

Katarína Hollá, Lívia Fenyvesiová,
Jana Hanuliaková
Slovak Republic

Measurement of Cyber-Bullying Severity

DOI: 10.15804/tner.2017.47.1.02

Abstract

The presented study presents results of research conducted in 2015 within the project of the Ministry of Education, Science, Research and Sport of the Slovak Republic *VEGA No. 1/0244/15 Detection and Resolving Cyber-Bullying*. The aim of the research was to find out and analyze levels of cyber-bullying severity. Participants in the research were 1118 respondents 11–18 years old (average age 15.25, SD 2.55) across the Slovak Republic. The severity of cyber-bullying was assessed through the GRM (Graded Response Model). The most severe forms of cyber-bullying were posting a mean video, creating a hurtful web-page and threats of bodily injury sent through a text message. The least severe forms were mean comments on the Internet, spreading rumours and posting mean or hurtful photographs of others.

Keywords: *cyber-bullying, cyber-aggressor, cyber-victim, IRT model, cyber-bullying severity*

Cyber-bullying – theoretical background

The issue of cyber-bullying has been paid attention to for some years. Cyber-bullying involves “*the use of information and communication technologies to support deliberate, repeated and hostile behaviour by an individual or group, which is intended to harm others*” (Belsey, B., 2008, p. 1). Distinguished authors dealing with cyber-bullying include P.K. Smith et al. (2008), E. Menesini et al. (2009, 2011), M. Vanucci et al. (2012), A. Brighi et al. (2012), P. Gradinger et al. (2012), A. Schultze-Krumbholz et al. (2015). In Slovakia and the Czech Republic,

the theoretical background of the issue has been dealt with by A. Kováčová (2013), I. Emmerová (2013, 2016), A. Hudecová and K. Kurčíková (2014), M. Niklová (2014), A. Černá et al. (2013), M. Valihorová and B. Holáková (2015), K. Kopecký (2016), and others. A significant amount of attention by the academic community and society at large is given to the definition of cyber-bullying. Despite several years' study of individual aspects of cyber-bullying, considerable problems concerning its definition continue to exist (Hollá, K. 2016). The authors R.M. Kowalski et al. (2008) consider cyber-bullying a form of bullying. Individual assertions by authors, as well as research have confirmed that cyber-bullying correlates with traditional bullying (Del Rey, R., et al., 2012). The above has been opposed by J. Raskauskas, A.D. Stoltz (2007); P. Gradinger et al. (2009) and others claiming that cyber-bullying occurs independently of bullying. The reason is that not all boys and girls are capable of bullying face to face, thus they prefer doing harm through information and communication media.

Definitional criteria of bullying and cyber-bullying include (i) intentionality, (ii) repetition, and (iii) imbalance of power. There are opinions that such criteria may be applied to bullying as well as cyber-bullying. However, scientists are divided in their viewpoints regarding individual characteristics of bullying and cyber-bullying. So far it seems unambiguous that the common attribute of both behaviours is intentional harm done to an individual or group. While the traditional form of bullying is defined by repeated attacks during a certain time, cyber-bullying creates situations where it is difficult to determine repetition or a certain periodicity of the act. Even a single act of online aggressive behaviour can be considered as cyber-bullying. Repetition does not need to be inevitably caused by the cyber-aggressor, but the nature of new media should be taken into account (cf., Kowalski, R.M. et al. 2008, Naruskov, K. et al. 2012, Hollá, K., 2013, 2016). The imbalance of power as another characteristic of cyber-bullying may, on the one hand, reside in actors' technological skills, on the other hand, in a higher status of the individual in the virtual community (Menesini, E., et al., 2009). However, in many cases the potential targets of attacks can intervene against cyber-bullying (by reporting the bully, blocking the bully, ending the communication), thus the imbalance of power is a debated attribute of cyber-bullying (for more details cf., Wolak, J., 2007).

Important features of cyber-bullying are anonymity and publicity of the cyber-act. Anonymity increases online aggression by allowing an individual to act in a disinhibited way (Wright, M.F., 2014) referring to loosening or abandonment of social restrictions and inhibitions when online. Anonymity and publicity are important elements accentuating the severity of cyber-bullying. It is important to

take the above theoretical background based on characteristics of cyber-bullying into consideration since it is precisely because of the conceptual ambiguity of cyber-bullying that individual research investigations yield different results.

