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Psychometric adaptation of the Comic Style Markers in a Polish sample

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Abstract: We attempted a psychometric validation of a Polish-language version of the Comic Style Markers questionnaire (CSM). A sample of 1785 adult Polish participants completed a Polish translation of the CSM (CSM-PL), the HSQ, and the IPIP-BFM-20. A self-other correlation analysis was carried out on 116 Polish university students. Exploratory and confirmatory factor analyses of several models have shown a six-factor, 33-item solution to have good model fit, with the lighter comic styles (benevolent humor, fun, nonsense, and wit) retained and the darker comic styles merging into cynicism and a new factor of *mocking humor*. The CSM-PL achieved satisfactory reliability and measurement invariance. We also present preliminary evidence suggesting validity in terms of correlations with age and gender, humor styles, Big Five personality traits, and self-other correlations. Nevertheless, the CSM-PL should be employed in further studies to confirm its validity.

Keywords: comic style markers; comic styles; humor; psychometric adaptation; individual differences

1 Introduction

Individual differences in humor behaviors encompass both broad personality dimensions (Banasik-Jemielniak and Kałowski 2022; Heintz and Ruch 2019; Mendiburo-Seguel et al. 2015) as well as more specific traits (Gardner et al. 2021; Ruch

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et al. 2015). However, alongside varied arrays of correlates and predictors of humor behaviors, studies also conceptualize, delineate, and measure these humor behaviors in varied ways (see Martin and Ford 2018, for an overview), in part due to potential cross-cultural differences. Consequently, one theoretical framework, measure, or set of results may not be easily generalized beyond the context in which it was produced (Lu 2023). We sought to advance the field by attempting a psychometric validation of a Polish version of the Comic Style Markers (CSM) questionnaire by Ruch et al. (2018), a recent self-report measure of humor behaviors focusing on formal aspects of humor. To this end, we first present the concept of the comic styles and discuss the CSM questionnaire, including existing evidence for its reliability and validity. We then introduce the current study in greater detail.

1.1 The Comic Style Markers

Psychological studies on the individual differences in humor use/appreciation typically conceptualize humor behaviors as theoretically or empirically derived trait-like factors. Taken together, they categorize the possible varieties, aspects, or functions of humor employed in interactions (Craik et al. 1996; Martin et al. 2003). This is in contrast to pragmatic or cognitive theories of the processes of humor use and understanding, general theoretical conceptualizations of “sense of humor,” or studies on the aesthetics, sociology, or philosophy of humor, on humor production/ability, or on humor understanding as a marker for clinical conditions (see Ruch 2008).

Several sets of humor behaviors following this conceptualization have been proposed. The CSM (Ruch et al. 2018) is a particularly notable contribution. In contrast to the most popular existing classifications or measures (Craik et al. 1996; Martin et al. 2003), the CSM is intended to measure humor behaviors distinguished not by virtue of their intra- or interpersonal functions nor by the constituent elements of a traitlike notion of sense of humor, but rather “elementary flavors, types, or distinctive qualities of humor” (Ruch et al. 2018: 2). To this end, the theoretical underpinnings and item generation of the CSM were based on lexical studies of words describing various types of humor distinguished based on a set of formal criteria (e.g., intention, attitude, intended audience). The CSM comprises eight scales: fun (good-natured teasing and practical jokes), benevolent humor (benevolent, sympathetic, and accepting of problems and shortcomings), nonsense (playfully creative and irreverent), wit (clever and pointed), sarcasm (hurtful, critical, and derisive), cynicism (mocking of established norms), satire (negative and mocking, but with a corrective, moral aim), and irony (creating a sense of ingroup superiority and conceitedness). The first four comic styles are referred to as *lighter*, while the latter four as *darker* (with wit being considered on the borderline between the two categories, but still lighter).

1.2 Psychometric properties of the Comic Style Markers

The CSM has a range of evidence in favor of its psychometric quality. Regarding its factorial structure, in the original CSM study, Ruch et al. (2018) tested a Swiss-German-Austrian sample and adopted the correlated eight-factor solution despite the fact that “the scree test indicated the retention of either four or six factors” and that “the parallel analysis suggested the retention of nine factors, and the revised minimum average test suggested the retention of seven factors” (p. 8). They also performed a confirmatory factor analysis (CFA) for the eight factors individually. In an Italian study, Dionigi et al. (2022) reported the results of a CFA for unidimensional models for each factor separately, while Mendiburo-Seguel and Heintz (2020b) confirmed the eight-factor structure via a CFA.

In contrast, Moreira and Inman (2021) found that in their Portuguese sample, the bifactor model (comprising a broad humor factor together with eight separate and specific comic style factors) had a better fit than either a first- or a second-order correlated-factors model. Finally, Torres-Marín et al. (2024) tested a Spanish-US sample and carried out a comprehensive evaluation of nine different factorial models. They found that a correlated eight-factor model with 24 items (selected based on “factorial loadings and modification indices,” 412) had optimal fitness indices. Furthermore, the shortened item pool represented the eight comic styles more accurately in terms of factor loadings.

Considering the cultural specificity of the CSM’s item generation process (see Ruch et al. 2018) as well as the emerging results on its factor structure in various samples, our main goal was to contribute to the CSM literature by carrying out a psychometric validation of its Polish-language version, which we also introduced in the current study. To this end, we carried out an exploratory (EFA) and confirmatory factor analysis (CFA) on a broad range of possible factorial models. We also examined the reliability of the CSM-PL and made an initial test of its validity via a correlation analysis with demographic variables, the Humor Styles Questionnaire (HSQ; Martin et al. 2003), currently the most popular humor measure, and the Big Five personality traits, for which comparative CSM data already exists.

1.3 The CSM in previous studies

In a Chilean sample, Mendiburo-Seguel and Heintz (2020a) showed that, with some statistically nonsignificant exceptions, the comic styles correlated with sense of humor and humorous self-image (self-rated “funniness and frequency of laughter” in

comparison to others) and appreciation of various subjects of humor, including disparaging humor targeting various social groups. Although the lighter and darker comic styles did not show a clear differentiation in terms of correlations with nondisparaging and disparaging humor subjects, the darker comic styles were correlated with acceptability of laughing at marginalized groups, while the lighter comic styles showed higher correlations with self-rated happiness. In another Chilean study, Mendiburo-Seguel and Heintz (2020b) found a range of small demographic effects: men achieved higher scores overall (except on benevolent humor) while fun, nonsense, irony, satire, sarcasm, and cynicism decreased with age. Lower education level was also related to lower irony, satire, sarcasm, and cynicism. Finally, sarcasm, cynicism, nonsense, irony, and satire were higher among “agnostics and atheists” (6), and cynicism was higher among left-wing people. Higher CSM scores in men were also reported by Ruch et al. (2018), Dionigi et al. (2022), and Torres-Marín et al. (2024), with some individual exceptions (e.g., benevolent humor in Ruch et al. 2018, and Torres-Marín et al. 2024). Age-related results are more conflicting between the existing studies, with Torres-Marín et al. (2024) reporting “no age-based differences [...] with the exception of fun” (415) being related to younger age.

Regarding the relationships between comic styles and psychological traits, the Big Five traits have been examined by Ruch et al. (2018) and Dionigi et al. (2022) who reported largely convergent results. Namely, extraversion and openness to experience were broadly positively correlated with all comic styles (except with sarcasm and cynicism with Ruch et al. (2018), and agreeableness was negatively correlated with the darker comic styles, but not positively correlated with the lighter ones). Neuroticism was also negatively correlated with the lighter humor styles, and in Dionigi et al. (2022) – positively correlated with sarcasm and cynicism. Finally, conscientiousness was negatively correlated with fun, nonsense, and cynicism. Despite some occasional differences in results between these studies, they offer some evidence for the validity of the eight comic styles concept. Therefore, in the current study, we sought to extend these results by also including a measure of the Big Five.

