


Social Media Literacy Among Adolescents and Young Adults: Results From a Cross-Country Validation Study

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Abstract

When being online, young users are often confronted with insulting, hateful, or misleading messages. To handle these dark forms of participation, it is essential to equip them with resources that support their social literacy in today's complex online environments. In the present article, we deployed a previously established scale on self-perceived participatory-moral literacy and conducted a broad online survey study with 1,489 adolescents and young adults aged 16–22 years ($M = 19.74$; $SD = 1.65$; 51% female) across eight different European countries (Austria, France, Germany, Hungary, Italy, Poland, Slovakia, and the United Kingdom). The results provided a configural identical model of participatory-moral abilities, motivation, and behavior across the considered European countries. We could confirm weak invariance, satisfactory psychometric qualities, and convergent validity of the scale across the different countries. Implications for digital literacy research are discussed.

Keywords

social media literacy, dark participation, scale development, international comparative research, adolescents, young adults

When using participatory technologies, users often observe or are confronted with attacks directed at singular persons (cyberbullying) or members of specific social groups (hate speech), as well as strategic forms of misinformation (Quandt, 2018). Recent data for Germany, for example, confirmed that more than half of the representative sample of adolescents aged 12–19 years have encountered fake news (56%), extreme political views (43%), and conspiracy theories (43%) while being online. In addition, a considerable percentage was also confronted with insulting comments (47%), also against oneself (16%), or hate speech (35%; see Medienpädagogischer Forschungsverbund Südwest, 2022). These widespread, maladaptive forms of so-called dark participation were found to have negative effects on the victims' wellbeing as well as the society (Quandt et al., 2022). It is thus essential to focus on resources that support young users to positively participate in today's digital societies and competently interact with others online.

A central resource requested by various stakeholders such as scientists, educators, politicians, and economics is to promote users' digital literacy. The European Union (EU) has developed programs and initiatives such as the *European Skills Agenda* or the *Digital Education Action Plan* to promote digital skills and secure Europe's competitiveness in

the digital world.¹ This need is especially valid for adolescents who have integrated digital media in their everyday life and are particularly confronted with the challenges of today's digital societies. Inequalities in digital literacy have been confirmed to be associated with consequences regarding users' online engagement and offline outcomes, reproducing and accelerating social inequalities (e.g., Van Deursen et al., 2017).

Due to the advent of social media and messengers, participatory and communication skills can be expected to be more important than ever (Pfaff-Rüdiger & Riesmeyer, 2016). Although a social component was considered in many conceptualizations of media and digital literacy, it has not been operationalized in a systematic manner until the multidimensional conceptualization of social media literacy

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by Pfaff-Rüdiger et al. (2012) and Riesmeyer et al. (2016), which has been developed into a standardized measure by Festl (2021). In this article, we deployed the measure by Festl (2021) and conducted a broad validation study with adolescents and young adults aged 16–22 years across eight different countries (Austria, France, Germany, Hungary, Italy, Poland, Slovenia, and the United Kingdom). We focused on the participatory-moral subdimension of the measure as this concept can be considered most relevant to address the described challenges of dark participation. The results provide a validated measure of self-perceived participatory-moral literacy in eight European countries that can be used as a starting point for further empirical research on social media literacy.

Conceptualizing Social Media Literacy

Although there is a long research tradition on media literacy, used definitions strongly vary as illustrated by a current systematic review of published articles (see Potter, 2022). Several researchers referred to a definition brought up by the National Leadership Conference on Media Literacy in the year 1992 that declared media literacy as “ability to access, analyze, evaluate, and communicate messages” (Aufderheide, 1993; see also Hobbs, 1998, p. 265). In the recent years, social science research mainly focused on a skill-based understanding of media literacy and brought up the concept of digital skills, which can be defined as “the ability to use ICTs in ways that help individuals to achieve beneficial, high-quality outcomes in everyday life for themselves and for others, and to reduce potential harm associated with more negative aspects of digital engagement” (Helsper et al., 2020, p. 9). Within this concept—and the preceding concept of Internet skills (see van Deursen et al., 2016)—communication and interaction skills were considered one of the main categories in addition to technical and operational skills, information navigation and processing skills, and content creation and production skills (Haddon et al., 2020, p. 15). In general, along the advent of social media the scientific focus has shifted from a technological and knowledge-based perspective on media literacy and skills to a broader understanding of the concept, considering the role of social participation and interaction (Pfaff-Rüdiger & Riesmeyer, 2016; Schreurs & Vandenbosch, 2022). Despite the general acknowledgment of the need for a social perspective on (digital) media literacy, systematic and multidimensional conceptualizations and operationalizations of this element are still rare.