Measurement of cyber-bullying – methodological anchor

For the purpose of empirical measurement of cyber-bullying, the *Cyber-bullying and Online Aggression* questionnaire (Hinduja, S., Patchin, J.W., 2009) was used. Permissions were obtained from the authors to use the questionnaire for the purpose of research into cyber-bullying in the Slovak Republic. The questionnaire was developed from the original *Cyber-bullying Assessment Instrument* questionnaire. Internal reliability, determined with the use of Cronbach's alpha, returned the values of 0.926–0.935 in individual items of the cyber-victim scale and 0.956–0.969 in individual items of the cyber-aggressor scale (cf., Hinduja, S., Patchin, J.W., 2009). Translation of the questionnaire from the English language to the Slovak language was provided by two specialized translators. Subsequently, the first Slovak translation was done. The first translation was re-translated to the original – a reverse translation was done.

Reliability of the translated and modified research tool was calculated by Cronbach's alpha in the SPSS program, where the cyber-victim scale yielded the coefficient value of 0.864 and the cyber-aggressor scale 0.905. The values of both scales show very good internal reliability of the research tool.

Research aim and research sample

The aim of the research investigation was to find out and analyze levels of cyber-bullying severity. Participants in the research conducted in 2015 were 1118 respondents 11–18 years old (average age 15.25, SD 2.55) across Slovakia. The majority of the respondents were from the region of Nitra (45.17 %). 509 boys and 609 girls participated in the research. As for the school type, 480 pupils (42.9%) attended elementary school and 638 (57.1%) secondary school. Cyber-bullying severity was determined and analyzed by the *Graded Response Model* (hereinafter referred to as GRM), also called the *Samejimin Model*. Results were analyzed with respect to the scale (0–4).

Research findings

Data were collected using the modified *Cyber-bullying and Online Aggression* questionnaire. The respondents' responses to 16 questionnaire items were used as a basis. The first eight items (CA1 – CA8) were about online aggressive conduct of the participants in the last 30 days and the other eight (CV1 – CV8) were mirror pictures of the previous items, to find out whether the respondents were cyber-victims.

Table 1. Coding of questionnaire items

Cyber-aggressor		Cyber-victim	
Code	Wording	Code	Wording
CA1	Mean or hurtful comments	CV1	Mean or hurtful comments
CA2	Posting a photograph	CV2	Posting a photograph
CA3	Posting a video on the net	CV3	Posting a video on the net
CA4	Mean web-page	CV4	Mean web-page
CA5	Spreading rumours	CV5	Spreading rumours
CA6	Threats through text messages	CV6	Threats through text messages
CA7	Threats through the Internet	CV7	Threats through the Internet
CA8	Impersonation	CV8	Impersonation

A question in the effort to measure the level of “cyber-bullying” in individual respondents was whether cyber-bullying has sub-dimensions or it is a mono-dimensional construct where various forms of conduct represent various levels of severity. The structure of cyber-bullying was examined using confirmatory factor analysis (CFA). Two multi-item scales were created (cf., Table 1). The appropriateness of the model used was assessed by the following criteria: chi square (χ^2), RMSEA (Root Mean Square Error of Approximation), CFI (Comparative Fit Index). For RMSEA, the maximum recommended values for a model to be still considered appropriate are 0.08 (Brown, M.W., Cude, R., 1993) or 0.06 (Hu, L., Bentler, P.M., 1998); for CFI the minimum recommended values are 0.90 (Bollen, K.A., 1989) or 0.95 (Hu, L., Bentler, P.M., 1998). Measurement using the CFA method indicated that the structure of the cyber-aggressor – cyber-victim scale was represented the best by a mono-dimensional model.

Thus, the cyber-bullying construct may be interpreted as a mono-dimensional measure where all items lie on a continuum of severity of cyber-bullying acts. The

values in Table 2 show that the mono-dimensional model is appropriate for the cyber-aggressor – cyber-victim scale.

