and the Swiss Psychological Society.

3 Results

3.1 Preliminary analyses

First, the descriptive statistics of the trait measures and comparisons to reference samples are presented. Furthermore, the means of the current sample were compared to reference samples in order to ensure comparability at baseline (i. e., before the intervention). Table 2 shows the descriptive statistics for the full sample and the internal consistencies of the scales.

As seen in Table 2, the current sample reported lower scores in trait cheerfulness ($t[103] = -3.52, p < 0.001$), sense of humor (total score; $t[105] = -4.81, p < 0.001$) and life satisfaction ($t[103] = -2.87, p = 0.005$), as well as higher scores in trait seriousness ($t[103] = 4.74, p < 0.001$), while not differing in trait bad mood ($p = 0.290$). The internal consistencies of the scales were all good and comparable to former findings. Next, the descriptive statistics of the trait variables are presented for each group separately (Table 3).

Table 3 shows the descriptive statistics of the trait variables at the three measurement time points (baseline = T1, end of intervention = T2, two-month follow up = T3) for each of the four groups, the two intervention groups with training (IG1, IG2) and the two control groups (CGH, CGW). Last, the descriptive statistics of the peer-ratings are presented. Table 3 shows peer-ratings of two close friends of the SHS obtained before the training (T1) and directly after the

Table 2: Descriptive statistics and internal consistency of the trait variables at baseline and comparison to reference samples.

Scale	N	M	Total sample				Reference samples		
			SD	α	Min	Max	M	SD	α
SWLS	104	24.33	4.88	0.84	9.00	34.00	25.70 ^a	4.80 ^a	0.84 ^a
STCI-T < 60 >									
Cheerfulness	104	57.63	9.91	0.93	29.00	78.00	61.06 ^b	9.60 ^b	0.92 ^b
Seriousness	104	52.99	8.82	0.86	29.00	75.00	48.89 ^b	9.69 ^b	0.88 ^b
Bad Mood	104	38.48	10.57	0.92	20.00	67.00	39.59 ^b	10.95 ^b	0.93 ^b
SHS									
Total Score	106	105.05	17.16	0.93	64.00	146.00	113.07 ^c	15.12 ^c	0.90 ^c

Notes: α = Cronbachs Alpha; *Min* = Minimal value; *Max* = Maximal value; *M* = mean sum score. SWLS = Satisfaction With Life Scale; STCI-T < 60 > = State-Trait-Cheerfulness Inventory Standard Trait Version < 60 >; SHS = Sense of Humor Scale; Total Score. ^a Swiss Sample ($N=445$. Peterson et al. 2007); ^b Construction Sample ($N=600$. Ruch et al. 1996); ^c Sample of German-Speaking adults ($N=151$. Ruch and Carrell 1998).

Table 3: Descriptive statistics of the trait variables at T1, T2, T3 for all groups separately.

	IG1		IG2		CGH		CGW	
	M	SD	M	SD	M	SD	M	SD
SWLS								
T1	22.95	5.02	25.64	3.90	24.06	6.35	24.39	4.66
T2	23.70	4.65	27.15	4.75	24.13	5.76	23.71	5.38
T3	24.20	4.90	27.83	3.66	25.63	4.76	24.64	6.10
STCI CH								
T1	60.30	9.09	59.72	8.84	56.72	11.78	55.79	9.92
T2	60.56	9.61	62.54	8.85	55.69	7.86	54.86	10.19
T3	62.09	6.82	60.54	8.12	57.25	8.18	54.51	8.91
STCI SE								
T1	50.15	10.53	52.14	8.73	53.54	6.50	54.45	8.69
T2	49.45	8.54	49.75	8.51	51.35	6.51	54.60	9.31
T3	46.08	9.14	48.67	6.13	53.41	7.28	54.37	10.04
STCI BM								
T1	38.00	10.30	35.92	8.44	37.79	11.50	40.15	11.28
T2	35.35	9.32	35.11	10.52	37.56	10.20	41.61	12.79
T3	33.57	7.94	33.97	10.31	33.65	10.29	41.17	13.18
SHS total score								

(continued)

Table 3: (continued)