The present study follows a multidimensional understanding of media literacy covering a triad of issue-related skills,² self-related skills, and social skills (Dewe & Sander, 1996; Pfaff-Rüdiger et al., 2012). In this context, social skills are considered using media as a form of social integration, to talk with others about their own media-related experiences, and to consider the social consequences of one’s own media-related behavior (Dewe & Sander, 1996). This understanding

implies a broad perspective on social media literacy that is embedded in young users’ everyday life and overall social development (see also Livingstone, 2014). According to the conceptualization of Riesmeyer et al. (2016, p. 38-39), social skills consist of four subdimensions: (1) participatory skills asking how to treat others and interact with others online in a socially responsible manner, (2) moral skills dealing with the question if users’ online behavior follows established moral standards and norms, (3) communicative skills asking if users are able to talk with others about their online experiences, and (4) educational skills dealing with the question if users are able to transfer their own media-related expertise and knowledge to others to help them. In previous empirical investigations, it has been shown that participatory and moral skills should be better considered as one joint dimension of social media literacy (Festl, 2021).

In addition to this content-based structuring of social media literacy, previous research also suggested a process-based understanding of the construct. Competencies are traditionally considered as a structure of knowledge (what a person knows) and abilities (what a person can do) under ideal conditions, and need to be differentiated from a person’s performance, describing “what is actually done under the existing circumstances” (Wood & Power, 1987, p. 409). The performance as access to and use of this structure thus also depends on certain personal and situational factors. In previous research, a person’s motivation was assumed to be a relevant aspect influencing the transfer of knowledge and abilities into competent behavior (Martens, 2010). However, it was also shown that motivation as perceived subjective importance of certain online behaviors can be considered as a part of the skill construct. In the study by Festl (2021), participatory-moral, communicative, and educational skills were modeled out of a person’s self-perceived knowledge, abilities, and motivation and were found to be related to self-perceived competent online behavior. Motivation thereby was considered as a form of intrinsic motivation, as a high agreement means that the adolescents perceive social literate online behavior as a value per se (see Riesmeyer et al., 2016).

Measuring Social Media Literacy

In their recent systematic meta-review of the core concepts in media education, Wuyckens et al. (2022) concluded that there is much conceptual effort in identifying skills that constitute media literacy. However, this process is not accompanied by establishing the required measures necessary to measure these skills. If at all, aspects of media literacy (see Hobbs et al., 2022) as well as digital skills (see van Deursen et al., 2016) were mostly measured with self-report instruments, reflecting the respondents’ subjective estimates and perceptions. Subjective perceptions of competence were shown to be influential drivers of corresponding observable behavior (e.g., Bandura, 1997). They might provide unique

information for understanding individual competences, but cannot be equated with objectively measured skills (Keefer, 2015). Alternatively, media literacy and digital skills were measured by investigating the respondent's level of digital engagement or via very context-specific performance tests (Helsper et al., 2020). The former can be considered problematic because the engagement or non-engagement in a certain online activity cannot be automatically equated with high or lacking levels of respective skills. Performance tests, in contrast, can provide more objective information about the participant's skill level (e.g., advertising, cyberbullying, privacy; Purington Drake et al., 2023), but cannot be transferred to different contexts beyond the specific focus of the study. Furthermore, they are also limited to application among smaller samples as their development and implementation are labor-intensive. Finally, measuring social skills with performance tests is challenging as there is often more than one valid answer to a specific task (Helsper et al., 2020).

To prove the pertinence of social media literacy for users' participation in digital societies, there is a need for standardized measures that allow for a broad and systematic investigation of the status quo and the development of social skills over time. Although self-report measures can be distorted by overconfident and socially accepted answers, they still enable valuable and unique information regarding persons' estimates of their skills (Mathieson et al., 2009). In addition, they can be broadly implemented among large survey studies providing the opportunity to analyze and compare these estimates among different groups of users in different countries (e.g., Allen & Van Der Velden, 2005; Chan, 2009). To conduct this kind of research, it is essential to prove the validity of the developed instruments. Up to now, validated instruments are still rare. As an exception, the multidimensional *Internet Skills Scale* (van Deursen et al., 2016) as well as the *Youth Digital Skills Indicator* (Helsper et al., 2020) could be confirmed as psychometric sound and valid instruments. Communication and interaction skills were considered as being one part of these measures. However, the used indicators were rather broad and general. In the present study, we aimed to have a more specific look at the social skills needed for a successful and socially responsible participation and interaction in digital environments.

The Present Study

The main objective of the present study was to validate a measure on young users' self-perceived participatory-moral literacy,³ expected to be most relevant to handle prevalent negative online experiences such as cyberbullying, hate speech, or the encounter of misinformation. We relied on a previously developed standardized measure on self-perceived participatory-moral knowledge, abilities, motivation, and behavior (Festl, 2021). For the present study, we omitted users' knowledge to stress the concept of social media literacy beyond cognitive and knowledge structures that

were predominant in most previous research (e.g., Schmid et al., 2022). We thus focused on users' self-perceived abilities and motivation, describing their participatory-moral skills as well as their self-perceived participatory-moral online behavior.