Table 2. CFA quality measures

	χ^2	df	p	CFI	RMSEA
Cyber-aggressor	231.60	20	<0.001	0.961	0.097
Cyber-victim	253.61	20	<0.001	0.947	0.102

(CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation)

To find out the relationship between a pupil's response to the item and his/her position on the cyber-aggressor – cyber-victim scale, the GRM was used. Within the given model, each item can be characterized by a *discrimination parameter* and a set of *categorical thresholds* with the number of thresholds fewer than the number of acceptable responses to the item by one (in our case, there are five possible responses 0–4, thus there are four thresholds for each item). Marginal categorical thresholds give values of the latent variable at which the probability of marginal responses (in our case 0–4) equals 0.5 (50%). In the case of other response categories, categorical thresholds enable to determine the mode of the relevant categorical response function, thus the value on the latent variable scale at which the probability of the given response is the highest. It also holds that higher values of categorical thresholds may indicate that the item is connected with higher risk of cyber-bullying perpetration or risk of cyber-victimization.

Values in Table 3 show that all of the eight items on the cyber-aggressor scale discriminate very well because the values of discrimination parameters fluctuate from 2.01 (CA1) to 4.91 (CA3). Since the value of discrimination parameter of each item is higher than 1.00, it indicates a strong relationship between the items and the latent variable (cyber-aggressor). Relatively high values of factor loadings (from 0.74 to 0.95) indicate a strong relationship between the latent variable and frequency of aggressive behaviour in the cyber-space.

The results show that the most frequent forms of cyber-bullying perpetration were mean or hurtful comments on the Internet (CA1), spreading rumours (CA5), and posting mean or hurtful photographs online (CA2). On the contrary, the least frequent forms were posting a mean video online (CA3), creating a hurtful web-page about a person (C4), and threats sent through text messages (C6). The relatively high positive values of categorical threshold *b1* in all items, but in particular in items CA2, CA3, CA4, CA6, CA7, CA8 show that these forms of cyber-bullying were perpetrated by respondents with a very high value of the latent variable (cyber-aggressor).

Table 3. Severity of cyber-bullying on the cyber-aggressor scale

Code	Responses					FZ					
	0	1	2	3	4		a (SE)	b1 (SE)	b2 (SE)	b3 (SE)	B4 (SE)
CA1	761	218	94	34	11	0.74	2.01 (0.16)	1.28 (0.12)	3.10 (0.18)	4.69 (0.25)	6.40 (0.44)
CA2	983	96	29	8	2	0.88	3.49 (0.41)	4.59 (0.47)	6.92 (0.61)	9.01 (0.79)	11.66 (1.18)
CA3	1068	31	12	4	3	0.93	4.91 (0.76)	8.57 (1.12)	10.64 (1.40)	12.83 (1.71)	15.16 (2.04)
CA4	1082	23	9	1	3	0.92	4.14 (0.90)	8.03 (1.40)	9.88 (1.65)	12.41 (2.04)	13.25 (2.38)
CA5	879	145	68	22	4	0.81	2.61 (0.20)	2.54 (0.18)	4.33 (0.25)	6.18 (0.34)	8.66 (0.66)
CA6	1075	35	4	2	2	0.95	4.28 (0.88)	7.91 (1.28)	11.12 (1.64)	12.53 (2.06)	14.40 (2.45)
CA7	1059	41	14	2	2	0.87	3.03 (0.51)	5.55 (0.67)	7.38 (0.82)	9.71 (1.21)	10.98 (1.32)
CA8	1021	72	18	3	4	0.82	2.84 (0.37)	4.52 (0.43)	6.66 (0.58)	8.57 (0.89)	9.41 (1.04)

Note: item discrimination parameter, item severity for the cyber-aggressor, FL = factor loadings – correlation of the latent variable with the item, a – discrimination parameter, b1 – b4 – categorical thresholds, SE – standard error of parameter estimate.