Finally, we focused on adapting the CSM into Polish. Poland represents a particularly interesting context for humor studies, as due to its geographical location, it is considered a national cultural midpoint between individualistic and collectivist cultures (Forbes et al. 2009). Moreover, some authors claim that Polish culture is characterized by a recognized norm of negative emotional states (Kurtyka 2019). Together with its history of political and military occupations, this may have resulted in a particular cultural preference for indirect speech, including irony or sarcasm (Barta 2013). Although the above are only tentative suggestions, examining the psychometric properties of appropriately adapted

humor behavior measures in different cultural contexts remains pertinent (Banasik-Jemielniak and Kałowski 2022; Moreira and Inman 2021).

1.4 The current study

We created a Polish version of the CSM, the CSM-PL, using the back-translation method (see Van de Vijver and Hambleton 1996), on two translations made by the first author and a professional translator which were then compared and collated. Data collected specifically for validation as well as CSM-PL data from our ongoing research projects were combined, yielding a large Polish sample. We examined the CSM-PL's factor structure (via an exploratory factor analysis, EFA, and CFA), measurement invariance (MI) for gender, education level, place of residence, and study subsample (see below), reliability (via Cronbach's α and McDonald's ω), and validity (via correlation analyses with the Big Five personality factors and the HSQ humor styles). A self-other correlation analysis was also carried out on a separate, Polish university student sample.

The current study was pre-registered. The pre-registration and the dataset are available at the Open Science Framework at <https://osf.io/5gqcm> (preregistration) and <https://osf.io/kzdfe/files/osfstorage> (data and the CSM-PL). Ethical approval was obtained from the Research Ethics Committee of the first author's affiliated university. Approval to use and translate the CSM was obtained from its original author via personal correspondence.

2 Methods

2.1 Participants

We collected online data from a total of 1785 (56.47 % women) adult Polish participants in six separate subsamples. Participants in Subsample 1 ($n = 719$) were recruited via a third-party surveying agency. Participants in Subsample 2 ($n = 116$, the self-other correlation subsample) were invited in-person to participate online. The participants in Subsample 3 ($n = 100$) were recruited online as part of a graduate course in psychology, while the participants in Subsamples 4–6 ($n = 285$, 348, and 217, respectively) were recruited online as part of other research projects with analogous procedures (see, e.g., Fanslau et al. 2023, 2024). This sample size is considered appropriate for CFA (see Moreira and Inman 2021). Descriptive statistics are presented in Table 1.

Table 1: Sample descriptive statistics.

	Subsample						Total
	1	2	3	4	5	6	CFA dataset
N	719	116	100	285	348	217	1,071
Age							1,785
M(SD)	39 (12.12)	21.61 (6.20)	25.93 (9.10)	24.14 (6.97)	46.07 (16.30)	30.07 (11.02)	35.06 (14.45)
Range	18–60	18–51	18–51	18–55	18–78	18–77	18–78
Gender (%)							
Women	55.35	65.52	55	60.70	56.90	49.77	56.86
Men	44.23	33.62	44	37.89	42.82	49.31	42.58
Other	0.42	0.86	1	1.40	0.29	0.92	0.56
Education (%)							0.67
Primary or secondary	7.65	2.59	3	0.35	2.87	1.84	4.95
Vocational	22.39	6.03	5	0	0	1.84	9.15
High school or current university student	38.25	82.76	48	81.05	62.36	44.70	55.37
Higher	31.71	8.62	44	18.60	34.77	51.61	30.53
Socioeconomic status (%)							n = 1,468
Low	14.05	0	–	0.35	2.59	–	8.91
Below average	24.76	12.93	–	3.86	14.49	–	17.65
							6.64
							17.30
							17.44

Table 1: (continued)

	Subsample						Total
	1	2	3	4	5	6	EFA dataset CFA dataset
Average	37.69	31.90	-	22.46	56.32	-	36.13 40.44
Good	23.50	55.17	-	77.33	26.15	-	37.31 35.62
Place of residence (%)							n = 1,183
Rural area	27.40	6.90	-	-	37.07	-	27.65 28.63
Below 20,000 citizens	11.68	6.90	-	-	11.78	-	14.14 9.26
Between 20,000 and 100,000 citizens	24.62	6.03	-	-	20.69	-	19.96 22.79
Between 100,000 and 200,000 citizens	10.43	3.45	-	-	10.92	-	11.02 9.12
Between 200,000 and 500,000 citizens	10.15	6.90	-	-	8.33	-	8.32 9.97
Above 500,000 citizens	15.72	69.83	-	-	11.21	-	18.92 20.23
							19.70

Note. EFA = exploratory factor analysis. CFA = confirmatory factor analysis. Primary and secondary education were merged into a single participant category due to the Polish education system. Socioeconomic status and place of residence data was not collected in every subsample. Only the self-report data from Subsample 2 was used in the main analysis.

2.2 Measures

2.2.1 Comic Style Markers

The CSM (Ruch et al. 2018) is a 48-item self-report questionnaire measuring eight comic styles: fun, benevolent humor, nonsense, wit, sarcasm, cynicism, satire, and irony. Each comic style comprises six items. Answers are given on a seven-point Likert-type scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). Scores are calculated separately for each comic style by averaging the item scores.

For the self-other correlation analysis, an other-rating version of the CSM-PL was created by adjusting the wording of the instructions and items to always refer to another person without implying their gender (e.g., “They are a funny joker”). The CSM-PL as well as of the other-rating version are available at the OSF data link.

2.2.2 Humor Styles Questionnaire

To examine the validity of the CSM-PL, the HSQ (Martin et al. 2003) in a Polish adaptation by Hornowska and Charytonik (2011) was used. It was chosen for the validation study due to the fact that it is one of the most popular measures of humor (Martin and Ford 2018). The HSQ is a 32-item self-report questionnaire measuring four humor styles, which are intended to capture “the interpersonal and intrapsychic functions that humor is made to serve by individuals in their everyday lives” (51). These are: affiliative (“I laugh and joke a lot with my closest friends”), self-enhancing (“If I am feeling depressed, I can usually cheer myself up with humor”), aggressive (“If someone makes a mistake, I will often tease them about it”), and self-defeating (“I let people laugh at me or make fun at my expense more than I should”). Each humor style comprises eight items. Answers are given on a seven-point Likert-type scale, from 1 (*totally disagree*) to 7 (*totally agree*). Scores are calculated separately for each humor style by reverse-coding appropriate items and summing the item scores.

2.2.3 IPIP-BFM-20

To provide evidence for validity in the context of personality traits, the IPIP-BFM-20, a Polish adaptation of Donnellan et al.’s (2006) Mini-IPIP by Topolewska et al. (2014) was used. The IPIP-BFM-20 is a 20-item measure of the Big Five personality traits: extraversion (“I am the life of the party”), agreeableness (“I sympathize with others’ feelings”), conscientiousness (“I get chores done right away”), emotional stability (the reverse of neuroticism, “I have frequent mood swings”) and openness to experience,

also called intellect (“I have a vivid imagination”). Each factor comprises four items. Answers are given on a five-point Likert-type scale, from 1 (*does not describe me at all*) to 5 (*describes me perfectly*).

2.3 Procedure

All data was collected online via Qualtrics. In Subsample 1, participants were first presented with introductory information about the study and asked to provide informed consent for participation. Then, the participants filled out the demographic questionnaire comprising age, gender, level of education, socioeconomic status, and size of place of residence. the CSM-PL, the IPIP-BFM-20, and the HSQ. At the end, participants were thanked for their time and were presented with additional information about the study’s aims. Two attention check items were embedded into the survey, one in the CSM-PL and one in the HSQ. Incomplete responses, responses from participants who failed to pass both attention checks, and responses from participants who took less than eight minutes and more than 70 min to complete the survey were removed to maintain a high quality of responses. The participants in Subsamples 3–6 followed analogous online procedures, filling out the CSM-PL as part of varying questionnaire batteries on Qualtrics. Due to differences in the demographic questionnaires between the subsamples, socioeconomic status and size of place of residence data were not gathered in Subsamples 3 and 6, and size of place of residence data was additionally not gathered in Subsample 4.

