

Online Privacy Literacy and Online Privacy Behavior – The Role of Crystallized Intelligence and Personality

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Test on Crystallized Intelligence

The revised version of the declarative knowledge test to assess crystallized intelligence contains a total of 26 items (see file uploaded at the Open Science Framework (OSF) website: <https://osf.io/ngdvv/>). Initially, we planned to include all of the 26 items to calculate a total score. The scree plot, which was created in course of a Principal Component Analysis, indicated one underlying component. However, when extracting one component, it turned out that several items loaded weakly (< 1.301) on this one component. These items were item 01 (on diabetes mellitus), 03 (on the color of a flame of calcium), 08 (on the pH-value of water), 09 (on the time lag between federal German elections), 10 (on the epoch before the Rococo), 12 (on Newton's law), 14 (on how deflation emerges), 18 (on the symbol displayed on the backside of the German 1€ coin), 19 (on the founding members of the European Economic Community), 20 (on the emission of different vehicles), 23 (on the volume of blood in a human body), 24 (on the amount of protein in various foods), and 25 (on the Stockholm syndrome)¹. Given their weak loadings on the component, it was decided to not include these items in the final score of the declarative knowledge test to assess crystallized intelligence.²

¹ The items were presented to the participants in randomized order; the numbers mentioned here refer to the order of the items in the document uploaded at the OSF.

² Please note that we aim at reinvestigating the structure of the scale when a larger sample is available also taking into account the difficulty of items, etc. For interested readers the data of all items are available at the OSF (see main manuscript).

Results of Confirmatory Factor Analyses

Supplementary Table 1.

Fit values of confirmatory factor analyses of all questionnaires.

	CFI	TLI	RMSEA	SRMR	Standardized loadings of items on respective factor
Online Privacy Literacy Scale	.970* / .925+	.966* / .914+	.029* / .035+	.079* / .079+	.243 [#] - .823
Crystallized Intelligence Scale	.981* / .963+	.977* / .956+	.021* / .027+	.060* / .060+	.389 - .678
Big Five Inventory	.882* / .778+	.875* / .764+	.103* / .084+	.094* / .094+	1.144 ^x - 1.789 ^l

Note: CFI = Comparative Fit Index, TLI = Tucker Lewis Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual; * = standard estimators, + = robust estimators.

Online Privacy Literacy Scale: We estimated a second order factorial model using the WLSMV estimator (Weighted Least Square Mean and Variance adjusted; implies the DWLS (diagonally weighted least squares) estimator), which was among others also implemented in the original work (Masur et al., 2017); #: only two items loaded < 1.301 on the respective factor, all others loaded ≥ 1.411 .

Crystallized Intelligence Scale: We estimated a one factorial model using the WLSMV estimator.

Big Five Inventory: We estimated a five factorial model using the WLSMV estimator. x: only two items loaded < 1.301 on the respective factor, all others loaded ≥ 1.441 .

If a reader is interested in the results of the *Online Privacy Behavior Scale* (not presented due to its formative character), we point towards the data uploaded at the OSF (see main manuscript).

Descriptive Statistics split by Education

Supplementary Table 2.

Descriptive statistics split by groups with different highest educational degrees.

	1 (n=26)	2 (n=35)	3 (n=208)	4 (n=74)	5 (n=209)	6 (n=157)	7 (n=364)
Online Privacy Literacy Scale	9.31 (4.35)	13.69 (3.59)	13.81 (3.65)	14.55 (2.96)	14.72 (3.14)	15.73 (2.72)	15.50 (3.05)
Online Privacy Behavior Scale	1.92 (1.26)	2.46 (1.17)	2.15 (1.17)	2.11 (1.21)	2.26 (1.33)	2.39 (1.22)	2.45 (1.28)
Crystallized Intelligence Scale	0.48 (0.19)	0.50 (0.14)	0.55 (0.18)	0.55 (0.18)	0.68 (0.17)	0.67 (0.17)	0.77 (0.17)
Openness	3.38 (0.71)	3.37 (0.56)	3.35 (0.60)	3.36 (0.60)	3.48 (0.60)	3.48 (0.62)	3.60 (0.63)
Conscientiousness	3.33 (0.95)	3.61 (0.59)	3.51 (0.64)	3.43 (0.67)	3.52 (0.69)	3.61 (0.59)	3.62 (0.66)
Extraversion	3.04 (0.77)	3.47 (0.77)	3.23 (0.79)	3.33 (0.73)	3.34 (0.81)	3.43 (0.71)	3.47 (0.78)
Agreeableness	3.37 (0.63)	3.36 (0.57)	3.49 (0.53)	3.41 (0.53)	3.40 (0.58)	3.49 (0.49)	3.53 (0.57)
Neuroticism	3.31 (0.87)	2.87 (0.64)	2.97 (0.79)	2.96 (0.81)	2.93 (0.80)	2.82 (0.79)	2.80 (0.82)

