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Validation of the New Media Literacy Scale in an online English-speaking sample.

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This work was funded by the Centre for Research and Evidence on Security Threats (ESRC Award: ES/N009614/1).

UNREFEREED PREPRINT

30th June 2020

Abstract

The English translation of the New Media Literacy Scale (NMLS; Koç & Barut, 2016) has not previously been validated. An online experiment was conducted comparing two criterion groups who should theoretically score higher or lower on the scale: research panel members who reported high ($n=96$) or low ($n=99$) levels of Twitter use when signing up for the panel. Findings of differences between the groups suggest that the English translation of the NMLS is usable in online research with an English-speaking population. Evidence of satisfactory psychometric properties is strongest for the overall NMLS total score.

Introduction

For economic, social and educational reasons, there is interest in assessing individuals' abilities to use digital media technologies. However, definitions of 'digital literacy' are varied and contested, and there are currently no widely accepted assessment tools (Chetty et al, 2018). The New Media Literacy Scale (NMLS; Koç & Barut, 2016) is a welcome addition. However, evidence of the validity of the English-language translation is lacking. The contribution of this paper is to establish, for the first time, that the NMLS is suitable for use with English-speaking samples.

The New Media Literacy Scale is a theory-based self-report measure of competences in using, critically interrogating, and creating digital media technologies and messaging. According to Koç & Barut the *"focus in NML is on collective creation of innovative media content over static content delivery, social interaction over isolated surfing, and active participation and engagement over passive reception ... being able to read and write media needs to be accompanied by critical and expressive thinking about the politics of representation ... Individuals are now expected to question potential biases, consequences and power of mediated messages they create or receive within the various channels of new media"* (2016, p. 835). The scale is designed to measure these abilities. It is based on a theoretical model of New Media Literacy developed by Chen et al (2009) that describes new media literacy in terms of two dimensions, functionality-criticality and consumption-prosumption ('prosumption' ability refers to creation of digital artefacts). It has four subscales (Functional Consumption, Critical Consumption, Functional Prosumption and Critical Prosumption).

Koç and Barut (2016) developed the scale and established its reliability and factor structure with a large Turkish sample in a paper-and-pencil format. The published version of the scale was translated into English from the Turkish version they used. A Latvian translation of the scale (Davidsons & Silkane, 2019) was used successfully online with acceptable reliability. However, at this time no published studies appear to report use of an English-language version.

The purpose of this study was to establish the usability, reliability and validity of the scale with an English-speaking audience tested online. A criterion group approach to validation was adopted, comparing groups of individuals who should in theory score higher or lower on any measure of New Media Literacy. Individuals who make regular, active use of a social media platform should theoretically have a higher level of proficiency in consuming and creating digital materials. Thus, the criterion groups were assembled from members of an online research panel, who reported different levels of experience with the social media platform Twitter when signing up for the panel. It was hypothesised that people with a higher level of Twitter use should report higher overall levels of New Media Literacy. Note that there is nothing special about Twitter as a platform in this respect – the same prediction might be made about people who differ in their level of use of other platforms such as Facebook or Reddit. Twitter was selected here because it has a reasonably high level of use / visibility, but is not as ubiquitous as Facebook.

Method

This study used a quasi-experimental design to compare the NMLS scores of participants who had reported either high or low levels of Twitter posting when signing up for an online research panel. Individuals in the 'low' group had answered "0" to the question "How many times did you tweet on Twitter in the last 12 months (excluding retweets)?" when signing up for the panel. Individuals in the 'high' group had answered "100 or more". Ethical approval came from the University of Westminster Research Ethics Committee and the Lancaster University Security Research Ethics Committee.

Materials

The study was conducted online. Participants recruited through the online research company Prolific completed an online questionnaire hosted on the Qualtrics online survey platform. They were asked to complete demographic items, an estimate of how often they visited or used Twitter (a 0-5 scale anchored at "not at all" and "several times a day") and the 35-item NMLS. The items of the NMLS were presented in the order published in Koç and Barut (2016). The wording of one item was changed from the published version. In the item "I manage to fend myself from the risks and consequences caused by media contents", the word "fend" was changed to "defend" on the basis that this would be more meaningful to participants. Participants were asked to respond to each item using a 5-point scale (strongly disagree – strongly agree). Higher scores indicate higher level of perceived competence. Total and subscale NMLS scores were calculated by summing the relevant item sets.