The participants in Subsample 2 (self-other correlation) were invited in-person and via email to participate in the online study. Each participant was instructed to invite one other person of their choice to participate simultaneously. The only criterion for invitation was that the other person be at least a good enough acquaintance for the participant to be able to accurately rate their sense of humor. The participants were also asked to participate only once. After providing informed consent, the participants first filled out the self version of the CSM-PL, then the other version, and the demographic questionnaire (same as Subsample 1). At the end, the participants were thanked for their time and presented with additional information about the study’s aims. No attention checks were embedded in the self-other questionnaires. Responses from participants who did not have a paired match as well as incomplete responses were removed. A total of 60 responses were removed this way, resulting in the final sample of 116. Only self-ratings from this subsample were included in the EFA/CFA, reliability, MI, and validity analyses. The self-other correlation analysis was carried out on this subsample only.

2.4 Data analysis strategy

Data analysis was carried out using *R* version 4.4.1. (2024.06.14) “Race for Your Life” (R Core Team 2021). Source code management was done using the *RStudio* program version 2024.04.2+764 (RStudio Team 2020). The following packages (together with their dependencies) were used: *tidyverse* (Wickham et al. 2019), *lavaan* (Rosseel 2012), *nFactors* (Raiche and Magis 2022), *psych* (Revelle 2024), and *GPArotation* (Bernaards and Jennrich 2005).

The following analysis strategy was adopted:

1. Exploratory factor analysis: 40 % of the total sample was randomly selected as the EFA dataset. The aim of the EFA was to analyze the number of latent factors indicated by the data and to fit appropriate EFA models. In particular, we sought to test whether the EFA would indicate the existence of eight latent factors (in conjunction with Ruch et al. 2018) and whether the EFA models derived from the data would align with that eight-factor model.
2. Confirmatory factor analysis: The remaining 60 % of the total sample was the CFA dataset. In light of previous psychometric analyses of the CSM (Moreira and Inman 2021; Torres-Marín et al. 2024), we sought to test a broad selection of CFA models. It included models from Torres-Marín et al. (2024) as well as models derived from the EFA. The overall aim of this stage of the analysis was to decide upon the final factor structure of the CSM-PL.
3. Reliability analysis: Cronbach’s α and McDonald’s ω were calculated for each of the CSM-PL factors derived in the CFA.
4. Measurement invariance (MI) analysis: MI was checked for participant gender, study subsample, size of place of residence, and level of education. MI was calculated using the *lavaan* R package (Rosseel 2012).
5. Preliminary validity analysis: Age, gender, HSQ humor style and the IPIP-BFM-20 Big Five data were entered into a correlation analysis with the final CSM-PL factors derived via the CFA. We expected male gender to correlate positively with all comic styles (Dionigi et al. 2022; Mendiburo-Seguel and Heintz 2020b; Ruch et al. 2018). We made no specific predictions about the correlation with age due to differing previous results. For the HSQ, we expected affiliative and aggressive humor styles to broadly correlate with the CSM-PL’s lighter and darker comic styles, respectively (Heintz and Ruch 2019). Despite Heintz and Ruch’s (2019) findings on this point, we did not make specific predictions for the HSQ self-enhancing and self-defeating humor styles (see the Discussion section). For the Big Five, we expected extraversion to correlate positively with the lighter comic styles and agreeableness to correlate negatively with the darker ones, emotional stability to correlate positively with the lighter and negatively with the

- darker comic styles, openness to experience to broadly correlate positively with all comic styles, and conscientiousness to correlate negatively (Dionigi et al. 2022; Ruch et al. 2018).
6. Self-other correlation analysis: The self- and other-ratings on the final CSM-PL factors were subjected to a correlation analysis presented as a multitrait-multimethod matrix.

3 Results

3.1 Exploratory factor analysis

We used Pearson’s r correlations for the EFA as the CSM response scale is relatively long (7 points) and item skewness absolute values were lower than 1 (kurtosis absolute values were all lower than 1.18). The item-level descriptive statistics are shown in Table S1 in the Supplementary Materials. The Kaiser-Meyer-Olkin criterion for the individual CSM-PL items ranged from 0.92 to 0.97 ($M = 0.95$). The item correlation matrix did not contain excessively high (above 0.90) correlations outside of the diagonal, and low correlations (lower than 0.10) comprised only 1.24 % of the matrix. Taken together, this indicated the existence of latent factors in the data.

Next, we carried out the scree plot analysis using the *nFactors* package (Raiche and Magis 2022). The results are shown in Figure 1.

Considering the criteria for the number of latent factors and the fact that the CSM’s theoretical model comprises eight factors (Ruch et al. 2018), we proceeded to

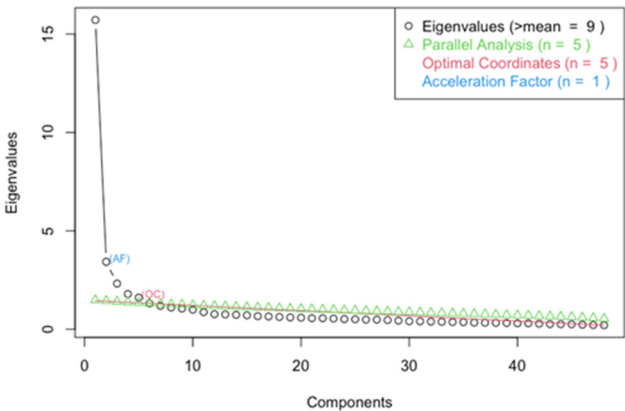


Figure 1: Exploratory factor analysis – scree plot.

test the one-, five-, and eight-factor EFA models. We fit them using the above-mentioned Pearson’s *r* correlation matrix and including Oblimin rotation which allows for correlations between the latent factors. The model fit indices are shown in Table 2.

Neither of the three EFA models achieved satisfactory fit to data (e.g., the Tucker-Lewis Index, TLI, was below 0.90). The models differed from one another to a statistically significant degree ($p < 0.001$). We rejected the one-factor model considering its low TLI. Before proceeding to the CFA, the five- and eight-factor EFA models were subjected to an analysis of their item factor loadings. We applied three criteria. First, any item without a factor loading of at least 0.30 was deleted. This resulted in deleting three items in the five-factor model (CSM13, and CSM34, CSM35) and four items in the eight-factor model (CSM5, CSM10, CSM13, and CSM34). Then, items with a factor loading of equal to or above 0.30 which simultaneously was higher by at least 0.10 than the second-highest loading for that item were assigned to their highest-loading factor. Finally, regarding items with a factor loading above 0.30 but which was not higher by at least 0.10 from the second-highest loading, we created two alternative versions of the five- and the eight-factor models. In the *lax* versions, we manually assigned the items to their highest-loading factor regardless of the difference in loadings within that item. In the *strict* versions, we deleted those items altogether. This way, we derived four models: the lax and strict five-factor models and the lax and strict eight-factor model. Factor loadings and intercorrelations for the five- and the eight-factor models are shown in Tables S2–S5 in the Supplementary Materials.

3.2 Confirmatory factor analysis

The CFA was carried out using the *lavaan* package in *R* (Rossell 2012). Due to divergences of some of the variable distributions from normal, we used the

Table 2: Exploratory factor analysis fit indices.