Note: Educational degrees are translated from German language: 1 = no graduation (ohne Schulabschluss), 2 = streamed secondary school for lesser able students (Volks-/Hauptschulabschluss), 3 = secondary school leaving certificate (Mittlere Reife), 4 = vocational baccalaureate diploma (Fachabitur), 5 = A-level / High school diploma (Abitur), 6 = university of applied sciences degree (Fachhochschulabschluss), 7 = university degree (Hochschulabschluss).

Correlations Between Study Variables

Supplementary Table 3.

Zero-order bivariate correlations between all study variables in the total sample of N = 1,073 participants.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. OPLIS Total											
2. OPLIS PRA	rho = .72, p < .001										
3. OPLIS TEC	rho = .65, p < .001	rho = .37, p < .001									
4. OPLIS GES	rho = .77, p < .001	rho = .41, p < .001	rho = .39, p < .001								
5. OPLIS STR	rho = .59, p < .001	rho = .22, p < .001	rho = .23, p < .001	rho = .27, p < .001							
6. OPBS	rho = .22, p < .001	rho = .15, p < .001	rho = .13, p < .001	rho = .19, p < .001	rho = .13, p < .001						
7. Openness	rho = .11, p < .001	rho = .06, p = .038	rho = .09, p = .002	rho = .08, p = .010	rho = .05, p = .120	rho = .18, p < .001		r = .09, p = .002	r = .32, p < .001	r = .16, p < .001	r = -.19, p < .001
8. Conscientiousness	rho = -.01, p = .714	rho = .01, p = .852	rho = -.06, p = .053	rho = .00, p = .957	rho = .01, p = .632	rho = .09, p = .004	rho = .09, p = .002		r = .28, p < .001	r = .15, p < .001	r = -.32, p < .001
9. Extraversion	rho = -.01, p = .728	rho = .01, p = .723	rho = -.04, p = .154	rho = .01, p = .688	rho = -.02, p = .539	rho = .00, p = .908	rho = .31, p < .001	rho = .27, p < .001		r = .15, p < .001	r = -.34, p < .001
10. Agreeableness	rho = -.08, p = .006	rho = -.09, p = .005	rho = -.09, p = .004	rho = -.06, p = .049	rho = -.02, p = .605	rho = -.05, p = .086	rho = .15, p < .001	rho = .15, p < .001	rho = .14, p < .001		r = -.32, p < .001
11. Neuroticism	rho = -.13, p < .001	rho = -.06, p = .034	rho = -.12, p < .001	rho = -.09, p = .002	rho = -.07, p = .033	rho = -.03, p = .258	rho = -.18, p < .001	rho = -.32, p < .001	rho = -.32, p < .001	rho = -.30, p < .001	
12. Crystallized Intelligence Scale	rho = .38, p < .001	rho = .26, p < .001	rho = .33, p < .001	rho = .29, p < .001	rho = .16, p < .001	rho = .19, p < .001	rho = .23, p < .001	rho = .01, p = .792	rho = .01, p = .684	rho = -.03, p = .315	rho = -.10, p = .001

Note: OPLIS Total = Online Privacy Literacy Scale total score, OPLIS PRA = OPLIS knowledge about institutional practices, OPLIS TEC = OPLIS knowledge about technical aspects of data protection, OPLIS GES = OPLIS knowledge about data protection law, OPLIS STR = OPLIS knowledge about data protection strategies, OPBS = Online Privacy Behavior Scale. p-values are not corrected for multiple testing. As the intercorrelations between the Big Five do not need to be calculated by means of Spearman correlations, we additionally present the respective Pearson correlations above the diagonal. Please note that subscales of the BFI were not calculated to not overload the present manuscript / Supplementary Material; however, the data as well as materials used in this project are available at the OSF (<https://osf.io/2ndgt/files/>) for interested readers.