As previous research has shown that children's and adolescents' online experiences strongly vary between different countries (e.g., Smahel et al., 2020), it is necessary to provide cross-country valid measures, especially if they address global challenges such as digital literacy. Or as Livingstone (2012) states, "it is no longer plausible to study one phenomenon in one country without asking, at a minimum, whether it is common across the globe or distinctive to that country or part of the world" (p. 417). Only with valid instruments, it is possible to answer the question regarding country influences on digital literacy that might result from different cultural values, education systems, technological infrastructure, regulatory frameworks, or socioeconomic stratifications (Smahel et al., 2020). In the present study, we contributed to this line of research by investigating young users' participatory-moral literacy beliefs for application in eight European countries. Thereby, we performed as follows:

1. Established configural identical models of participatory-moral literacy beliefs in eight European countries;
2. Tested measurement invariance of the models across countries;
3. Established the psychometric qualities of the adequate invariant model;
4. Demonstrated the convergent validity of the participatory-moral literacy belief scale.

Method

Availability of Data and Materials

All data and code underlying this article are available in OSF, at <https://osf.io/3s6uw/>.

Participants and Procedure

We conducted an online survey with adolescents and young adults aged between 16 and 22 years through the panel provider RESPONDI. The data were collected from 24 September to 4 October 2021, within eight European countries:⁴ Austria (AUT), Germany (GER), France (FRA), Hungary (HUN), Italy (ITA), Poland (POL), Slovakia (SLO), and the United Kingdom. We asked the panel provider to recruit participants within the mentioned age range, stratified by gender and different educational backgrounds. Each participant gave informed consent before participating in the study. No identifying information was collected to ensure anonymity, and each participant received a small payment for their participation.

Table 1. Descriptive Statistics per Country.

Country	Sample size	Age	Gender		
	n (%)	M (SD)	Male (%)	Female (%)	Other (%)
AUT	211 (14)	19.84 (1.72)	28	69	2
FRA	139 (9)	19.72 (1.71)	46	53	1
GER	420 (28)	19.70 (1.78)	45	54	1
HUN	140 (9)	19.83 (1.43)	45	54	-
ITA	157 (11)	19.91 (1.39)	38	61	1
POL	152 (10)	19.50 (1.58)	61	38	1
SLO	143 (10)	19.75 (1.55)	59	38	1
UK	127 (9)	19.69 (1.71)	66	31	3

Missing percentages regarding gender refer to the answer options “prefer not to say.”

A total of 1,522 adolescents and young adults between 16 and 22 years old responded to the survey. First, we checked for the number of missing responses to the scale indicators. We found that only 33 participants provided some missing responses (6 or less) to the 21 indicator items, and thus decided to retain all participants based on item-level missing data. Second, we defined speeders as participants who took 2 *SD* less time per completed questionnaire page compared with the average participant in their country. We excluded 5 speeders from the sample. Third, we considered straightliners. They were identified based on 12 items that assessed positions to highly contradictory value statements (e.g., “All cultures are worth the same” and “My religion is superior to other religions”). We considered a response pattern invalid if three criteria were met: (1) Participants indicated their opinion for at least 6 of the 12 statements; (2) the intrapersonal variance of the responses was 0, indicating that they chose the same reply across all statements; (3) the intrapersonal mean of the valid responses was not 3, indicating that the participant was not indifferent toward all statements. The procedure led to the exclusion of 25 participants. Fourth, we excluded three multivariate outliers based on an analysis of the 21 indicator items of participatory-moral literacy. One case was excluded based on its extreme Mahalanobis distance from the other cases. Two cases were excluded based on their extreme generalized Cook’s distance from the other cases (Flora et al., 2012).

This leaves a final sample of 1,489 adolescents (age: $M=19.74$; $SD=1.65$; 47% male; 51% female; 2.0% other or prefer not to say). The sample sizes and descriptive statistics per country can be found in Table 1. Despite the company’s efforts, the gender distribution varied across countries, with some containing more female participants (Austria, Italy) and some containing more male participants (Poland, Slovakia, the United Kingdom). Regarding education, 38% ($n=568$) of the respondents had no school-leaving qualification, completed lower-secondary education, or vocational school education, 42% ($n=620$) completed secondary

education, 18% ($n=266$) completed university education, and 2% ($n=35$) did not want to answer this question.

Measures

Participatory-Moral Literacy Belief Scale. We employed items on self-perceived participatory-moral literacy adopted from Festl (2021). The scale consists of three subscales asking the respondents about their self-perceived abilities, measured with seven items, self-perceived motivation, measured with eight items, and self-perceived behavior measured with six items. All items were answered on a 5-point Likert-type scale, ranging from 1 (*I don’t agree at all*) to 5 (*I completely agree*). The original items were in German language. An English native speaker with research background and a background in pedagogy translated the items. The suggested translations were then translated back by a German native speaker to assess the quality of the translation. After the quality of the English translation was assessed, we employed the English items as a basis for translation to the other five languages: French, Hungarian, Italian, Polish, and Slovakian. The translation process was again employed by working with native speakers who all had a background in pedagogy. The items in the English version can be found in the Supplemental Materials Document (Table A1).