	IG1		IG2		CGH		CGW	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
T1	108.93	17.56	109.02	16.04	101.31	16.90	102.59	17.44
T2	112.62	14.14	113.03	12.87	103.20	12.35	101.35	17.45
T3	114.05	17.01	114.50	12.36	109.13	14.01	101.74	17.21
Peer SHS total score								
T1	104.30	25.94	104.60	15.01	109.09	15.24		
T2	118.20	15.13	110.85	12.73	105.38	13.89		

Notes: $N_{total} = 100-104$. $N_{IG1} = 20$. $N_{IG2} = 24$. $N_{CGH} = 16$. $N_{CGW} = 42 - 46$. IG1 = Training and Home Play. IG2 = Training only. CGH = Control group: Placebo humor group. CGW = Control group: Waiting control group. SWLS = Satisfaction with Life Scale. STCI = State-Trait Cheerfulness Inventory. CH = Trait cheerfulness. BM = Trait bad mood. SE = Trait seriousness. SHS = Sense of Humor Scale (McGhee 1996). T1 = Baseline. T2 = Intervention end time. T3 = Two month-up follow up. Mean sum scores are reported.

end of the training (T2) for the two intervention groups (IG1, IG2) and the placebo humor control group (CGH).³

3.2 Testing aim 1 and 2: the malleability of humor and boosting humor in the individuals' life

To test aim 1 and aim 2, we first investigated mean level differences in the four groups at three measurement time points for the sense of humor assessed by the SHS (self-reports; mean sum scores reported in Table 3). We conducted a repeated measures ANOVA with group (IG1, IG2, CGH, CGW) as factor, and the SHS total score as dependent variable (for T1, T2, and T3). The SHS total scores increased across all three time points ($F[2, 188] = 7.63$, $p < 0.001$, $\eta_p^2 = 0.075$). Helmert contrasts indicated that T1 differed from the later time points, as well as T2 (T1 < later: $p = 0.002$, T2 < later: $p = 0.034$). Next, we tested a set of contrasts to investigate the five hypotheses postulated and to reveal differences between the four groups at the three measurement time points. Most importantly, we wanted to investigate whether the two intervention groups differed from the two control groups (contrast 1). Secondly, we checked whether the intervention groups separately differed from the two control groups (contrast 2 and 3).

³ Zero order correlations between the trait and state measures were in line with former findings.

Thirdly, we checked whether the two intervention groups differed from one another (i.e., whether additional Home Play would make a change), and whether the two control groups differed from each other (i.e., whether being in a placebo humor group made a change to being in a waiting control group; contrast 4 and 5). The results are reported in Table 4.

Table 4: Group differences in the SHS total scores (self and peer-reports).

		SHS total score self-report contrasts					SHS total score peer-report contrasts			
		1	2	3	4	5	1	2	3	4
T1	t	1.96	1.53	1.65	-0.02	-0.26	-0.82	-0.74	-0.72	-0.05
	df	102	102	102	102	102	57	57	57	57
	p	0.05	0.13	0.10	0.99	0.80	0.42	0.46	0.48	0.96
T2	t	3.31	2.56	2.83	-0.09	0.42	2.26	2.76	1.22	1.75
	df	98	98	98	98	98	57	57	57	57
	p	0.001	0.01	0.01	0.93	0.68	0.03	0.01	0.27	0.09
T3	t	2.68	2.05	2.30	-0.10	1.61				
	df	100	100	100	100	100				
	p	0.01	0.04	0.02	0.93	0.11				

Notes: Contrast coding: Contrast 1 (IG1, IG2, CGH, CGW): 0.5, 0.5, -0.5, -0.5. Contrast 2 (IG1, IG2, CGH, CGW): 1, 0, -0.5, -0.5. Contrast 3 (IG1, IG2, CGH, CGW): 0, 1, -0.5, -0.5. Contrast 4 (IG1, IG2, CGH, CGW): 1, -1, 0, 0. Contrast 5 (IG1, IG2, CGH, CGW): 0, 0, 1, -1. Equal variances were assumed for the self- and the peer-reports.