A similar method was used to assess items on the cyber-victim scale. The values in Table 4 show that all eight items in the cyber-victim scale discriminate very well because the values of discrimination parameters fluctuate from 1.83 (CA1) to 3.47 (CA4). The value of the discrimination parameter of each item is higher than 1.00, which indicates a strong relationship between the items and the latent variable (cyber-victim). Relatively high values of factor loadings (from 0.71 to 0.88) indicate a strong relationship between the latent variable and the frequency of being cyber-victimized.

The respondents were most frequently cyber-victimized through mean or hurtful comments (CV1) and spreading rumours online (CV5). The least frequent forms faced by the respondents as victims in the cyberspace were a hurtful video posted on the Internet (CV3) and creation of a mean or hurtful web-page about the individual (CV6). The categorical threshold *b1* has a relatively high values in items CV2, CV3, CV4, CV5, CV6, CV7, CV8, from which it follows that these were the forms of cyber-bullying to which the pupils with a very high value of the latent variable were exposed (cyber-victim).

Table 4. Severity of cyber-bullying on the cyber-victim scale

Code	Response					FZ	a (SE)	b1 (SE)	b2 (SE)	b3 (SE)	b4 (SE)
	0	1	2	3	4						
CV1	695	219	139	52	13	0.71	1.83 (0.13)	0.78 (0.10)	2.29 (0.14)	4.02 (0.20)	5.85 (0.36)
CV2	902	126	70	20	0	0.76	2.12 (0.19)	2.40 (0.17)	3.87 (0.24)	5.91 (0.39)	n/a
CV3	1043	48	21	6	0	0.88	3.28 (0.47)	5.48 (0.60)	7.26 (0.73)	9.75 (1.11)	n/a
CV4	1073	22	16	5	2	0.88	3.47 (0.63)	5.48 (0.60)	7.26 (0.73)	9.75 (1.11)	12.33 (1.73)
CV5	660	229	144	71	14	0.76	2.19 (0.16)	0.65 (0.11)	2.29 (0.15)	4.00 (0.20)	6.39 (0.39)
CV6	1011	78	20	7	2	0.88	2.97 (0.39)	4.46 (0.43)	6.60 (0.57)	8.31 (0.78)	10.89 (1.11)
CV7	966	106	30	13	3	0.83	2.47 (0.28)	3.28 (0.27)	5.21 (0.36)	6.71 (0.49)	9.03 (0.89)
CV8	904	143	44	23	4	0.71	2.04 (0.18)	2.32 (0.15)	4.06 (0.21)	5.34 (0.31)	7.72 (0.55)

Note: item discrimination parameter, item severity for the cyber-victim, FL = factor loadings – correlation of the latent variable with the item, a – discrimination parameter, b1 – b4 – categorical thresholds, SE – standard error of parameter estimate, N/A – the value could not be estimated because none of the respondents gave the response “4”.

Conclusions and interpretation

The issue of cyber-bullying as a world-wide phenomenon is vast. The research aim was to analyze the measured different levels of cyber-bullying severity. The research investigation proved that the most frequent method of cyber-bullying perpetration was posting rude (mean and hurtful) remarks and comments in the cyberspace. 19.5% of the respondents had used this form of cyber-bullying at least once. A very similar form of cyber-bullying is spreading rumours, used at least once in 30 days by 13% of the respondents. Another cyber-bullying form used was posting a mean and hurtful photograph in the cyberspace. This method of doing harm was used by 8.6% of the respondents. Posting mean and hurtful remarks and comments, mean photographs and spreading rumours in the cyberspace belonged also to the least severe cyber-bullying forms (cf., Table 3 and the threshold values b1 – b4). It may be assumed that the given forms of cyber-bullying are used by the

current generation because they are easy to use in information-communication media and because of easy access to the Internet.

As mentioned above, the least frequent methods of online bullying included posting a mean video on the Internet. This method was used by 2.7% of the respondents at least once in 30 days. This form belongs to the most severe, with the standard error of parameter estimate on scale 4 (four and more times) achieving the value of 15.16. For a respondent with the cyber-aggressor level of 8.57, there was a 0.5 (50%) probability that he/she would not perpetuate this method of online bullying. Other least used, while also the most severe, forms include:

- Threats sent through text messages, used by 3% of the respondents, with the maximum value of difficulty of 14.00 on scale 4;
- Creation of a hurtful web-page about a person, used by 2% of the respondents, with the maximum value of difficulty of 13.250 on scale 4;

In the case of cyber-victims it showed that the most frequent methods they were bullied by were spreading rumours on the Internet and mean and hurtful remarks and comments. 20.5% of the respondents faced rumours online at least once a month. 19.6% of the respondents were contacted with the second form of cyber-bullying, mean and hurtful remarks and comments.