As part of its construct validity, we focused on proving the convergent validity of the participatory-moral literacy belief scale. As it is considered a dimension of social media literacy, we investigated correlations with indicators of participants’ social perception and embeddedness. In addition, we looked at users’ liberal attitudes as counterparts of socially hostile extremist beliefs. For all the following validation constructs, descriptive statistics per country can be found in the Supplemental Materials Document (Table A2).

Liberalism. The construct of liberalism was measured with the following two items: *All people are worth the same* and *All cultures are worth the same*. The items were adopted from Reinemann et al. (2019) and answered on a 5-point Likert-type scale, ranging from 1 (*I don’t agree at all*) to 5 (*I completely agree*; $M=4.26$; $SD=1.02$; $\alpha=.80$). We expected liberal attitudes to positively correlate with the dimensions of participatory-moral literacy because liberalism has been previously found to positively correspond with compassion (Hirsh et al., 2010) and emotional expression (Block & Block, 2006).

Loneliness. Respondents’ loneliness was measured with three items: *How often do you feel like you lack companionship*, *How often do you feel excluded*, and *How often do you feel isolated from others*, adopted from Russell et al. (1980). The items were answered on a 5-point frequency scale, ranging from 1 (*never*) to 5 (*very often*; $M=2.88$; $SD=1.02$; $\alpha=.82$). We expected loneliness to negatively correlate with the dimensions of participatory-moral literacy, because previous

research has already confirmed a negative relationship between loneliness and self-perceived social skills (e.g., Qualter et al., 2015; Segrin & Flora, 2000).

Perceived Social Support. We measured the respondents' perception of social support with six items reflecting three sub-dimensions: perceived emotional support (*There are some people who truly like me, Whenever I am not feeling well, other people show me that they are fond of me*; $M=3.86$; $SD=0.92$; $\alpha=.66$); perceived instrumental support (*There are people who offer me help when I need it, When everything becomes too much for me to handle, others are there to help me*; $M=3.87$; $SD=0.96$; $\alpha=.76$); and need for support (*Before making any important decisions, I absolutely need a second opinion, It is important for me always to have someone who listens to me*; $M=3.72$; $SD=0.93$; $\alpha=.53$). The items were adopted from Schwarzer and Schulz (2000) and answered on a 5-point Likert-type scale, ranging from 1 (*I don't agree at all*) to 5 (*I completely agree*). We expected perceived social support to positively correlate with the dimensions of participatory-moral literacy, because previous research has confirmed a positive relationship of social skills and perceived social support (e.g., Riggio et al., 1993).

Social Capital. We assessed social capital with a single item measurement focusing on the dimension of social trust, asking *How many people do you have in your life that you can trust?* (Kawachi et al., 1997). The answer options ranged from 1 (*I can't really rely on anyone in my life*), 2 (*I can only really trust one person in my life*), 3 (*I have a small circle of people [2–5 people] in my life that I can really trust*) to 4 (*I have a larger circle of people [more than 5 people] in my life that I can trust*); $M=3.10$, $SD=0.68$. We expected the perceived social capital to positively correlate with the dimensions of respondents' participatory-moral literacy because it was conversely shown that persons with lower social skills have difficulties to build and maintain close social relationships, which should result in less social capital (e.g., Segrin & Flora, 2000).

Data Analysis

Using Mardia's (1970) multivariate skewness and kurtosis indicators, we could show that the data exhibited multivariate non-normality (skewness: $b_{1,21}=32.80$; $\chi=7,958.19$, $df=1,771$, $p<.001$; kurtosis: $b_{2,21}=639.64$; $z=96.15$, $p<.001$). We thus fitted all latent variable models using maximum likelihood estimation with robust Huber–White standard errors to account for the Likert-type items and the non-normality of their (multivariate) distributions (see Rhemtulla et al., 2012). All reported test statistics and fit indices in this article were consequently calculated as their scaled versions. Notable exceptions are the standardized root mean square residual (SRMR) fit index and the χ^2 difference test for comparing nested models. Overall, the indicators for the measurement

models had 68 missing values (between 0 and 19 per item, between 0 and 3 per participant, $n=1,459$ [98%] complete cases). The data for the model, including external covariates, had 236 missing values, between 0 and 93 per item, between 0 and 4 per participant, and $n=1,327$ (89.1%) complete cases. Missing values were accommodated with full information maximum likelihood estimation, assuming that missingness at the item level occurred at random (MAR). We used the R (R Core Team, 2022) package *lavaan* (Rosseel, 2012) for latent variable modeling. Functions from *semTools* (Jorgensen et al., 2022) and *psych* (Revelle, 2022) were used to calculate reliability scores, and packages from the *tidyverse* (Wickham et al., 2019) for data wrangling and management.

