Validity and Reliability Analysis of the Cyberbullying Scale

Muniratul Husna[a], Fatwa Tentama[b]*, Purwadi[c]

[a,b,c]*Faculty of Psychology, Ahmad Dahlan University, Yogyakarta, Indonesia*
[a]*Email: muniratulhusnaa@gmail.com*
[b]*Email: fatwa.tentama@psy.uad.ac.id*
[c]*Email: purwadi@psy.uad.ac.id*

Abstract

This study aimed to test the construct validity and construct reliability on the cyberbullying scale, and to examine the forms and indicators reflecting the construct of cyberbullying. Cyberbullying was measured by a cyberbullying scale that referred to the forms of cyberbullying, namely harassment, denigration, flaming, impersonation, masquerading, pseudonym, outing and trickery, and cyberstalking. The populations in this study were 393 2nd grade students at X, Y, Z high schools in Yogyakarta. The sample in this study were 146 students from 6 classes consisting of 93 males and 53 females with an age range of 16-17 years. The sampling technique used cluster random sampling. The cyberbullying scale was adopted as the data collection method. The data of this study were analyzed using Structural Equational Model (SEM) through the SmartPLS 3.2.8 program. Based on the results of the analysis, the forms and indicators creating the construct of cyberbullying were declared as valid and reliable. The most dominant form reflecting cyberbullying was masquerading with a loading factor of 0.879. Meanwhile, the weakest form reflecting cyberbullying was outing and trickery, with a loading factor value of 0.638. This showed that all forms and indicators were able to reflect and form the construct of cyberbullying. Thus, the measurement model could be accepted because the theory that describes cyberbullying is in accordance with empirical data obtained through the subject.

Keyword: Cyberbullying; harassment; denigration; flaming; impersonation; masquerading; pseudonym; outing and trickery; cyberstalking.

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* Corresponding author.

1. Introduction

All Individuals in daily life cannot be separated from the use of the internet. It is a modern telecommunications device that helps individuals to interact with one another and to ease them working with others to achieve common goals [1]. The use of communication technologies, such as the internet and cell phones continue to increase every year [2]. Although it has the benefit of facilitating adolescents to do work either at homes or in school environments, it does not rule out the possibility of providing negative impacts, including cyberbullying [3]. Cyberbullying can impact on depression, anxiety, loneliness, suicide, and somatic symptoms in adolescents [4]. Cyberbullying also effects the lack of subjective well-being in victims [5]. Reference [6] asserted that cyberbullying might cause a decrease in self-esteem and students' academic achievement. Besides, Cyberbullying can cause anger, depression, thoughts of violence, and disruption in learning [7]. Cyberbullying can have an impact on psychological health, physical health, and academic performance [8]. Cyberbullying has an effect on lower school performance and attachment to schools [9]. Cyberbullying also influences one's level of aggression [10]. Thus, cyberbullying can affect individuals' emotional state, physiology, and behavior [11]. Violence in social media generates the phenomenon of cyberbullying and cyber victimization [12]. This can occur because individuals see their peers' doing cyberbullying to others [13]. Reference [14] added that the occurrence of cyberbullying is more frequently attached to girls than boys, especially at school. Besides, low self-esteem, low empathy, and loneliness can also trigger individuals to commit cyberbullying [15]. One risk generated from cyberbullying is the emergence of anonymity in someone who does cyberbullying [16]. Cyberbullying is an intimidating action done by children, students, and adolescents on social media. Forms of cyberbullying that occurs can be in the form of mocking, uploading photos and videos of friends to embarrass them, offending others with status updates, insinuating and commenting with harsh and frontal words, insulting the body's shape and size, stalking victims through accounts fake, spreading gossips or others' secrets, pretending to be someone else, sending photos that have been changed or edited into stickers. This behavior is usually undertaken in cyberspace through electronic media intermediaries. The act of this behavior occurs due to the existence of habitual and environmental processes. Cyberbullying is common among students who have low performance in terms of intellectuality and lack special knowledge [17]. In addition, cyberbullying can take place in school environments. Consequently, schools are suggested to seriously pay attention to the ways of preventing this issue and reducing the occurrence in schools [18]. The strategies of cyberbullying prevention include programs of prevention and intervention at the level of communities, schools, and families. Furthermore, in applying the law enforcement to fight against cyberbullying, many schools have established policies that prohibit cyberbullying, as well as implementing a number of curriculums, anti-bullying programs, software, interventions' strategies for schools and houses designed to protect children and adolescents from being targeted by cyberbullying perpetrators. The main theory is essential not only to express the factors entangled in cyberbullying but also to design assessment and intervention steps which can effectively find the personal and environmental factors involved in victimization and cyberbullying [19], cyberbullying literature does not present a strong theoretical foundation but can be supported by several previous studies on oppression (cyberbullying) employing social information processing theory [20] or social cognitive theory [21] to help the understanding of cyberbullying phenomena. Hereinafter, the General Aggression Model (GAM) can also be adopted. This model explains that aggression is triggered by several variables that have an arousal influence,