Descriptive Statistics of Study Variables Split by Responses to each Online Privacy Behavior Scale Item

Supplementary Table 4.

Descriptive statistics of important study variables split by responses to each Online Privacy Behavior Scale item in the total sample of N = 1,073 participants.

	2. item OPBS [take action to stay anonymous on the Internet]		3. item OPBS [(not) using online services without caution about digital traces left online]		5. item OPBS [using several different passwords]		6. item OPBS [changing passwords regularly]		8. item OPBS [using the Tor Browser]		9. item OPBS [using pseudonyms for social media profiles]	
	Not privacy protective	Privacy protective	Not privacy protective	Privacy protective	Not privacy protective	Privacy protective	Not privacy protective	Privacy protective	Not privacy protective	Privacy protective	Not privacy protective	Privacy protective
	M (SD) (n = 680)	M (SD) (n = 393)	M (SD) (n = 822)	M (SD) (n = 251)	M (SD) (n = 70)	M (SD) (n = 1003)	M (SD) (n = 657)	M (SD) (n = 416)	M (SD) (n = 999)	M (SD) (n = 74)	M (SD) (n = 732)	M (SD) (n = 341)
OPLIS Total	14.38 (3.37)	15.47 (3.28)	14.50 (3.39)	15.71 (3.18)	12.07 (4.54)	14.97 (3.20)	14.65 (3.49)	14.98 (3.19)	14.70 (3.35)	15.85 (3.57)	14.55 (3.41)	15.28 (3.27)
OPBS	1.69 (0.89)	3.39 (1.05)	1.91 (1.00)	3.62 (1.09)	0.73 (0.88)	2.42 (1.20)	1.75 (1.01)	3.19 (1.08)	2.17 (1.14)	4.20 (1.16)	1.88 (1.04)	3.24 (1.17)
Crystallized Intelligence Scale	0.64 (0.20)	0.70 (0.18)	0.65 (0.20)	0.73 (0.18)	0.57 (0.19)	0.67 (0.20)	0.66 (0.20)	0.67 (0.20)	0.66 (0.20)	0.72 (0.20)	0.65 (0.20)	0.69 (0.18)
Openness	3.44 (0.63)	3.55 (0.61)	3.45 (0.62)	3.57 (0.63)	3.34 (0.68)	3.49 (0.62)	3.42 (0.65)	3.58 (0.57)	3.46 (0.63)	3.71 (0.54)	3.43 (0.63)	3.58 (0.59)
Conscientiousness	3.51 (0.67)	3.63 (0.63)	3.53 (0.67)	3.62 (0.63)	3.38 (0.76)	3.57 (0.65)	3.51 (0.68)	3.63 (0.62)	3.56 (0.66)	3.54 (0.66)	3.57 (0.66)	3.52 (0.66)
Extraversion	3.38 (0.80)	3.36 (0.74)	3.38 (0.78)	3.33 (0.76)	3.25 (0.86)	3.38 (0.77)	3.31 (0.80)	3.46 (0.73)	3.37 (0.78)	3.36 (0.78)	3.39 (0.78)	3.33 (0.76)
Agreeableness	3.50 (0.54)	3.43 (0.57)	3.47 (0.56)	3.49 (0.51)	3.58 (0.62)	3.47 (0.55)	3.46 (0.54)	3.49 (0.57)	3.48 (0.55)	3.32 (0.59)	3.49 (0.54)	3.44 (0.58)
Neuroticism	2.89 (0.81)	2.89 (0.80)	2.90 (0.81)	2.84 (0.79)	3.05 (0.87)	2.88 (0.80)	2.95 (0.83)	2.79 (0.76)	2.89 (0.81)	2.79 (0.72)	2.86 (0.80)	2.95 (0.81)

Note: OPLIS Total = Online Privacy Literacy Scale total score, OPBS = Online Privacy Behavior Scale.