In line with the expectations, the groups did not differ in their SHS total score at baseline (T1; all n.s.). At the time point right after the intervention (T2), the two intervention groups had higher scores in the sense of humor compared to the two control groups (contrast 1), in line with the expectations. Moreover, both intervention groups also outperformed the control groups separately (contrast 2 and 3), in line with the expectations. Yet, the additional Home Play did not lead to a further increase in the sense of humor as compared to the intervention with no Home Play after the intervention at T2 (contrast 4). Also, it did not matter whether one was assigned to a humor placebo group or a waiting control group at T2 (contrast 5 n.s.). To conclude, the training did boost the humor of the individuals in the intervention groups compared to the control groups and the sense of humor was shown to be malleable, as the scores changed across time.

At the two-month follow up (T3), contrast 1 indicated that the two intervention groups still scored higher in the sense of humor than the two control groups. Moreover, the two intervention groups also outperformed the controls

groups separately (contrast 2 and 3). Again, it did not make a change whether the group received additional Home Play or not (contrast 4).

Next, we looked at the peer-reported changes in sense of humor from T1 (baseline) to T2 (after the training). Data from the three groups who met (IG1, IG2, CGH) were available. We conducted a repeated measures ANOVA with group (IG1, IG2, CGH) as factor, and the SHS total score as dependent variable (T1, T2). The peer SHS total scores increased from pre to post (main effect time: $F[1, 57] = 4.82$, $p = 0.032$, $\eta_p^2 = 0.078$; main effect group: $F[2, 57] = 0.48$, $p = 0.620$) and the effect was qualified by an interaction (group x time): $F(2, 57) = 3.96$, $p = 0.028$, $\eta_p^2 = 0.118$, indicating that while the peer-reports increased from T1 to T2 for the two intervention groups, they did not increase for the placebo humor group. Consequently, four contrasts were computed: again, we tested whether the intervention groups differed from the control group (contrast 1). Secondly, we checked whether the intervention groups separately differed from the placebo humor control group (contrast 2 and 3). Thirdly, we checked whether the two intervention groups differed from one another (i.e., whether additional Home Play would make a change; contrast 4). As expected, no differences occurred at T1. At T2, both intervention groups were reported to have a higher score on the SHS as compared to the placebo humor group. As perceived by close friends of the trainees, the individuals in IG1, receiving a training and Home Play were reported to have an increase in the sense of humor at T2 compared to the placebo humor control group (contrast 2). The training alone (IG2) did not lead to peer-reported increases in the sense of humor (contrast 3) and there was no difference among the two intervention groups (contrast 4).

3.3 Testing aim 3 and 4: increasing the frequency of positive emotions and decreasing negative emotions

To test the increase in positive emotions and the decrease in negative emotions as outcomes of the training, we investigated changes in humor-related mood (state cheerfulness, state seriousness, state bad mood) assessed pre and post each training session in the two intervention groups and the placebo humor control group. On a micro level (short term increase of positive emotions and decrease of negative emotions), we checked whether the training sessions increased cheerful mood, decreased bad mood, and seriousness at each session individually. On a macro level (longer lasting changes), we tested whether the mean levels of the pre-training state cheerfulness, seriousness, and bad mood changed over time. If positive emotions increase, mean levels of cheerfulness

may increase over the eight weeks (and the reverse effect was expected for state bad mood and seriousness).

First, we investigated pre-post changes at every training session. We conducted eight repeated measures ANOVAs with the groups (IG1, IG2, CGH) as factor, the pre and post assessment as repeated measure and level of cheerfulness as dependent variable (the means of the sum scores are reported in Figure 1).⁴ The results can be seen in Table 5.

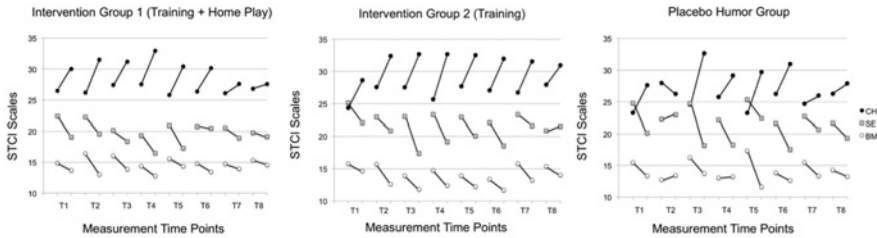


Figure 1: Humor-related mood (state cheerfulness = CH, state seriousness = SE, state bad mood = BM) before and after each meeting for the two intervention groups (IG1, IG2) and placebo humor group (CGH) separately.