Factors in model	<i>df</i>	Δdf	χ^2	$\Delta\chi^2$	<i>p</i>	BIC	Δ BIC	TLI	RMSEA [90 % CI]
1	1,080		7,463.92			367.37		0.61	0.091 [0.089, 0.093]
5	898	182	3,201.79	4,262.13	<0.001	−2,698.86	−3,066.23	0.83	0.060 [0.058, 0.062]
8	772	126	2,050.47	1,151.32	<0.001	−3,022.25	−323.39	0.89	0.048 [0.046, 0.051]

Note. *df* = degrees of freedom; χ^2 = chi-square test; BIC = Bayesian Information Criterion; TLI = Tucker-Lewis Index; RMSEA = root mean square error of approximation, CI = confidence interval.

maximum likelihood mean-adjusted (MLM) estimator. We tested several models from Torres-Marín et al. (2024) as well as the models derived from our EFA, including their versions with error covariances included in an attempt to further improve model fit. Importantly, for Models 6.1 and 6.2 (see Table 3), we selected the same items as Torres-Marín et al. (2024) did for their analysis of the Spanish CSM. We also attempted to test the bifactor model in two variants (one general factor and eight specific factors; one general factor and two specific factors of the lighter and darker comic styles), but the models did not converge for our data, even with relaxed number of iterations and tolerance of approximation. The CFA models, their sources, and fit indices are shown in Table 3.

We adopted Model 8.2 as the structure of the CSM-PL, as it combined satisfactory model fit with a factor structure most closely resembling the original eight-factor model of Ruch et al. (2018).¹ Importantly, two factors were removed from this model due to insufficient item number ($n < 3$). Additionally, it contained 33 items (in contrast to the original CSM's 48), allowing for a degree of shortening. Model 8.2 is shown in Figure 2 and the final item and factor structure of the CSM-PL is shown in Table S6 in the Supplementary Materials. We continued the reliability and validity analysis on this model.

Five of the original CSM factors were replicated in our CSM-PL factorial model: benevolent humor (2 items out of 6 from the original factor, one item from CSM satire), fun (4 items out of 6 from the original CSM factor), nonsense (all 6 items from the original CSM factor), wit (all 6 items from the original CSM factor), and cynicism (5 items out of 6 from the original CSM factor). Therefore, item migration between the scales was minimal and the psychological meaning of these five factors remains the same between the original CSM and the CSM-PL. However, with the exception of cynicism remaining as a separate, albeit shortened, factor, the darker comic styles of sarcasm and satire coalesced into one factor which we termed *mocking humor*. Interestingly, none of the original irony items were retained in the model: all six were deleted due to insufficiently high or clear factor loadings.

The new factor of mocking humor comprises nine items: five from the original sarcasm factor (CSM4, CSM12, CSM20, CSM28, and CSM36), three from the original satire factor (CSM6, CSM14, and CSM22), and one from the original cynicism factor (CSM8), which was not classified into the CSM-PL cynicism factor mentioned above based on factor loadings (see Table S4 in the Supplementary Materials).

¹ Model 6.2 in Table 3 achieved a higher CFA (0.93 vs 0.91) with a lower number of items. However, this model was taken directly from Torres-Marín et al. (2024) who based its item selection based on EFA results with a Spanish version of the CSM. Therefore, we tested it here for exploratory purposes only, and adopting its item/factor structure directly for our Polish data would have been problematic.

Table 3: Confirmatory factor analysis fit indices.

Model	Model description	df	χ^2	CFI	RMSEA [90 % CI]	BIC
Model 1	Model A from Torres-Marín et al. (2024): One-factor model; six error covariances.	1,074	7,252.59	0.70	0.073 [0.072, 0.075]	181,817.59
Model 2	Model B from Torres-Marín et al. (2024): Two-factor model; lighter and darker comic styles.	1,079	6,789.91	0.73	0.070 [0.069, 0.072]	181,213.49
Model 3	Model C from Torres-Marín et al. (2024): Three-factor model; darker comic styles on the one hand, humor enjoyment (nonsense, fun) and good humor (wit, benevolent humor) on the other.	1,077	6,483.02	0.74	0.068 [0.067, 0.070]	180,834.17
Model 4.1	Model D from Torres-Marín et al. (2024): The original 8-factor model from Ruch et al. (2018).	1,052	4,417.75	0.84	0.055 [0.053, 0.056]	178,324.79
Model 4.2	Model D from Torres-Marín et al. (2024): The original 8-factor model from Ruch et al. (2018); five error covariances.	1,047	3,897.73	0.86	0.050 [0.049, 0.052]	177,674.06
Model 5	Model E from Torres-Marín et al. (2024): Hierarchical model; two superordinate factors of four lighter and darker comic styles each.	1,071	4,727.18	0.83	0.056 [0.055, 0.058]	178,607.4
Model 6.1	Model H from Torres-Marín et al. (2024): Correlated 8 factors, 32 items selected by Torres-Marín et al.	436	1,630.75	0.90	0.051 [0.048, 0.053]	119,636.82
Model 6.2	Model I from Torres-Marín et al. (2024): Correlated 8 factors, 24 items selected by Torres-Marín et al.	224	834.23	0.93	0.050 [0.047, 0.054]	90,103.29
Model 7.1	EFA: Strict 5-factor model.	584	2,920.92	0.85	0.061 [0.059, 0.063]	135,959.57
Model 7.2	EFA: Lax 5-factor model.	935	4,721.32	0.81	0.061 [0.060, 0.063]	168,346.2
Model 8.1	EFA: Strict 8-factor model, reduced to 6 factors.	480	1,842.93	0.90	0.051 [0.049, 0.054]	123,216.5
Model 8.2	EFA: Strict 8-factor model, reduced to 6 factors; four error covariances. Final adopted model.	476	1,676.71	0.91	0.049 [0.046, 0.051]	123,023.34
Model 9	EFA model: Lax 8-factor model.	874	3,892.88	0.85	0.057 [0.055, 0.058]	163,432.01

Note. *df* = degrees of freedom; χ^2 = chi-square test; CFI = comparative fit index; RMSEA = root mean square error of approximation. CI = confidence interval; BIC = Bayesian Information Criterion.

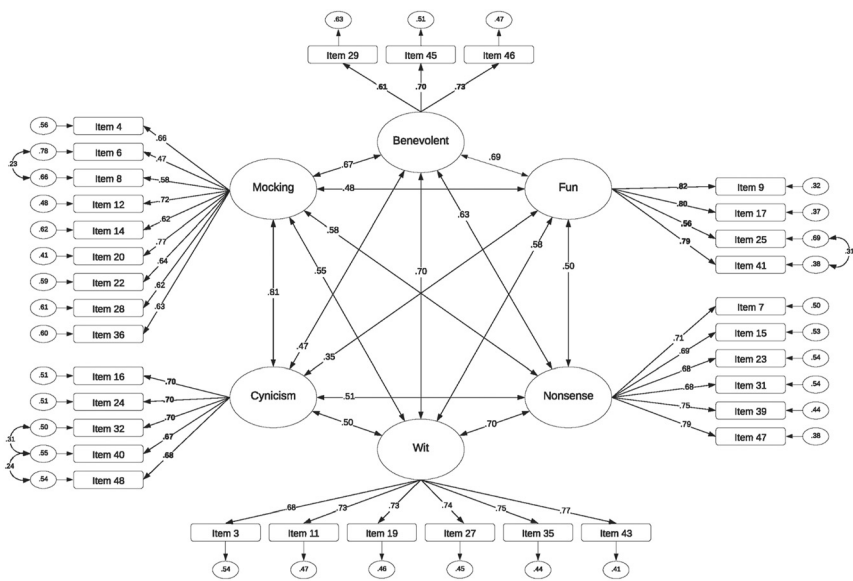


Figure 2: Confirmatory factor analysis – diagram of Model 8.2.

3.3 Reliability analysis

Cronbach's α and McDonald's ω values for the CSM-PL in the total sample, are shown in Table 4. Reliability indices for the HSQ and the IPIP-BFM-20 and for the CSM-PL in the six subsamples separately are shown in Tables S7 and S8 in the Supplementary Materials. They also include comparisons with previous studies where applicable. Additional descriptive statistics for the final CSM-PL are shown in Table S9 in the Supplementary Materials.