Results

Establishing the Participatory-Moral Literacy Belief Scale

Addressing our first research aim to establish configural identical models of participatory-moral literacy beliefs in eight European countries, we initially estimated one global as well as eight country-specific structural equation models with the three dimensions of participatory-moral abilities, motivation, and behavior. These estimations were based on the total item pool of the original model (see Festl, 2021), displayed in the Supplemental Materials Document (Table A1). As illustrated in Table A3 and A4 (see Supplemental Materials Document), the model fits in all countries were incompatible with the usually accepted thresholds: values close to .95 or greater for TLI and CFI, values close to .08 or below for SRMR, and values close to .06 or below for RMSEA (Hu & Bentler, 1999, p. 27). In a next step, we applied an iterative process, combining theoretical discussions on the item contents and statistical analyses of modification indices and factor loadings to select the most suitable items per dimension.

This iterative process led to a configural model with four items for each dimension:⁵

1. Participatory-moral abilities: *I'm good at judging who I can and cannot trust online (Abilities_2), I'm good at judging what is forbidden online and what is not (Abilities_5), I can always tell the difference between right and wrong online behavior (Abilities_6), I am good at assessing the consequences my online behavior could have for others (Abilities_7)*;
2. Participatory-moral motivation: *It's important to me to do what I want online, but without hurting anyone (Motivation_2), It's important to me to always be respectful and polite to others online (Motivation_4), It is important to me to abide by rules and laws online (Motivation_6), It is important to me to only post things about others online if they are okay with it (Motivation_7)*;

3. Participatory-moral behavior: *Online, I treat others the way I would want to be treated (Behavior_3), If I do something wrong online, I own up to it and try to make it right (Behavior_4), If I post something about others online, I ask them if they are okay with it first (Behavior_5), When I'm online, I abide by the same laws and rules as I do offline (Behavior_6).*

The set of items in the different languages can be found in the Supplemental Materials Document (Table A4). The model fitted the data well for all the eight European countries (see Table 2). We used this configural model to test for measurement invariance of participatory-moral literacy beliefs across the different countries (Research Aim 2; see Table 3). The test provided evidence for weak invariance. Thus, we can assume factor loadings to be equal across the different countries and, consequently, conduct cross-country comparisons of correlations with the latent variables. However, the hypothesis of equal item intercepts was rejected. We therefore cannot compare the levels of the latent variables across the countries. The model with equal loadings across countries fitted the data well: $\chi^2(455)=542.74, p=.003, CFI=.985, TLI=.982, RMSEA=.033, SRMR=.055$ and was selected for further investigations.

Psychometric Qualities of the Participatory-Moral Literacy Belief Scale

In the next step, we investigated the psychometric qualities of the participatory-moral literacy belief scale (following

Table 2. Fit of the Selected Configural Model per Country.

Country	χ^2	df	p	CFI	TLI	RMSEA	SRMR
AUT	100.54	49	.000	.943	.923	.074	.055
FRA	57.16	49	.198	.987	.983	.035	.047
GER	57.10	49	.199	.995	.993	.023	.030
HUN	57.41	49	.192	.989	.986	.031	.043
ITA	41.82	49	.757	1.000	1.025	.000	.039
POL	61.69	49	.105	.978	.970	.044	.048
SLO	60.38	49	.128	.977	.969	.041	.051
UK	48.12	49	.509	1.000	1.016	.000	.050

CFI: comparative fit index; TLI: Tucker–Lewis index; RMSEA: root mean square error of approximation; SRMR: standardized root mean square residual.

Scaled test statistics were used.

Table 3. Testing Measurement Invariance Across the Different Countries.

Level of invariance	χ^2	df	p	AIC	BIC	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$	p
Configural	484.40	392	.001	44,883	46,623	.985	.979	.036	.043		
Weak	542.74	455	.003	44,824	46,230	.985	.982	.033	.055	57.45	.674
Strong	677.33	518	.000	44,843	45,915	.972	.971	.043	.061	146.98	.000

The $\Delta\chi^2$ column contains the difference between the standard test statistics, not the scaled test statistics that was reported in the second column; a robust difference test is a function of two standard (not robust) statistics; scaled values are indicated for χ^2 , df, and p; robust values are indicated for CFI, TLI, and RMSEA; weak invariance: the factor loadings are constrained to be equal across countries; strong invariance: in addition, the intercepts are constrained to be equal across countries.

Research Aim 3). First, we looked at the factor loadings (see Table 4). Except for one of the ability items (Abilities_2: $Est=.57, SE=.05$), all factor loadings were similarly high, indicating consistent and meaningful associations with the latent factors.