In line with the expectations, Table 5 shows that cheerfulness increased from pre to post the training session for the first six meetings (with no differences amongst the groups and no interactions). For meeting 7 and 8, no significant increase in cheerfulness occurred. For IG1 and IG2, those two sessions targeted the ability to laugh at yourself and humor under stress, the two most difficult stages of humor skills (the placebo humor group had sessions on quick-wittedness and a wrap up session).

Second, we investigated pre-post changes in state seriousness. Similarly to state cheerfulness, seriousness decreased from before to after the session for six out of eight sessions, with no effect for the group factor, nor the group x time interaction (see Table 5). Again, the last sessions did not lead to a significant decrease in state seriousness. Third, we looked at pre-post changes for state bad mood. Notably, the participants did not report high levels of bad mood at the start of the sessions. Thus, unsurprisingly, the results show that bad mood decreased for two sessions only (with numerical, but statistically insignificant decreases for the other sessions). To conclude, the sessions induced cheerfulness and decreased seriousness, while having little effect on (the low levels of) bad mood.

⁴ To account for the multiple testing, we applied a correction across all eight ANOVAs.

Table 5: Pre-post changes in humor-related states (cheerfulness, seriousness, bad mood).

Session	CH (pre-post)	η_p^2	Group	Interaction
1	$F(1, 55) = 22.11^{***}$	0.287	$F(2, 55) = 1.76$	$F(2, 55) = 0.40$
2	$F(1, 55) = 15.96^{***}$	0.225	$F(2, 55) = 1.76$	$F(2, 55) = 9.26$
3	$F(1, 55) = 43.63^{***}$	0.447	$F(2, 55) = 1.97$	$F(2, 55) = 0.44$
4	$F(1, 55) = 39.16^{***}$	0.424	$F(2, 55) = 1.63$	$F(2, 55) = 1.49$
5	$F(1, 55) = 68.69^{***}$	0.569	$F(2, 55) = 1.71$	$F(2, 55) = 1.08$
6	$F(1, 53) = 22.52^{***}$	0.298	$F(2, 53) = 0.36$	$F(2, 53) = 0.14$
7	$F(1, 47) = 8.35$		$F(2, 47) = 2.15$	$F(2, 47) = 2.18$
8	$F(1, 50) = 6.01$		$F(2, 50) = 0.84$	$F(2, 50) = 0.67$
	SE (pre-post)	η_p^2	Group	Interaction
1	$F(1, 55) = 28.80^{***}$	0.344	$F(2, 55) = 1.50$	$F(2, 55) = 0.75$
2	$F(1, 55) = 2.96$		$F(2, 55) = 0.35$	$F(2, 55) = 1.56$
3	$F(1, 54) = 37.02^{***}$	0.407	$F(2, 54) = 0.75$	$F(2, 54) = 3.49$
4	$F(1, 52) = 35.10^{***}$	0.394	$F(2, 52) = 1.79$	$F(2, 52) = 0.47$
5	$F(1, 53) = 17.03^{**}$	0.247	$F(2, 53) = 2.61$	$F(2, 53) = 2.10$
6	$F(1, 53) = 10.05$	0.159	$F(2, 53) = 0.17$	$F(2, 53) = 0.14$
7	$F(1, 47) = 6.43$	0.120	$F(2, 47) = 0.74$	$F(2, 47) = 0.39$
8	$F(1, 50) = 2.14$		$F(2, 50) = 0.51$	$F(2, 50) = 1.28$
	BM (pre-post)	η_p^2	Group	Interaction
1	$F(1, 55) = 2.54$		$F(2, 55) = 0.36$	$F(2, 55) = 0.35$
2	$F(1, 52) = 8.87$		$F(2, 52) = 0.45$	$F(2, 52) = 3.51$
3	$F(1, 54) = 13.10^*$	0.195	$F(2, 54) = 1.12$	$F(2, 54) = 0.38$
4	$F(1, 54) = 3.88$		$F(2, 52) = 0.47$	$F(2, 52) = 1.13$
5	$F(1, 52) = 17.78^{***}$	0.255	$F(2, 52) = 0.63$	$F(2, 52) = 3.36$
6	$F(1, 53) = 4.79$		$F(2, 53) = 0.72$	$F(2, 53) = 0.05$
7	$F(1, 47) = 6.92$		$F(2, 47) = 0.05$	$F(2, 47) = 1.60$
8	$F(1, 50) = 2.88$		$F(2, 50) = 0.27$	$F(2, 50) = 0.14$