level of affect, and cognition in a broad range. A series of events leading aggressiveness can be triggered by two variables, namely (1) factors related to the present (situational factors) and (2) factors relating to the people involved in it (personal factors). GAM will be applied to describe factors related to victimization and action since victims and perpetrators are often reflected as the same person in cyberbullying circumstances [22,23] defined cyberbullying as oppression or violence used to harass, threaten, humiliate others. Reference [24] explains that cyberbullying is the act of someone sending and uploading dangerous or vicious texts or images using the internet or other digital communication devices. Furthermore, Reference [25] ascertained cyberbullying as an act consisting of psychological intimidation conveyed through electronic media such as cellphones, blogs, and websites, online chat (the use of different accounts by perpetrators). Meanwhile, according to [26], cyberbullying is someone's action to repeatedly harass, abusee, or mock others online or when using a cellphone or other electronic device. Reference [27] said that cyberbullying is oppression through the communication technology of computers, cellphones, tablets, and other devices to deliberately harm others who cannot easily defend themselves. Reference [29] added the characteristics of cyberbullying. Firstly, it involves the use of communication technology, such as instant messengers, text messages, and cell phones. Secondly, the perpetrators use communication technology to threaten or endanger others. The sent messages can be in the form of threats of physical or psychological violence, exclusion, spreading rumors, statements of inciting or inviting others in action. Thirdly, this is done deliberately and consciously to tease or joke with others. Fourthly, cyberbullying is done repeatedly. The influence of social groups such as family members, classmates, and friends around the environment on the attitudes and behavior of adolescents has been researched for decades [29]. By the increasing use of social media, cyberbullying has turned into a huge problem in adolescents. The results showed that cyberbullying is closely related to the use of social networking sites, and the risk of victimization increases with the time spent online. Moreover, victimization and cyberbullying can be encountered by emotions and behavior in adolescents [30]. A study conducted by [23] developed cyberbullying measuring devices based on forms, namely: 1) Harassment, it is repeatedly sending messages that are offensive, abusive, and insulting towards someone. 2) Denigration, it is to spread information with the intention of humiliating others 3) Flaming, it is an online 'fighting' or intense argument using electronic messages in the chat room. It is done through instant messages or emails in abusive and vulgar language, as well as using images and symbols. 4) Impersonation, it hacks someone's email or social networking accounts and to use their identity. 5) Masquerading is pretending to be someone else by creating fake emails. 6) Pseudonym, it is the use of an alias or fake nickname to keep their identity. 7) Outing and Trickery, it is sharing confidential or embarrassing information or persuading someone to reveal confidential or embarrassing information and spread it to others. 8) Cyberstalking is a form of harassment repeatedly sending messages in the form of threats, intimidating, or being engaged in online activities making someone terrified of their safety. Based on these forms of cyberbullying, a conceptual framework can be formed, which is shown in Figure 1.
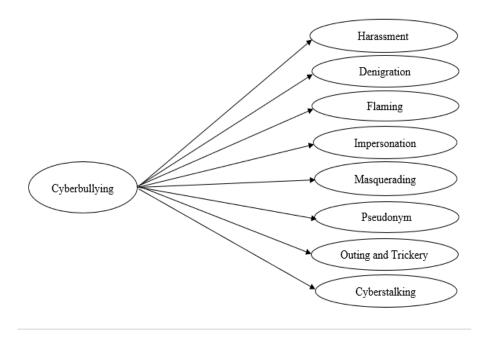
Figure 1: Cyberbullying conceptual framework

Based on figure 1, the hypothesis of this study are forms of cyberbullying such as harassment, denigration, flaming, impersonation, masquerading, pseudonym, outing and trickery, and cyberstalking simultaneously able to form the construct of cyberbullying. Furthermore, an approach used in testing the construction of a measuring instrument was Confirmatory Factor Analysis (CFA). It is one of the main approaches in factor analysis. Confirmatory Factor Analysis (CFA) can be applied to test the shape of a construct. This test was used to measure the model to describe the shape and behavioral indicators in reflecting latent variables, namely cyberbullying, by looking at the loading factor of each form that forms a construct. Besides, the use of Confirmatory Factor Analysis (CFA) is testing the construct validity and construct reliability of the indicators (items) forming latent constructs [31]. Confirmatory Factor Analysis (CFA) in this study adopted the second-order Confirmatory Factor Analysis (2nd Order CFA), a measurement model that consisted of two levels. The first analysis level was undertaken from the forms to the indicators, while the second analysis was the latent construct to the forms. Based on the aforementioned description, it showed that cyberbullying is an important psychological attribute to recognize the impact by students, both in the school environment setting and the wider social environment [31]. Considering the important recognition cyberbullying, the purpose of this study was to analyze the construct validity and construct reliability of cyberbullying and to examine the forms and indicators creating the construct of cyberbullying.

2. Research Method

2.1. Participant

The population in this study were 393 2nd grade students at X, Y, Z high schools in Yogyakarta. Also, 146 students participated as the sample in this study from 6 classes with 93 males and 53 females with an age range of 16-17 years. The sampling technique uses cluster random sampling.