Table 4: Reliability analysis.

CSM (N = 1,785)	α	ω
Benevolent humor	0.72	0.73
Fun	0.84	0.85
Nonsense	0.86	0.86
Wit	0.87	0.87
Cynicism	0.83	0.84
Mocking humor	0.86	0.86

Note. α = Cronbach's α . ω = McDonald's ω .

Overall, the CSM-PL subscales showed satisfactory reliability indices. Thus, the CSM-PL can be recommended for use in research. However, reliability for the benevolent humor subscale was lower (0.64–0.75, see Table S7 in the Supplementary Materials), potentially due to the fact that this subscale comprises only three items.

3.4 Measurement invariance

The *lavaan* package in *R* (Rosell 2012) was also used to examine the MI for (a) gender, (b) subsample, (c), size of place of residence, and (d) level of education. MI was not examined for age due to an insufficient distribution in the dataset. To facilitate intergroup comparisons for MI, several subsamples were combined as follows. For gender, MI was compared for females and males only; 12 participants who indicated their gender as “other” were removed from this part of the analysis. For data subsample, data from Subsamples 2 and 3 were combined. Similarly, for size of place of residence, participants living in places below 20,000 and between 20,000–100,000 residents were combined, and participants living in places between 100,000–200,000 and between 200,000–500,000 residents were also combined. Finally, for education, participants with primary/secondary and vocational education were combined. The sample sizes and MI results (unbiased comparative fit index and root mean square error of approximation) are given in Table S10 in the Supplementary Materials. Overall, strict MI was observed for gender, size of place of residence, and education level.

3.5 Validity analysis

The six CSM-PL scales were subjected to Pearson's r partial correlation analysis with humor styles (HSQ) and Big Five personality factors (IPIP-BFM-20) while controlling for gender and age. Gender and age were entered into a separate zero-order Pearson's r correlation analysis with the CSM-PL scales where age (and gender, respectively) as well as the age/gender interaction were controlled for. However, that interaction was not statistically significant for each of the CSM factors. The results are shown in Table 5.

Overall, the CSM-PL comic styles were positively and weakly correlated with the male gender, which was in line with our predictions. The CSM-PL was also largely negatively and weakly correlated with age (with the exception of cynicism, for which a statistically significant relationship did not emerge). However, since MI was not tested for age, these results should be treated with caution. The HSQ correlated with all of the CSM-PL subscales, however, the CSM-PL lighter comic styles correlated

Table 5: Correlation matrix (N = 719).

CSM-PL	HSQ				IPIP-BFM-20					Gender	Age
	AFF	AGG	SE	SD	O	C	E	A	ES		
Benevolent humor	0.55***	0.24***	0.63***	0.41***	0.41***	-0.03	0.40***	0.15***	0.25***	0.18**	-0.10**
Fun	0.63***	0.18***	0.47***	0.33***	0.34***	-0.01	0.52***	0.17***	0.20***	0.18**	-0.08**
Nonsense	0.45***	0.21***	0.46***	0.36***	0.31***	-0.06	0.27***	0.11**	0.08*	0.23***	-0.17***
Wit	0.66***	0.23***	0.54***	0.32***	0.54***	0.03	0.51***	0.14***	0.21***	0.13*	-0.14***
Cynicism	0.27***	0.43***	0.33***	0.30***	0.24***	-0.07	0.17***	-0.14***	0.07	0.25***	-0.03
Mocking humor	0.38***	0.44***	0.35***	0.31***	0.32***	-0.05	0.25***	-0.10**	0.07	0.12*	-0.11***

Note. CSM-PL = Comic Style Markers, Polish adaptation; HSQ = Humor Styles Questionnaire. IPIP-BFM-20 = Mini-IPIP; AFF = affiliative humor style; AGG = aggressive humor style; SE = self-enhancing humor style; SD = self-defeating humor style; O = openness to experience; C = conscientiousness; E = extraversion; A = agreeableness; ES = emotional stability. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

positively with the HSQ affiliative humor style to a greater extent than they did with the aggressive humor style. They also correlated positively and more strongly with the self-enhancing humor style than the self-defeating humor style, although this difference was relatively less pronounced. Regarding the two darker comic styles in the CSM-PL, cynicism and mocking humor, they correlated higher with the aggressive humor style than the affiliative humor style (although this difference was rather small for mocking humor), but their correlations with the self-enhancing and self-defeating humor styles were similar. Overall, this partially confirmed our predictions regarding the correlations with the HSQ humor styles. Regarding the Big Five personality factors, openness to experience was positively correlated with all comic styles in the CSM-PL. Conscientiousness did not achieve any statistically significant correlations. The lighter comic styles were positively correlated with extraversion, agreeableness, and emotional stability to a greater extent than were the two darker comic styles, which were negatively correlated with agreeableness only. Again, this partially supported our predictions regarding the CSM-PL and Big Five correlations.

3.6 Self-other correlation analysis

The self-other correlation analysis involved calculating Pearson's zero-order r correlations for the self- and other- ratings within the participant pairs (see the Procedure section) for each of the six CSM-PL subscales. The results are shown in Table 6.

The self-other correlations ranged from 0.23 for wit to 0.46 for nonsense. With the exception of wit and mocking humor, the self-other correlation for each individual comic style in the CSM-PL was higher than the correlations between the self-rating for that comic style and the other-ratings for all other comic styles (e.g., the self-other correlation for benevolent humor was higher than the self-benevolent humor and other-fun, other-nonsense, other-wit, other-cynicism, and other-mocking humor correlation etc.). Taken together with the correlation sizes, this indicates an average degree of self-other agreement.

4 Discussion

We carried out a psychometric validation of the CSM-PL, a Polish-language translation of the Comic Style Markers (Ruch et al. 2018). Above all, our factor analyses yielded a six-factor, 33-item model with good fit indices (CFI = 0.91, which meets the recommended thresholds; see Torres-Marín et al. 2024). This model retained all four

Table 6: Self-other correlation analysis – multitrait-multimethod matrix (N = 116).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Self-benevolent humor	0.73											
2. Self-fun	0.57***	0.83										
3. Self-nonsense	0.74***	0.48***	0.86									
4. Self-wit	0.72***	0.65***	0.64***	0.86								
5. Self-cynicism	0.48***	0.16	0.47***	0.41***	0.84							
6. Self-mocking humor	0.51***	0.27**	0.54***	0.58***	0.83***	0.79						
7. Other-benevolent humor	0.40***	0.22*	0.43***	0.30**	0.30**	0.28**	0.64					
8. Other-fun	0.20*	0.30**	0.18	0.23*	0.14	0.17	0.56***	0.88				
9. Other-nonsense	0.34***	0.21*	0.46***	0.32***	0.23*	0.27**	0.79***	0.52***	0.94			
10. Other-wit	0.19*	0.23*	0.30***	0.23*	0.12	0.12	0.75***	0.58***	0.63***	0.89		
11. Other-cynicism	0.25*	0.11	0.31***	0.19*	0.38***	0.29**	0.48***	0.29**	0.45***	0.38***	0.87	
12. Other-mocking humor	0.27*	0.17	0.33***	0.27**	0.24**	0.24**	0.58***	0.41***	0.53***	0.65***	0.82***	0.85

Note. Cronbach's α values are given in the diagonal. *** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$.

of the original CSM lighter comic styles. Although they are shorter in the CSM-PL (aside from wit and nonsense, which were replicated fully), with the exception of one item (CSM46, which originally belonged to the satire factor, but loaded the most strongly on the benevolent humor factor in the CSM-PL), they are composed of the same items as the original CSM factors. Regarding the darker comic styles, cynicism was retained in a shortened, but consistent fashion. However, none of the original CSM irony items entered the model at all, and a total of nine items from the sarcasm, satire, and cynicism factors (5, 3, and 1, respectively) formed the new *mocking humor* factor.