Notes: All p with Bonferroni correction². * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

To test whether positive emotions increased over the time course of the intervention, we investigated whether there was a trend in increase in cheerful mood across all eight pre session measures of state cheerfulness (serving as an indicator for general positive mood on a given day). We computed a repeated measures ANCOVA with the eight pre measures as repeated measures factor, the group as factor (IG1, IG2, CGH), trait cheerfulness as covariate and the level of state cheerfulness as dependent variable. Results show that no linear trend occurred, $F(1, 28) = 0.05$, $p = 0.826$. Equivalent analyses with state seriousness, $F(1, 28) = 0.42$, $p = 0.522$ (controlling for trait seriousness), and state bad mood (controlling for trait bad mood), $F(1, 28) = 0.54$, $p = 0.486$, did not indicate a general drop in “negative emotions” and a serious frame of mind.

3.4 Testing aim 5: increasing life satisfaction

Finally, to test whether the training would change individuals' evaluations of their lives in general (life satisfaction; mean sum scores and standard deviations reported in Table 2), we conducted a repeated measures ANOVA with group (IG1, IG2, CGH, CGW) as factor, and the SWLS total score as dependent variable (for T1, T2, and T3), followed by five planned contrasts. The life satisfaction increased across all three time points (main effect time: $F[2, 184] = 3.75$, $p = 0.02$, $\eta_p^2 = 0.039$). Next, we tested a set of contrasts to investigate differences between the four groups at the three measurement time points. Most importantly, we wanted to investigate whether the intervention groups differed from the control groups (contrast 1). Secondly, we checked whether the intervention groups separately differed from the two control groups (contrast 2 and 3). Thirdly, we checked whether the two intervention groups differed from one another (i.e., whether additional Home Play would make a change), and whether the two control groups differed from each other (i.e., whether being in a placebo humor group made a change to being in a waiting control group; contrast 4 and 5). At T1, none of the contrasts was significant, in line with the expectations (all n.s. $p > 0.08$). At T2, IG2 differed from the control groups (contrast 3; $t[98] = 2.48$, $p = 0.01$) and IG1 reported lower life satisfaction than IG2 (contrast 4; $t[98] = -2.20$, $p = 0.03$). At T3, again, IG2 differed from the control groups (contrast 3; $t[100] = 2.07$, $p = 0.01$) and IG1 reported lower life satisfaction than IG2 (contrast 4; $t[100] = -2.30$, $p = 0.01$).

4 Discussion

This study experimentally tested the effects of the 7 Humor Habits Program proposed by McGhee and adapted by the authors and evaluated the achievement of five aims summarized by Ruch and McGhee (2014). Four groups were tested: IG1 received McGhee's eight-week humor training, accompanied by Home Play exercises, IG2 received the training without the Home Play. In the two control groups, one received a placebo humor "training" (CGH) and one was established as a waiting control group (CGW). In line with the initial idea that this program was particularly useful for individuals who discover problems in being playful, want to foster their sense of humor or discover first signs of what was called "terminal seriousness" (see McGhee 2010), the individuals volunteering to participate in this study showed lower levels of trait cheerfulness, sense of humor and life satisfaction at baseline compared to reference samples. We

found support for aim 1 and aim 2 (boosting humor in the individuals' life and malleability of the sense of humor), aim 3 (increase of positive emotions through the training) and support for aim 5 (increase of life satisfaction for one of the two groups who received the training by McGhee), in line with other published findings (e.g., Crawford and Caltabiano 2011; Falkenberg et al. 2011).