Second, we looked at the reliabilities of the participatory-moral literacy dimensions across the different countries (see Table 5). We calculated the coefficients based on the measurement model. It should be noted that while the factor loadings were constrained to be equal across countries, the variances of the indicators differed between the countries. Therefore, the reliability scores also differed between countries. Overall, the findings confirmed acceptable internal consistencies for the self-perceived abilities (*aver. $\alpha=.74$; aver. $\omega=.74$*), motivation (*aver. $\alpha=.77$; aver. $\omega=.78$*), and behavior (*aver. $\alpha=.75$; aver. $\omega=.76$*) dimensions across the countries. A comparable low reliability was found for participatory-moral abilities in the United Kingdom ($\alpha=.67$; $\omega=.65$), as well as participatory-moral motivation ($\alpha=.65$; $\omega=.74$) and behavior ($\alpha=.62$; $\omega=.65$) in Italy. We finally looked at the average variance extracted (AVE) and found rather low average values for self-perceived abilities (*aver. AVE=.43*), motivation (*aver. AVE=.47*), and behavior (*aver. AVE=.44*) across the different countries.

Third, we looked at the covariances between the latent factors of the measurement model. We estimated a reference model that included the participatory-moral belief measures and the external validation measures with all covariances fixed across countries. We then tested whether freely estimating the covariance coefficients improved model fit. A statistically significant fit improvement compared with the reference model was not found: $\Delta\chi^2=280.96, p=.102$. Therefore, we report the results from the model with all covariances fixed across countries. Overall, we found moderate covariances between the constructs across the different countries, being highest for motivation and behavior (*cov=.43, $p<.001$*), followed by abilities and behavior (*cov=.39, $p<.001$*) and motivation and abilities (*cov=.31, $p<.001$*).

Validity of the Participatory-Moral Literacy Belief Scale

Finally, we aimed to demonstrate the convergent validity of the participatory-moral literacy belief scale by looking at its

Table 4. Item Loadings of the Selected Model.

Subscales	Indicator	Est	SE	z
Self-perceived participatory-moral abilities	Abilities_6	1.00	.00	–
	Abilities_2	.57	.05	12.50
	Abilities_5	1.00	.04	25.61
	Abilities_7	.94	.04	23.04
Self-perceived participatory-moral motivation	Motivation_6	1.00	.00	–
	Motivation_2	.90	.04	22.13
	Motivation_4	1.01	.04	26.76
	Motivation_7	.88	.05	19.18
Self-perceived participatory-moral behavior	Behavior_6	1.00	.00	–
	Behavior_3	.92	.05	20.41
	Behavior_4	.87	.04	21.16
	Behavior_5	.87	.04	20.68

We reported item loadings without standardization, because the more commonly reported standardized loadings differ between the countries, as the variances, which are used for standardization, vary across countries.

Est is the maximum likelihood estimate of the factor loading with its robust standard error (SE) and the resulting z score.

All loadings were statistically significant at $\alpha < .001$; the first indicator of each latent variable was set to 1 to identify the model.

Table 5. Reliabilities of the Participatory-Moral Literacy Beliefs Dimensions Across the Different Countries.

Subscales	Country	α	AVE	ω
Self-perceived participatory-moral abilities	AUT	.76	.49	.81
	FRA	.78	.49	.79
	GER	.75	.45	.75
	HUN	.77	.50	.83
	ITA	.73	.37	.63
	POL	.71	.43	.78
	SLO	.72	.38	.67
	UK	.67	.34	.65
Self-perceived participatory-moral motivation	AUT	.80	.47	.74
	FRA	.79	.49	.81
	GER	.81	.52	.81
	HUN	.79	.50	.84
	ITA	.65	.35	.74
	POL	.81	.51	.80
	SLO	.77	.46	.78
	UK	.75	.43	.75
Self-perceived participatory-moral behavior	AUT	.79	.49	.81
	FRA	.80	.50	.80
	GER	.81	.53	.82
	HUN	.78	.46	.76
	ITA	.62	.30	.65
	POL	.78	.46	.77
	SLO	.71	.38	.70
	UK	.70	.38	.73

α is Cronbach's α ; AVE: average variance extracted; ω is McDonald's ω .

covariances with different indicators of social integration and attitudes (following Research Aim 4). As with the measurement model, we referred to the model in which each

Table 6. Convergent Validity of the Participatory-Moral Literacy Beliefs Scale.

Validation construct	Self-perceived participatory-moral abilities	Self-perceived participatory-moral motivation	Self-perceived participatory-moral behavior
Liberalism	.23***	.28***	.30***
Loneliness	-.12***	-.05*	-.05*
Need for support	.20***	.24***	.28***
Perceived emotional support	.30***	.26***	.33***
Perceived instrumental support	.28***	.26***	.34***
Social capital	.07***	.05**	.08***

Covariances between the constructs are indicated.

For the indicators of the measurement model we used latent factors; for the external validation measures we used manifest factors due to the low number of items per construct.

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

covariance was constrained to be the same across countries. We thus assumed that the dimensions are similarly related to each other across the eight European countries. As illustrated in Table 6, the components of participatory-moral literacy beliefs and the validation indicators covaried with each other in the expected direction.