We also tested a range of several others, derived from Ruch et al. (2018) and Torres-Marin et al. (2024), for a more in-depth exploration of our data. None of them achieved the same optimal balance of model fit, factor structure, and item number. Moreover, the CSM-PL achieved high reliability indices, with the exception of benevolent humor (researchers particularly interested in benevolent humor may consider using the Polish BenCor scale, Heintz et al. 2018, 2020). We also confirmed strict MI for gender, size of place of residence, and education level. Finally, we were able to show initial evidence for the CSM-PL's validity.

The new CSM-PL factor of *mocking humor* appears to combine the pretense- and parody-based forms of humor with both corrective as well as negative evaluative aspects. The absence of CSM irony items may thus be surprising, considering that this comic style also relies on indirect and critical humor from the perspective of assumed superiority (Ruch et al. 2018). However, the phenomenon of irony may be particularly ill-suited to taxonomical classification of the kind that underlies the theoretical structure of the CSM (Attardo 2002; Hutcheon 1994). Indeed, the distinction between irony and sarcasm – readily made in the CSM – is a point of significant contention in psycholinguistics and humor studies (see, e.g., Dynel 2017). The nature of association between irony and humor is also not universally accepted as straightforward (Attardo 2002; Dynel 2014; Gibbs et al. 2014). From this point of view, rigid distinctions based on theoretically-derived features may lead to a “loss of perspective whereby phenomena such as irony, understatement, teasing, etc. have been seen as existing outside of the intentions of the speakers and the contexts in which their utterances take place” (Attardo 2002: 7).

Hutcheon (1994) likewise claimed that “the existence of one signifier – “irony” – should never blind us to the plurality of its functions as well as effects” (42) and proposed a unifying scheme of the functions of irony. In particular, the ludic function allows irony to be used for playful teasing, the distancing and provisional functions imbue irony with the ability to signal personal distance and emotional detachment, while the assailing function allows irony to be used for “corrective” and “satiric” functions (50). Finally, it is the aggregative function which makes irony create in- and outgroups. Within Hutcheon's framework, it is this function which most closely

corresponds to the definition of irony as a comic style (Ruch et al. 2018). Thus, the single umbrella term of *irony* may cover many features of both the lighter and darker comic styles distinguished in the CSM. This is also borne out by a range of psycholinguistic studies showing the varying contexts in which irony is seen as more or less funny, critical, appropriate, and so forth (e.g., Averbeck 2013; Caffarra et al. 2019; Matthews et al. 2006; Pexman and Zvaigzne 2004). We suggest that the CSM-PL's mocking humor similarly covers a wide range of phenomena which may, but do not have to be, divided into irony, sarcasm, satire, and cynicism, potentially depending on, among others, cultural factors and conventions regarding humor. Specific distinctions between the content of the darker comic styles may not fit the Polish culture, accepting of and familiar with indirect humor as it is (Barta 2013; Forbes et al. 2009; Kurtyka 2019).

A related point concerns the relationships between the CSM-PL comic styles and the HSQ humor styles. Heintz and Ruch (2019) noted that the HSQ is composed of conceptually broader factors which represent “interpersonal and intrapsychic functions” of humor (Martin et al. 2003: 51). Accordingly, they reported correlations between the HSQ and the CSM, with the affiliative and aggressive humor styles being more highly correlated with the lighter and darker comic styles, respectively, and a similar pattern emerging for the self-enhancing and self-defeating humor style and the lighter and darker comic styles, respectively. Although the lighter CSM-PL comic styles were more strongly related to the affiliative humor style and the two darker ones to the aggressive humor style, all comic styles were significantly correlated with all humor styles. The self-enhancing and self-defeating humor styles also did not discriminate as distinctly between the lighter and darker comic styles in terms of correlations. However, Tsukawaki and Imura (2020) have noted that the HSQ may define the self-defeating humor style in particular as overly negative and maladaptive. They distinguished between *benign* (i.e., positive, coping) and *deleterious* (i.e., excessive, insecure) self-directed humor, showing their different relationships with the HSQ and with various measures of psychological well-being. Considering these results, broad overlaps between the HSQ and the CSM may be expected (Heintz and Ruch 2019), but due to the scope of the HSQ factors, may not necessarily indicate lack of validity for the CSM.

Regarding the CSM-PL's validity, we obtained preliminary evidence that converges in several places with previous studies. Similar to Ruch et al. (2018), Dionigi et al. (2022), and Mendiburo-Seguel and Heintz (2020b), we observed a general weak, positive correlation of the CSM-PL with the male gender. However, our results for age were less unanimous: we found a weak, negative general correlation (with the exception of cynicism), while previous studies found some distinctions between the lighter and darker comic styles. This discrepancy may be due to the uneven age distribution in our sample (which also prevented us from examining MI for age).

Moreover, although older age is negatively related to humor ability and appreciation (Daniluk and Borkowska 2017), both our sample as well as the samples in the above-mentioned studies were largely comprised of people under 60 years of age. Therefore, age and the CSM-PL comic styles need to be examined further. Potential cultural differences may also come into play.

Our correlation analysis results between the CSM-PL and the Big Five personality factors were also in partial agreement with the results by Ruch et al. (2018) regarding openness to experience, the negative correlations of agreeableness and the darker comic styles, and the positive correlations of emotional stability with the lighter ones. Extraversion was also positively correlated with both the lighter and darker comic styles, but comparisons regarding the darker comic styles are difficult to make. Compared to Dionigi et al. (2022), correlations in our sample were larger across the board. However, the general effect of openness to experience being a universal correlate, conscientiousness not being a central correlate, as well as extraversion being more highly correlated with the lighter than the darker comic styles can also be observed. Agreeableness was also negatively correlated with the darker comic styles in our sample, although in contrast to Dionigi et al. (2022), it was also positively, but weakly, correlated with the lighter ones. However, due to differences in the darker comic style factors, direct comparisons are limited.

Finally, the results of the self-other correlation can also be taken as initial evidence of validity, though mostly for the light comic styles. With the exception of wit and mocking humor, the correlation between a given participant rating themselves on a given comic style and their confederate rating that participant on the same comic style were higher than for any other comic style pairing. These correlations were small to medium overall. Considering the limitations of the self-other sample (both in terms of size as well as having only one other-rating for each self-rating, cf. Ruch et al. 2018) as well as the nature of the mocking humor factor discussed above, follow-up studies in this direction would be valuable.

4.1 Limitations and future directions

Although we carried out the current study on a large sample, it did not sufficiently represent older participants, participants with lower education levels, and participants reporting lower socioeconomic status. Mendiburo-Seguel and Heintz (2020b) showed some demographic differences in comic styles in terms of age, but reported that “education effects were [...] negligible to small” (p. 568). Nevertheless, a more detailed replication of these effects in different samples, as well as the inclusion of other potentially interesting demographic variables (i.e., political orientation, see also Young 2020) appears warranted to further test the CSM-PL as well as the comic

styles framework in general. Further replications could also contribute to examining the CSM-PL's MI. We were not able to test MI for age, and MI for study subsamples was confirmed only on the metric level. This implies that the CSM-PL may be sensitive to certain characteristics of the study designs it is deployed in, for example volunteer participants versus participants incentivized in various ways by survey agencies or participants completing the CSM-PL by itself or as part of a larger battery of measures. These suggestions need further examination.