Procedure

Participants first saw an information page and indicated their consent. They then completed demographic items, and the 35-item NMLS. They then answered two questions about sharing untrue political stories (not used in the present analysis) and re-confirmed their consent for participation. They were then debriefed and thanked. Each participant was paid £0.63. Participants responded very quickly: the average time taken was 294 seconds (range of 93 to 3025 seconds). However, even the fastest times were not judged to be impossible, and none were more than 2 *SD* below the mean. Visual inspection of the datafile suggested inauthentic responding on the part of five respondents: Three individuals were identified who had answered all NMLS items with the same value, and two who had answered all but one with the same value. All these individuals were deleted from the datafile.

Participants

Sample size was determined by power analysis using G Power 3.1 (Faul et al, 2007). To detect an effect size of $d=.41$ (set by Ferguson, 2009, as the minimum effect size likely to have real-world importance), two groups of 95 would give 80% power to detect a difference at $\alpha=.05$. The target sample size was set at 200 in order to exceed this requirement.

Following exclusions for inauthentic responding, the sample comprised 99 individuals in the low-user condition, and 96 in the high user condition. All were UK or US nationals. Participant demographics are shown in Table 1.

Results

NMLS scores are summarised in Table 2. Values of α indicated that internal consistency is acceptable, with all subscales and the full measure exceeding $\alpha=.7$.

As a manipulation check, scores of the two groups on the item “about how often do you visit or use Twitter” were compared using a between-groups t -test. This indicated that participants in the ‘high’ group ($M=4.58$, $SD=.88$) did indeed make more use of the site than participants in the ‘low’ group ($M=3.17$, $SD=1.62$). There was greater variance in the ‘low’ group (Levene’s $F=44.19$, $p<.0005$), presumably reflecting the fact that some of the previous non-users had started using Twitter, while others had not. Adjusted df were therefore used in the between-groups comparison ($t_{(152.23)}=-7.61$, $p<.0005$). This indicates that people in the ‘high’ Twitter use group did indeed use the site more.

To test the hypothesis that the two groups would differ in their scores on the New Media Literacy Scale, a series of between-groups t -tests was performed. Results are summarised in Table 3. These comparisons demonstrate that the NMLS and its subscales all differ across the two groups, in the predicted manner. Applying a Bonferroni correction for multiple comparisons would reduce the alpha level for statistical significance to .01. All the scales other than Critical Consumption meet this more stringent criterion.

As a final exploratory analysis, the correlation between age and NMLS total score was computed. It is frequently speculated that older adults may have lower levels of digital literacy, with implications for their social media behaviour (e.g. Guess, Nagler & Tucker, 2019). Indeed, total NMLS scores were inversely correlated with age ($r=-.23$, $N=195$, $p=.002$).

Discussion

On the basis of these findings, the New Media Literacy Scale (Koç & Barut, 2016) appears to have acceptable internal consistency reliability when used online with an English-speaking sample. There is also some evidence of validity, obtained from comparing two criterion groups. Groups of individuals whose NMLS scores should differ, do differ, and in the predicted direction. This effect is strongest for the total scale score, and weakest for the Critical Consumption subscale. Further evidence for validity comes from the negative correlation of NMLS total score with age: older individuals reported lower levels of digital literacy. In fact, the obtained $r=-.23$ is likely to be attenuated as the sample is skewed towards younger individuals. Furthermore, membership of an opt-in online research panel like the one used is likely to be associated with higher levels of digital literacy. For both these reasons, the present result is likely to be an underestimate of the true relationship between age and NMLS score in the wider population.

Overall, the findings suggest that the English translation of the NMLS is usable in online research with an English-speaking population. Evidence of satisfactory psychometric properties is strongest for the overall NMLS total score.