As expected, stronger liberal attitudes were related to more self-perceived participatory-moral abilities ($cov = .23$, $p < .001$), motivation ($cov = .28$, $p < .001$), and behavior ($cov = .30$, $p < .001$). Regarding participants' perceived loneliness, we also found the expected negative covariance with self-perceived participatory-moral abilities ($cov = -.12$, $p < .001$), motivation ($cov = -.05$, $p < .005$), and behavior ($cov = -.05$, $p < .05$). The relationship was, however, rather weak.

Regarding participant's perceived social support, the results confirmed the expected positive covariances with participatory-moral literacy beliefs. First, the data showed that the higher participants' need for support, the stronger their self-perceived participatory-moral abilities ($cov = .20$, $p < .001$), motivation ($cov = .24$, $p < .001$), and behavior ($cov = .28$, $p < .001$) when being online. Moreover, we found that the higher the respondents' perceived emotional support, the stronger their self-perceived participatory-moral abilities ($cov = .30$, $p < .001$), motivation ($cov = .26$, $p < .001$), and behavior ($cov = .33$, $p < .001$). Finally, the findings confirmed positive covariances between perceived instrumental support and self-perceived participatory-moral abilities ($cov = .28$, $p < .001$), motivation ($cov = .26$, $p < .001$) and behavior ($cov = .34$, $p < .001$).

Finally, regarding the participants' perceived social capital, the data again confirmed the expected positive relationships with self-perceived participatory-moral abilities ($cov = .07$, $p < .001$), motivation ($cov = .05$, $p < .01$), and

behavior ($cov = .08$, $p < .001$). Again, these covariances were rather weak.

Discussion

While being online, young users are often confronted with insulting, hateful, or misleading messages. To handle these dark forms of participation, it is essential to equip them with resources that support their social literacy in today's complex online environments (Quandt et al., 2022). Regarding the described challenges, it particularly seems essential to foster users' positive participation in online environments and socially responsible interaction with others that should resonate with commonly accepted moral standards. In the present article, we thus focused on a previously developed measure on self-perceived participatory-moral literacy (Festl, 2021) and investigated its fit and validity across eight European countries: Austria, France, Germany, Hungary, Italy, Poland, Slovakia, and the United Kingdom.

First, we aimed to establish a configural model of self-perceived participatory-moral literacy that uses the same (translated) items across the considered European countries. Out of the original 21-item measure, we found a suitable model of participatory-moral literacy with four items per dimension: self-perceived abilities, motivation, and behavior. As a theoretical contribution, this research thus also supports the integration of intrinsic motivation as a relevant component of literacy (see also Festl, 2021), expanding the previous focus on cognitive dimensions of literacy. We could confirm weak invariance for this 12-item measure across the different countries, meaning that the same latent variables were measured across these countries. We thus can assume that the constructs of participatory-moral literacy were understood similarly by the participants of the different countries. This shortened version of the participatory-moral literacy beliefs scale thus can be used as a starting point for further empirical research within each of the considered countries, addressing questions such as if and how social media literacy can be considered as a relevant resource for positive online participation.

Second, we aimed to establish the psychometric qualities of this final model and, for the most part, could confirm satisfying results regarding factor loadings, internal consistencies, and the covariances between the dimensions. Comparably low reliability values were detected in the United Kingdom and Italy, which might indicate that some of the items might be less suitable in those two countries or those two languages. Future research with these instruments in the specific country needs to be done to further prove and improve their applicability.

Finally, we aimed to demonstrate the convergent validity of the participatory-moral literacy belief scale across different countries. As expected, we could show moderate positive relationships of self-perceived participatory-moral abilities, motivation, and behavior with users' liberal attitudes (e.g., Hirsh et al., 2010) and the indicators of perceived social

support (emotional, instrumental, and need for support; Riggio et al., 1993). In addition, the results confirmed weak positive relationships between literacy beliefs and perceived social capital (Segrin & Flora, 2000). Following these findings, it can be assumed that regarding online social literacy the quality of respondents' perceived social embeddedness is more important than the quantity. Finally, we also found systematic negative relationships between users' perceived loneliness and their participatory-moral literacy beliefs across all countries. However, these associations were comparatively weak. This might be explained by our focus on online social literacy. Although previous research has shown that loneliness and lower social skills are intertwined (Qualter et al., 2015; Segrin & Flora, 2000), it might be less pronounced in the online context. According to the social compensation hypothesis (e.g., Valkenburg & Peter, 2007), it can be expected that lonely and socially anxious persons use social media more often to interact with other users. Thus, their online social skills might not be limited even if they are lonely and isolated outside the online context.