The most severe forms of harassment in the cyber-environment, threatening the respondents at least once a month, were threats through text messages (almost 7%), posting a mean or hurtful video on the Internet (4.3%), and creation of a mean web-page about an individual (almost 2%). In the case of a mean or hurtful video posted online, there was even a 0.5 (50%) probability for the respondent with the cyber-victim level of 5.48 that he/she was exposed to this form of bullying in the last 30 days. It holds that the most frequently used forms of cyber-bullying were considered as the least severe by the respondents. And vice-versa, the least used forms of cyber-bullying were considered as the most severe.

Reasons for the severity of individual forms of cyber-bullying should be studied more deeply. It seems that threats through text messages are a little used method because of the criminal nature of the online act and possibility to present the text messages to prosecuting authorities. Creation of a web-page to cause damage to a person is prevented by the cost of web domains. In our opinion, online impersonation intended to cause damage to a person is particularly severe. This form of cyber-bullying was encountered by 12.8% of the respondents at least once a month and used by 6.44 % of the respondents at least once a month. The user of this form pretends to be his/her victim, assumes his/her cyber-identity and subsequently posts online information causing damage to the victim. Severity of this form can be seen precisely in ruining the victim's reputation among friends and

acquaintances; the victim loses friends and withdraws into him/herself. The loss of social contact, ridicule and humiliation as a psychological form of doing harm has far reaching consequences for the victim. Despite the fact that we managed to determine the severity of individual cyber-bullying acts, from the less severe to the most severe ones, it must be pointed out that each form is a threat to the victim, but also to the cyber-bully, and not least to the people around them. The above findings are a challenge to educational practice.

References

- Belsey, B. (2004). *Cyberbullying*. Available on: <<http://www.cyberbully.ca>>.
- Bollen, K.A. (1989). *Structural equations with latent variables*. New York: Wiley.
- Brighi, A., Giancesini, G. (2015). Cyberbullying in the era of digital relationships: the unique role of resilience and emotion regulation on adolescents' adjustment. *Technology and Youth: Growing Up in a Digital World Sociological Studies of Children and Youth*, Volume 19, pp.1–46.
- Brown, M. W, Cudek, R. (1993). Alternative ways of assessing model fit. In Bollen K, Long JS, eds. *Testing structural equation models*. Newbury Park: Sage, pp. 136–62.
- Černá, A. et al. (2013). *Kyberšikana. Průvodce novým fenoménem*. Grada Publishing a.s. ISBN 978–80–210–6374–7.
- Del Rey, R. et al. (2012). Bullying and cyberbullying: Overlapping and predictive value of the co-occurrence. *Psicothema* 2012. Vol. 24, n° 4, pp. 608–613.
- Emmerová, I. (2013). Rizikové správanie detí a mládeže vyplývajúce z používania moderných technológií. *Mládež a spoločnosť*, roč. XIX, 1/2013.
- Emmerová, I. (2016). Šikanovanie a agresivita v škole – možnosti ich prevencie. In Hroncová, J., Emmerová, I., Hronec, M., 2016. *Sociológia výchovy a sociálna patológia*. Žilina: IPV Inštitút priemyselnej výchovy, pp. 169–181.
- Gradinger, P. et al. (2009). Traditional bullying and cyberbullying. *Zeitschrift für Psychologie / Journal of Psychology*, 217(4), pp. 205–213.
- Gradinger, P. Strohmeier, D. et al. (2012). Cyber-victimization and popularity in early adolescence: Stability and predictive associations – *European Journal of Developmental Psychology*, Vol. 9, No. 2, 2012, pp. 228–243.
- Hinduja, S., Patchin, W.J. (2009). *Bullying beyond the schoolyard: Preventing and responding to cyber bullying*. Thousand Oaks, CA : Corwin Sage Publications.
- Hollá, K. (2013). *Kyberšikana*. Bratislava : Iris. ISBN 978–80–8153–011–1.
- Hollá, K. (2015). Cyberbullying in Slovak Republic – the Analysis of Variance of Main Effects. *Slavonic Pedagogical Studies Journal. The Scientific Educational Journal*. Vol. 4, issue 2, pp. 136–146, ISSN 1339–8660.
- Hollá, K. (2016). *Sexting a kyberšikana*. Bratislava: Iris, p. 166.
- Hu, L., Bentler, P.M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods* 1998; 4: pp. 424–53.