A significant limitation of the current study is also its cross-sectional character and the limited, preliminary choice of measures for the validity analysis. Further studies on the personality determinants of comic style use, the relationships between humor styles (beyond the HSQ, see Tsukawaki and Imura 2020), comic styles, and other humor-related phenomena and individual differences (see, e.g., Ruch 2020), as well as tests of the CSM-PL's temporal stability are still required. Using behavioral tasks as a source of validation data for the CSM-PL also appears as an important next step. For example, do CSM-PL scores correlate with observed humor behaviors in line with a certain comic style? Although relatively rare, several studies can serve as an inspiration in this direction (e.g., Bowes and Katz 2011; Bruntsch and Ruch 2017; Dress et al. 2008; Heintz 2017; Ivanko et al. 2004). In particular, Heintz (2023) used the CSM in conjunction with the Cartoon Punchline Production Test Short Version (CPPT-K; Ruch and Heintz 2019) in a German-Swiss-Austrian sample and found that the lighter, but not darker comic styles were correlated with the total number of punchlines produced in the task, although only nonsense and wit achieved statistically significant correlations with independent raters' average wittiness ratings of the best selected punchline. Wit was also the only comic style correlated with originality ratings. These results would be interesting to follow up on.

Lastly, a point of consideration involves the content and wording of the CSM items, which may need to be examined further in cultural adaptations. Ruch et al. (2018) note that some of the CSM items may be complex in their wording or meaning. Procedures such as the think-aloud protocol (Zajackowska et al. 2024) could help elucidate potential issues with or cultural specificities of participants' understanding of specific CSM items. Similarly, cross-cultural studies like Fanslau et al. (2024) would also prove valuable in terms of testing the comic style framework. Nevertheless, the content-based classification of humor (Ruch et al. 2018) is a promising avenue of psycholinguistic research and thus deserves further study. It may help break new ground both in humor research by allowing for fine-grained analyses. For example, the distinction between irony and sarcasm has been a topic of long-standing debate (Dynel 2017; Fanslau et al. 2023; Taylor 2017), and the CSM may offer a valuable source of empirical data to help resolve it.

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Data availability: The current study has been preregistered. The preregistration is available on the Open Science Framework at <https://osf.io/5gqcm>. The dataset associated with the current study is available on the Open Science Framework at <https://osf.io/kzdfe/files/osfstorage>.

References

- Attardo, Salvatore. 2002. Humor and irony in interaction: From mode adoption to failure of detection. In Luigi Anolli, Maria Rita Ciceri & Giuseppe Riva (eds.), *Say not to say: New perspectives on miscommunication*, 159–179. Amsterdam: IOS Press.
- Averbeck, Jousha M. 2013. Comparisons of ironic and sarcastic arguments in terms of appropriateness and effectiveness in personal relationships. *Argumentation and Advocacy* 50(1). 47–57.
- Banasik-Jemielniak, Natalia & Piotr Kałowski. 2022. Socio-cultural and individual factors in verbal irony use and understanding: What we know, what we don't know, what we want to know. *Review of Communication Research* 10. 81–113.
- Barta, Peter. 2013. *The fall of the Iron Curtain and the culture of Europe*. Abingdon: Routledge.
- Bernaards, Coen A. & Robert I. Jennrich. 2005. Gradient projection algorithms and software for arbitrary rotation criteria in factor analysis. *Educational and Psychological Measurement* 65(5). 676–696.
- Bowes, Andrea & Albert Katz. 2011. When sarcasm stings. *Discourse Processes* 48(4). 215–236.
- Bruntsch, Richard & Willibald Ruch. 2017. The role of humor-related traits and broad personality dimensions in irony use. *Personality and Individual Differences* 112. 139–143.
- Caffarra, Sendy, Arman Motamed Haeri, Elissa Michell & Clara D. Martin. 2019. When is irony influenced by communicative constraints? ERP evidence supporting interactive models. *European Journal of Neuroscience* 50(10). 3566–3577.
- Craik, Kenneth. H., Martin D. Lampert & Arvalea J. Nelson. 1996. Sense of humor and styles of everyday humorous conduct. *Humor* 9(3-4). 273–302.
- Daniluk, Beata & Aneta R. Borkowska. 2017. Humor appreciation in elderly people and its cognitive determinants. *Annals of Psychology* 20(3). 529–543.
- Dionigi, Alberto, Mirko Duradoni & Laura Vagnoli. 2022. Humor and personality: Psychometric properties of the comic styles markers and its relationship with the big five personality traits. *Current Psychology* 41. 8705–8717.
- Donnellan, M. Brent, Frederick L. Oswald, Brendan M. Baird & Richard E. Lucas. 2006. The Mini-IPIP scales: Tiny yet-effective measures of the Big Five Factors of personality. *Psychological Assessment* 18(2). 192–203.

- Dress, Megan L., Roger J. Kreuz, Kristen E. Link & Gina M. Caucci. 2008. Regional variation in the use of sarcasm. *Journal of Language and Social Psychology* 27(1). 71–85.
- Dynel, Marta. 2014. Isn't it ironic? Defining the scope of humorous irony. *Humor* 27(4). 619–639.
- Dynel, Marta. 2017. Academics vs. American scriptwriters vs. Academics: A battle over the etic and emic “sarcasm” and “irony” labels. *Language & Communication* 55. 69–87.
- Fanslau, Agnieszka, Piotr Kałowski, Michał Olech, Magdalena Rowicka, Katarzyna Branowska, Anna Olechowska, Anna Zarazińska, Aleksandra Siemieniuk & Natalia Banasik-Jemielniak. 2023. Dark triad predictors of irony and sarcasm use: An investigation in a Polish sample. *Personality and Individual Differences* 214. 112344.
- Fanslau, Agnieszka, Michał Olech, Piotr Kałowski, Katarzyna Branowska, Anna Zarazińska, Melanie Glenwright & Natalia Banasik-Jemielniak. 2024. Let's entertain others: The relationship between comic styles and the histrionic self-presentation style in Polish, British, and Canadian samples. *Humor* 37(3). 421–438.
- Forbes, Gordon, Xiaoying Zhang, Krystyna Doroszewicz & Haas Kelly. 2009. Relationships between individualism–collectivism, gender, and direct or indirect aggression: A study in China, Poland, and the US. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression* 35(1). 24–30.
- Gardner, Kathryn J., Nicola-Maria Jabs, Jennifer Drabble & Umair Akram. 2021. Humor styles influence the perception of depression-related internet memes in depression. *Humor* 34(4). 497–517.
- Gibbs, Raymond W., Jr., Gregory A. Bryant & Herbert L. Colston. 2014. Where is the humor in verbal irony? *Humor* 27(4). 575–595.
- Heintz, Sonja. 2017. Putting a spotlight on daily humor behaviors: Dimensionality and relationships with personality, subjective well-being, and humor styles. *Personality and Individual Differences* 104. 407–412.
- Heintz, Sonja. 2023. Locating eight comic styles in basic and broad concepts of humor: Findings from self-reports and behavior tests. *Current Psychology* 42. 16154–16165.
- Heintz, Sonja & Willibald Ruch. 2019. From four to nine styles: An update on individual differences in humor. *Personality and Individual Differences* 141. 7–12.
- Heintz, Sonja, Willibald Ruch, Simge Aykan, Ingrid Brdar, Dorota Brzozowska, Hugo Carretero-Dios, Peter S. O. Wong, Władysław Chłopicki, Incheol Choi, Alberto Dionigi, Róbert Ďurka, Thomas E. Ford, Angelika Güsewell, Robert B. Isler, Alyona Ivanova, Liisi Laineste, Petra Lajčáková, Chloe Lau, Minha Lee, Stanca Măda, Charles Martin-Krumm, Andrés Mendiburo-Seguel, Ifu Migiwa, Nailya Mustafi, Atsushi Oshio, Tracey Platt, René T. Proyer, Angélica Quiroga-Garza, TamilSelvan Ramis, Răzvan Săftoiu, Donald H. Saklofske, Olga V. Shcherbakova, Alena Slezackova, Anastasios Stalikas, Ieva Stokenberga & Jorge Torres-Marín. 2020. Benevolent and corrective humor, life satisfaction, and broad humor dimensions: Extending the nomological network of the BenCor across 25 countries. *Journal of Happiness Studies* 21. 2473–2492.
- Heintz, Sonja, Willibald Ruch, Tracey Platt, Dandan Pang, Hugo Carretero-Dios, Alberto Dionigi, Jorge Torres-Marín, Ingrid Brdar, Dorota Brzozowska, Hsueh-Chih Chen, Władysław Chłopicki, Matthew Collins, Róbert Ďurka, Najwa Y. El Yahfoufi, Angélica Quiroga-Garza, Robert B. Isler, Andrés Mendiburo-Seguel, TamilSelvan Ramis, Betül Saglam, Olga V. Shcherbakova, Kamlesh Singh, Ieva Stokenberga, Peter S. O. Wong & Jorge Torres-Marín. 2018. Psychometric comparisons of benevolent and corrective humor across 22 countries: The virtue gap in humor goes international. *Frontiers in Psychology* 9. 92.
- Hutcheon, Linda. 1994. *Irony's edge: The theory and politics of irony*. London/New York: Routledge.
- Hornowska, Elżbieta & Jolanta Charytonik. 2011. *Polska adaptacja kwestionariusza stylów humoru (HSQ) R. Martina, P. Puhlik-Doris, G. Larsena, J. Gray i K. Weir* [Polish adaptation of R. Martin, P. Puhlik-Doris, G.