References

- Chen, D. T., Wu, J., & Wang, Y. M. (2011). Unpacking new media literacy. *Journal of Systemics, Cybernetics and Informatics*, 9(2), 84-88. Retrieved from <https://repository.nie.edu.sg/bitstream/10497/18170/1/JSCI-9-2-84.pdf>
- Chetty, K., Qigui, L., Gcora, N., Josie, J., Wenwei, L., & Fang, C. (2018). Bridging the digital divide: measuring digital literacy. *Economics: The Open-Access, Open-Assessment E-Journal*, 12(2018-23), 1-20. doi:10.5018/economics-ejournal.ja.2018-23
- Davidson, A., & Silkane, V. (2019). The Relationship Between Media Literacy and Civic Participation Among Young Adults in Latvia. In S. Kurbanoğlu, S. Špiranec, Y. Ünal, J. Boustany, M. L. Huotari, E. Grassian, . . . L. Roy(pp. 103-112). Cham: Springer International Publishing. doi:10.1007/978-3-030-13472-3_10
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*. doi:10.3758/BF03193146
- Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice*, 40(5), 532-538. doi:10.1037/a0015808
- Guess, A., Nagler, J., & Tucker, J. (2019). Less than you think: Prevalence and predictors of fake news dissemination on Facebook. *Science Advances*, 5(1), eaau4586. doi:10.1126/sciadv.aau4586
- Koç, M., & Barut, E. (2016). Development and validation of New Media Literacy Scale (NMLS) for university students. *Computers in Human Behavior*, 63, 834-843. doi:10.1016/j.chb.2016.06.035

Tables

Table 1
Demographic Data

<i>N</i>	195
Sex	
Men	85 (43.6%)
Women	110 (56.4%)
Country of residence	
UK	180 (92.3%)
USA	11 (5.6%)
Other (Belgium, Ireland, Italy, Switzerland)	4 (2%)
Highest level of education	
High school / secondary school	28 (14.4%)
Some college or university	40 (20.5%)
College or university degree	81 (41.5%)
Master's degree	31 (15.9%)
Doctoral degree	10 (5.1%)
Professional degree (JD, MD)	5 (2.6%)
Occupation	
Employed for wages	110 (56.4%)
Self-employed	29 (14.9%)
Unemployed but looking for work	10 (5.1%)
Home-maker	9 (4.6%)
Student	28 (14.4%)
Retired	4 (2.1%)
Unable to work for health or other reasons	5 (2.6%)
About how often do you visit or use Twitter?	
Not at all	10 (5.1%)
Less often	8 (4.1%)
Every few weeks	17 (8.7%)
A few times a week	29 (14.9%)
About once a day	30 (15.4%)
Several times a day	101 (51.8%)

Note. Percentages may not sum exactly to 100% due to rounding errors.

Table 2
Descriptive Statistics

Variable	N	M	SD	α	Range		Skew	Kurtosis
					Potential	Actual		
Total NMLS score	195	136.18	16.39	0.93	35-175	77-170	-0.32	0.31
Functional Consumption	195	28.86	3.56	0.77	7-35	17-35	-0.17	0.20
Critical Consumption	195	43.26	5.34	0.82	11-55	26-55	-0.17	0.02
Functional Prosumption	195	29.46	4.46	0.87	7-35	14-35	-0.77	0.55
Critical Prosumption	195	34.61	7.07	0.89	10-50	10-49	-0.55	0.75
Age (years)	195	34.83	12.34			18-73	0.78	0.02
Duration (seconds)	195	294.37	237.03			93-3025	8.27	91.54

Table 3
Comparison of NMLS scores for higher and lower Twitter-use groups

	Twitter Condition	N	M	SD	t	df	p	Cohen's d
Total NMLS	Lower	99	131.87	16.53	-3.87	193	.000	.55
	Higher	96	140.64	15.08				
Functional Consumption	Lower	99	28.17	3.46	-2.77	193	.006	.40
	Higher	96	29.56	3.54				
Critical Consumption	Lower	99	42.44	5.36	-2.19	193	.030	.31
	Higher	96	44.10	5.23				
Functional Prosumption	Lower	99	28.42	4.97	-3.40	178.62	.001	.49
	Higher	96	30.53	3.60				
Critical Prosumption	Lower	99	32.83	7.11	-3.68	193	.000	.53
	Higher	96	36.44	6.58				

Note. Adjusted DF used for Functional Prosumption as Levene's test indicated unequal variance in the two groups ($F=6.34$, $p=.013$).