- Hudecová, A., Kurčíková, K. (2014). *Kyberšikanovanie ako rizikové správanie*. Banská Bystrica : Belanium, 2014. ISBN 978-80-5570-745-7.
- Kopecký, K. (2016). Cyberbullying in the population of Slovak teenagers (quantitative research). *Human Affairs: Postdisciplinary Humanities, Social Sciences Quarterly*, vol. 26, issues 2 (2016).
- Kováčová, A. (2013). Elektronické šikanovanie ako nový rozmer agresívneho správania v podmienkach stredných škôl. In *Fridrichová, P., Vismeková E. Zborník vedecko-výskumných prác doktorandov pedagogickej fakulty UMB v Banskej Bystrici*. Banská Bystrica : PF UMB. ISBN 978-80-557-0658-0.
- Kowalski, R.M. et al. (2008). *Cyber bullying: Bullying in the Digital Age*. USA : Blackwell Publishing Ltd. 218 p.
- Menesini, E. et al. (2009). *Cyber bullying and psychological health symptoms*. Poster Workshop, XX Biennial Meeting ISSBD, Wurzburg, Germany.
- Menesini, E. et al. (2011). The Measurement of Cyberbullying: dimensional Structure and Relative Item Severity and Discrimination. *Cyberpsychology, Behavior, and Social Networking*, vol. 14, number 5.
- Naruskov, K. et al. (2012). *Estonian student's perception and definition of cyberbullying*. TRAMES, 2012, 16 (66/61), 4, 323-343. Available on: http://www.kirj.ee/public/trames_pdf/2012/issue_4/trames-2012-4-323-343.pdf
- Niklová, M. (2014). Kyberšikanovanie ako fenomén súčasnej doby a možnosti jeho prevencie u detí a mládeže. In *Hroncová, J., Emmerová I. (ed.) 2014. Sociálne ohrozenia detí a mládeže v XXI. storočí a možnosti ich prevencie*. Banská Bystrica: UMB. ISBN 978-80-557-0807-2.
- Raskauskas, J., Stoltz, A.D. (2007). Involvement in traditional and electronic bullying among adolescents. *Developmental Psychology*, 43, pp. 564-575.
- Schultze-Krumbholz, A. et al. (2015). A comparison of Classification Approaches for Cyberbullying and Traditional Bullying Using Data From Six European Countries. *Journal of School Violence*, 14: pp. 47-65.
- Smith, P.K. (2008). 'Cyberbullying: its nature and impact in secondary school pupils', *Journal of Child Psychology and Psychiatry* 49(4): pp. 376-85.
- Valihorová, M., Holáková, B. (2015). Kyberšikana ako forma agresívneho správania na školách a jej prevencia. *Školský psychológ/Školní psycholog* 16 (1), 2015, pp. 12-19.
- Vannucci, M. et al. (2012). Recalling unrepresented hostile words: False memories predictors of traditional and cyberbullying. *European Journal of Developmental Psychology*, 9, pp. 182-194.
- Wolak, J. et al. (2007). Does online harassment constitute bullying? An exploration of online harassment by known peers and online-only contacts. *Journal of Adolescent Health*, 41(6, suppl.), pp. 51-58.
- Wright, M.F. (2014). Cyber aggression within adolescents' romantic relationships: Linkages to parental attachment and partner attachment *Journal of Youth & Adolescence*. pp. 28-30.