- Larsen, J. Gray, and K. Weir's the Humor Styles Questionnaire (HSQ)]. *Psychological Studies* 49(4). 5–22.
- Ivanko, Stacey L., Penny M. Pexman & Kara M. Olineck. 2004. How sarcastic are you? Individual differences and verbal irony. *Journal of Language and Social Psychology* 23(3). 244–271.
- Kurtyka, Andrzej. 2019. I complain, therefore I am: On indirect complaints in Polish. *Journal of Pragmatics* 153. 34–45.
- Lu, Jackson. G. 2023. Cultural differences in humor: A systematic review and critique. *Current Opinion in Psychology* 53. 101690.
- Martin, Rod A., Patricia Puhlik-Doris, Gwen Larsen, Jeanette Gray & Weir Kelly. 2003. Individual differences in uses of humor and their relation to psychological well-being: Development of the Humor Styles Questionnaire. *Journal of Research in Personality* 37(1). 48–75.
- Martin, Rod A. & Thomas Ford. 2018. *The psychology of humor: An integrative approach*. London: Academic Press.
- Matthews, Jacqueline K., Jeffrey T. Hancock & Philip J. Dunham. 2006. The roles of politeness and humor in the asymmetry of affect in verbal irony. *Discourse Processes* 41(1). 3–24.
- Mendiburo-Seguel, Andrés & Sonja Heintz. 2020a. Comic styles and their relation to the sense of humor, humor appreciation, acceptability of prejudice, humorous self-image and happiness. *Humor* 33(3). 381–403.
- Mendiburo-Seguel, Andrés & Sonja Heintz. 2020b. Who shows which kind of humor? Exploring sociodemographic differences in eight comic styles in a large Chilean sample. *Scandinavian Journal of Psychology* 61(4). 565–573.
- Mendiburo-Seguel, Andrés, Dario Páez & Francisco Martínez-Sánchez. 2015. Humor styles and personality: A meta-analysis of the relation between humor styles and the Big Five personality traits. *Scandinavian Journal of Psychology* 56(3). 335–340.
- Moreira, Paulo A. S. & Richard A. Inman. 2021. Psychometric properties of the Comic Style Markers—Portuguese version: Applying bifactor and hierarchical approaches to studying broad versus narrow styles of humor. *Humor* 34(4). 537–565.
- Pexman, Penny M. & Meghan T. Zvaigzne. 2004. Does irony go better with friends? *Metaphor and Symbol* 19(2). 143–163.
- Raiche, Gilles & David Magis. 2022. *nFactors: Parallel analysis and other nongraphical solutions to the Cattell scree test*. Available at: <https://cran.r-project.org/web/packages/nFactors/index.html>.
- R Core Team. 2021. *R: A language and environment for statistical computing*. Foundation for Statistical Computing. Available at: <https://www.R-project.org/>.
- Revelle, William. 2024. *psych: Procedures for psychological, psychometric, and personality research*. Available at: <https://cran.r-project.org/web/packages/psych/psych.pdf>.
- Rossell, Yves. 2012. lavaan: An R package for structural equation modeling. *Journal of Statistical Software* 48. 1–36.
- RStudio Team. 2020. *RStudio: Integrated development for R. RStudio*. PBC. Available at: <http://www.rstudio.com/>.
- Ruch, Willibald. 2008. Psychology of humor. In Victor Raskin (ed.), *The primer of humor research*, 17–100. Berlin: Mouton de Gruyter.
- Ruch, Willibald. 2020. Domains of humor: Challenges from psychology. In Salvatore Attardo (ed.), *Script-based semantics: Foundations and applications: Essays in honor of Victor Raskin*, 115–138. Berlin: De Gruyter Mouton.
- Ruch, Willibald & Sonja Heintz. 2019. Humor production and creativity: Overview and recommendations. In Sarah R. Luria, John Baer & James C. Kaufman (eds.), *Creativity and humor*, 1–42. London: Academic Press.

- Ruch, Willibald, Jennifer Hofmann & Tracey Platt. 2015. Individual differences in gelotophobia and responses to laughter-eliciting emotions. *Personality and Individual Differences* 72. 117–121.
- Ruch, Willibald, Sonja Heintz, Tracey Platt, Lisa Wagner & René T. Proyer. 2018. Broadening humor: Comic styles differentially tap into temperament, character, and ability. *Frontiers in Psychology* 9. 6.
- Taylor, Charlotte. 2017. The relationship between irony and sarcasm: Insights from a first-order metalanguage investigation. *Journal of Politeness Research* 13(2). 209–241.
- Topolewska, Ewa, Ewa Skimina, Włodzimierz Strus, Jan Ciecuch & Tomasz Rowiński. 2014. Krótki kwestionariusz do pomiaru Wielkiej Piątki IPIP-BFM-20. *Roczniki Psychologiczne* 17(2). 367–384.
- Torres-Marín, Jorge, Ginés Navarro-Carrillo, Mariela Bustos-Ortega, S. Sonja Heintz & Hugo Carretero-Dios. 2024. Competitive latent structures for the Comic Style Markers: Developing a psychometrically sound short version using Spanish and US American samples. *Journal of Personality Assessment* 106(3). 407–420.
- Tsukawaki, Ryota & Tomoya Imura. 2020. The light and dark side of self-directed humor: The development and initial validation of the Dual Self-Directed Humor Scale (DSDHS). *Personality and Individual Differences* 157. 109835.
- Van de Vijver, Fons & Ronald K. Hambleton. 1996. Translating tests. *European Psychologist* 1(2). 89–99.
- Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Hiroaki Yutani, Alex Hayes, Lionel Henry, Jim Hester, Max Kuhn, Thomas Pedersen, Evan Miller, Stephan Bache, Kirill Müller, Jeroen Ooms, David Robinson, Dana Seidel, Vitalie Spinu, Kohnske Takahashi, Davis Vaughan, Claus Wilke & Kara Woo. 2019. Welcome to the Tidyverse. *Journal of Open Source Software* 4(43). 1686.
- Young, Dannagal G. 2020. *Irony and outrage: The polarised landscape of rage, fear, and laughter in the United States*. New York: Oxford University Press.
- Zajączkowska, Maria, Olga Zimna, Malwina Kurzawa & Natalia Banasik-Jemieliński. 2024. Exploring the Polish adaptation of the Sarcasm Self-report Scale using the Think-Aloud Protocol: Three lessons about studying irony through questionnaires. In Natalia Banasik-Jemieliński, Piotr Kałowski & Maria Zajączkowska (eds.), *Studying verbal irony and sarcasm: Methodological perspectives from communication studies and beyond*, 241–256. Cham: Springer Nature Switzerland.

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