4.1 Aim 1 and 2: boosting humor and malleability of humor

For both intervention groups, the sense of humor assessed by the SHS (McGhee 1996) increased from pre to post the intervention and the differences were still visible after two months (T3). For the intervention groups (with and without accompanying Home Play), this effect was substantiated by the peer-reports on the SHS: The peers noticed an increase in the sense of humor for the individuals in these groups. This indicated that the sense of humor is indeed malleable through a humor training, and this is not only noticeable for the individual (through introspection), but also observable by close friends (peers did not notice any change in the sense of humor for individuals in the placebo humor group). This points towards the humor training fostering intra-personal functions of humor directly observable to others (i.e., individuals rather laughing at themselves than getting annoyed after a mishap) and inter-personal functions of humor (i.e., bringing smiling and laughter to other people to foster group cohesion, etc.).

4.2 Aim 3 and 4: increase of positive and decrease of negative emotions

When looking at the induction of state cheerfulness from pre to post each training or meeting session (micro level), it was found that cheerfulness increased for the first six meetings in the two intervention groups, as well as in the placebo humor group. Similar results, but in the opposite direction, were found for state seriousness (dropping from pre to post the sessions). This is important as McGhee pointed out that adults may acquire what he calls "terminal seriousness" and thus this result shows that the program is capable of decreasing seriousness too (in order for more playfulness to be possible). With respect to bad mood (i.e., decrease of negative emotions), no significant decreases could be detected, as individuals did not report to be in a bad mood to start with. Therefore, there was not much room for bad mood decreasing much further. Interestingly, no increase in state cheerfulness and

no decrease in state seriousness for the sessions on “laughing at yourself” and “humor under stress” were found. First of all, this might be partly due to the more difficult nature of the habits. The ability to laugh at yourself targets adverse situations, personal weaknesses and mishaps and asks for acceptance of one’s blunders, the ability to self-distance, and the overcoming of negative emotions (see also Hofmann 2018, in this Special Issue). Similarly, for “humor under stress” an engagement with the elicitors of one’s stress is necessary and the development of constructive, humorous coping mechanisms indicated. These topics ask for a more serious frame of mind and explain why seriousness did not drop as much. Secondly, debriefings and conversations with the participants indicated that the participants felt sad that the training would end soon, which had impacted on their mood during the last two sessions and might alternatively explain the non-significant increase in cheerfulness and non-significant decrease in seriousness and bad mood.

4.3 Aim 5: life satisfaction

In this study, we used a measure of life satisfaction as an indicator of resilience and the ability to successfully cope with stress. Although the concepts are different, life satisfaction may be seen as a good indicator of one’s overall evaluations of one’s life that can be easily assessed. Generally, life satisfaction increased over the course of the intervention time span and follow up, with IG2 reporting higher life satisfaction than IG1 and the two control groups after the intervention (T2) as well as after two months (T3). This might be surprising, as it was expected that the IG1, which did not only receive the training, but also worked with the Home Play exercises should have experienced the largest benefits. Yet again, information from the participants might explain these results: The participants from IG2 met on a voluntary basis (and without the knowledge of the experimenters) between the sessions and reported to have “great fun”. This might have boosted the life satisfaction of this group through the positive group experience even more than the program alone could do. While this obviously is not desirable from the point of view of scientific experimenting, it still points towards an important mechanism for humor training: Humor trainings might just need to “start the motor and get the car going”, while participants then “keep the car moving and bring it up to speed” themselves. Lastly, further studies should include direct measures of resilience and stress coping to directly test aim 5, as well as including other measures of well-being that target different facets of well-being.