The present study is an important step in advancing international research on social media literacy. However, there are also some limitations in the study design that need to be considered. First, the present study relied on a self-report measure of adolescents' participatory-moral literacy. Although there are many advantages to this procedure (e.g., its broad applicability and transferability to different contexts), it needs to be considered that we measured participants' subjective beliefs about their abilities and their behavior and not their actual abilities and behavior (see Potter & Thai, 2016). The provided answers might be distorted by tendencies of social desirability or inaccurate assessments of especially the ability dimension. To further strengthen the proof of its validity, it is important to combine the developed scale with skill measures resulting from other methods such as performance or peer ratings. Second, although the overall sample of adolescents and young adults was quite large ($n = 1,489$), the present study relied on multigroup comparisons between the different countries. In each individual country, the sample size was rather small and strongly varied between the respective countries ($n = 127-420$). It is recommended to calculate multigroup Structural Equation Modeling (SEM) comparisons based on larger sample sizes per group (Meade & Bauer, 2007). However, larger sample sizes within each country could not be realized due to the financial limitations of the superordinate project. This power limitation might, however, be partly compensated by an overidentified measurement model as applied in the present study (Meade & Bauer, 2007). In addition, we also found varying gender distribution for the countries. In future studies, the scale thus should be tested with larger and more representative samples. Third, the selection of the eight European countries was not systematically following specific socioeconomic or geographical reasons but depended on the collaboration of the research team and only considered as European countries. Future studies need to consider the culture-specific backgrounds and their influences on

young users' digital literacy more carefully and they might want to opt for a more global perspective in country selection (Livingstone & Bulger, 2014). Fourth, we could not establish strong measurement invariance. Thus, it was not possible to compare the levels of participatory-moral literacy across the different countries. Following Davidov et al. (2014), there are different strategies to deal with measurement nonequivalence in studies with cross-country comparisons. One option is to identify subgroups of countries and items for which measurement invariance can be confirmed (partial invariance) and conduct analyses with this subset. For a new comparative project using our participatory-moral literacy belief scale, we thus suggest using our open data and analysis scripts as a starting point and deriving a suitable adaption of the scale for the countries of interest. Another option is to identify and improve the items that are responsible for the found nonequivalence, as lacking invariance might be caused by bad translations or the integration of very culture-specific terms (see Davidov et al., 2014). Fifth, our central constructs abilities, motivation, and behavior showed quite strong relationships mitigating their discriminant validity. Finally, we did not completely replicate the original model on participatory-moral literacy as we did not include the knowledge dimension. Although measuring knowledge solely based on subjective perceptions can be problematic (see Haddon et al., 2020), it was previously declared as an essential component of competence (e.g., Wood & Power, 1987) and a central dimension of media literacy (e.g., Potter, 2004). Thus, knowledge should be considered and integrated in future studies that might, for example, combine subjective perceptions with objective performance tests.

Conclusion

In the present study, we systematically analyzed young users' self-perceived participatory-moral literacy and provided a standardized measure of their respective abilities, motivation, and behavior that could be established in different European countries and languages. This measure can be applied to contribute to and advance the systematic, empirical research on digital literacy with a specific focus on users' social participation and interaction online. This kind of research is necessary to address the question if higher levels of social media literacy are a relevant resource in preventing and handling dark forms of participation in online communication, such as cyberbullying, hate speech, and misinformation. Suitable and valid standardized measures, moreover, are needed to evaluate and improve media education programs (e.g., in schools) that aim to promote young users' digital literacy. Up to now, most of the programs lack an empirical evaluation, not allowing for any clear indication if they are able to foster the intended dimension of digital literacy from a short- or long-term perspective. Standardized measures can be implemented to examine the value of the respective programs and identify opportunities for improvement.

By proving the general suitability of the instrument in different countries and languages, we additionally enable international comparisons on young users' digital literacy, with a specific focus on their social participation and interaction online. This is relevant because the promotion of digital literacy is a global challenge that, however, depends on country-specific particularities and differences. Hate speech and misinformation are phenomena that are globally spread and can reach everybody everywhere. However, the handling of these issues might vary between different countries, not only from a legal perspective but also depending on their educational resources such as users' digital literacy. Detecting country-specific differences can help to map out best practice examples as well as underlying structures that can be used to advance the resources in other countries as well.

The present study can be considered a relevant starting point for these questions that, however, needs to be expanded by additional research with larger sample sizes and in more diverse countries (beyond our underlying European focus). By providing access to the scale in different languages, we enable international researchers to use, adapt, and improve the instrument and thus cumulatively stimulate progress in digital literacy research.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. European Commission (2021). Digital skills. Available at: <https://digital-strategy.ec.europa.eu/en/policies/digital-skills>.
2. In the original German source, the term *Kompetenzen* was used, which might be translated with "competencies" or "skills." For the present article, we decided to use the term "skills" consistently to be in line with current research on digital literacy (see, for example, Helsper et al., 2020) and avoid conceptual misunderstandings.
3. We refer to the term "literacy" when speaking of respondents' competencies and behavior (as the performance of these competencies).
4. This online survey was part of a larger study addressing the prevention of radicalization among youth. Only variables relevant to the present research aims are described here. The scale development was not the main focus of this project.

5. The model allowed for correlations between the residuals of the items Behavior_6 and Motivation_6 and the residuals of the items Behavior_5 and Motivation_7. Both pairs of items used similar terms and even the same words, which explains why they shared a common variance beyond the correlation of their underlying latent variables.

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