4.4 Who should be trained?

The results of several studies have shown that trait cheerfulness predicts how much individuals profit from humor interventions (e.g., Hofmann et al. 2015; Papousek and Schulter 2008). Therefore, it might be considered that trait cheerful individuals respond differently compared to non-trait cheerful individuals when being confronted with a humor intervention. Interestingly, the recruitment strategy (i.e., announcing for a training to foster humor and well-being) seemed to attract individuals that were indeed “in need” of a humor training, as they reported to be less trait cheerful, more trait serious, less satisfied with their lives and less humorous as assessed by the SHS compared to reference samples at baseline (i.e., “terminally serious” in the spirit of McGhee). This supports the view that humor is a trait that people do like to foster and it seems that individuals who have lower inclination to humor volunteer for a humor training more likely than individuals who already see themselves as cheerful, playful and having a good sense of humor. While the training reduces state seriousness, it is important to note that seriousness and playfulness are not mutually exclusive on the level of traits and certain forms of humor do require a cheerfully composed attitude while also giving serious consideration to the situation and circumstances. In line with this, Proyer and Rodden (2013) found that some individuals do score high on cheerfulness and seriousness at the same time (the “*homines ludentes*”), and some of the subjects were also amongst the most playful subjects of the study.

4.5 McGhee training versus “unsystematic exposure to humor”

Our design allowed for a comparison of the training after Paul McGhee with a “placebo humor group”. In the latter group, individuals also met regularly and where exposed to humor, yet in an a-theoretical manner. The current results showed that while the placebo humor group also experienced increases of cheerfulness and decreases in seriousness for most of the meeting sessions, the exposure to humor itself did not increase the sense of humor nor life satisfaction on a trait level. Thus, while being exposed to humor may lead to a short-term induction of humor-related mood, it does not have an impact on the training outcomes targeting the fostering of one’s sense of humor and life satisfaction.

4.6 Limitations

This study has several limitations. First of all, the sample sizes for the groups were comparatively small and unweighted in terms of gender. Future studies may aim at the training of bigger groups with a more equal distribution of males and females for a comparison of gender differences in more detail. Secondly, aim 5 should be directly tested by utilizing measures of resilience and stress coping. Thirdly, in the current study, we did not check whether people actually completed the additional Home Play. Future studies may thus explicitly check this and include this information in the analyses.

4.7 Further developments

The current study showed that the manualized training by McGhee fostered humor. Due to similar, encouraging findings from the clinical context, an adaptation of the manual for the use in therapy was developed (Falkenberg et al. 2012; Falkenberg et al. 2011). Yet, the current results show that one challenge of such a humor training is the issue of consolidation and transfer to all-day life. Although many interventions (even much shorter ones, see Ruch and Hofmann 2017 for an overview) lead to positive outcomes, one challenge is for these benefits to remain over a longer time span (even longer than the typical follow up time spans measured in psychological studies!). Therefore, interventions may be extended to include consolidation sessions, which particularly target the use of the newly learned humor skills in all-day life or refresher sessions to reflect on the use of the skills after the training ended and how this can be supported/increased/advanced.

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Bionotes

Willibald F. Ruch

Willibald Ruch is a Full Professor of Psychology at the University of Zurich, Switzerland. His research interests are in the field of personality and assessment, with a special focus on humor and laughter, cheerfulness, and smiling. In his doctoral dissertation at the University of Graz (Austria) in 1980, he developed a taxonomy of jokes and cartoons and studied their relation to personality. His more recent work, together with his research team at the University of Zurich, includes humor from a positive psychology perspective, the effectiveness of humor training programs and clown interventions, the ability to laugh at oneself, the fear of being laughed at (gelotophobia), and the measurement of humor.

Jennifer Hofmann

Jennifer Hofmann PhD, is a senior teaching and research fellow at the department of personality and assessment (Institute of Psychology), University of Zurich. Her current research interests are in personality and assessment, humor, encoding and decoding of positive emotions, as well as nonverbal behavior (applying the Facial Action Coding System), with a special interest in laughter.

Sandra Rusch and Heidi Stolz

M.Sc. Heidi Stolz and M.Sc. Sandra Rusch graduated at the Department of Psychology at the University of Zurich in Switzerland by Willibald Ruch with a special interest in the training of humor. Since then, they have been on the road as humor trainers and carry out humor trainings at many different companies, organizations and institutions, as well as the post-graduate course CAS in Positive Psychology at the University of Zurich.