2.2. Data Collection Method

Cyberbullying in this study was measured using a cyberbullying scale with a semantic differential scaling model. The scale of the study was arranged with reference to the forms of cyberbullying according to [23], namely harassment, denigration, flaming, impersonation, masquerading, pseudonyms, outing and trickery, and cyberstalking. The examples of items on the cyberbullying scale were submitted in Table 1.

Table 1: The example of a cyberbullying variable item

In social media, I use the word that is…...						
Offensive	5	4	3	2	1	straightforward
Rude	5	4	3	2	1	Gentle
During the use of social media, I .... someone else						
Indulgence the bad sides of	5	4	3	2	1	Keep the bad things in secret
Do defamation of	5	4	3	2	1	Save face of
When sending messages on social media I use .... words						
Vulgar	5	4	3	2	1	Polite
Negative	5	4	3	2	1	Positive
When using social media, I ...... someone else's account						
Resemble	5	4	3	2	1	Am frank
Hack	5	4	3	2	1	Do not hack
In social media, I ...						
Pretend	5	4	3	2	1	Do not pretend
Imitate	5	4	3	2	1	Do not imitate
I use ...... name in using social media						
Alias	5	4	3	2	1	Actual
Mysterious	5	4	3	2	1	Clear
When there is new information about other people on social media, I ...						
Spread	5	4	3	2	1	Keep it
Deceive	5	4	3	2	1	Do not deceive
During the use of social media, I use.... words						
Threaten	5	4	3	2	1	Protective
Frighten	5	4	3	2	1	Calm

The blueprint used as a reference in the preparation of the cyberbullying scale was in Table 2.

Table 2: Cyberbullying scale blueprint

No	Forms	No Item	∑
1	Harassment	1, 2, 3, 4	4
2	Denigration	5, 6, 7, 8	4
3	Flaming	9, 10, 11, 12	4
4	Impersonation	13, 14, 15, 16	4
5	Masquerading	17, 18, 19, 20	4
6	Pseudonyms	21, 22, 23, 24	4
7	Outing and Trickery	25, 26, 27, 28	4
8	Cyberstalking	29, 30, 31, 32	4

2.3. Construction Validity and Reliability

The construct validity test consisted of the convergent validity test and the discriminant validity test. Convergent validity can be seen by the loading factor value > 0.5 and the Average Variance Extracted (AVE) value was > 0.5 [32]. According to [33], the higher the loading factor score, the more important the role of loading will be in interpreting the factor matrix. The loading factor value was > 0.5, and the value of Average Variance Extracted (AVE) > 0.5 is considered significant [32]. Meanwhile, discriminant validity can be seen by comparing the roots of the Average Variance Extracted (AVE) between aspects that should be higher than the correlation with other aspects [32]. The construct reliability test was to show the internal consistency of the measuring instrument by looking at the value of composite reliability and Cronbach alpha with a higher value. Hence, it would show the consistency value of each item in measuring latent variables. According to [33] the expected composite reliability and Cronbach alpha values are > 0.7, and 0.6 values are still acceptable [32].

2.4. Data Analysis

The data was analyzed using the outer model with the CFA 2nd Order approach through the SmartPLS 3.2.8 program. According to [34], Partial Least Square (PLS) is a variant-based Structural Equation Model (SEM) that can simultaneously test measurement models to test the construct validity and reliability.

3. Result

Based on testing the outer cyberbullying scale model, it was performed using the Smart PLS 3.2.8 program. The results were presented in Figure 2.
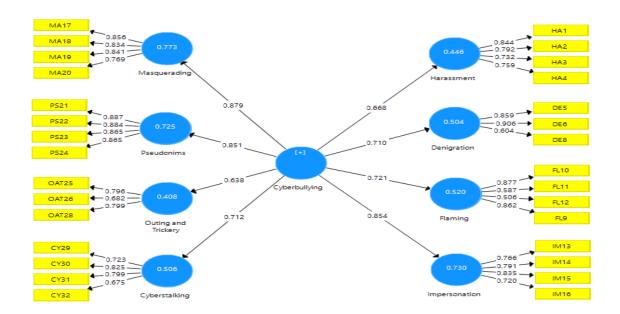
Figure 2: Outer model of the cyberbullying scale

3.1. Convergent Validity

Convergent validity test results were conducted by testing the outer model, which indicated the loading factor value and Average Variance Extracted (AVE). This test reflected the loading factor value > 0.5 and Average Variance Extracted (AVE) > 0.5. Based on the data analysis, it was found that the loading factor value from variables to forms. Then, it was continued by forms to indicators showing a value > 0.5. Loading factor weights of 0.5 or more are considered to have validation that is strong enough to explain latent constructs [33]. The results of convergent validity testing were put in Table 3 and Table 4.

Table 3: Value of loading factor (variable-forms)

Forms	Value of loading factor	Information
Harassment	0.668	Valid
Denigration	0.710	Valid
Flaming	0.721	Valid
Impersonation	0.854	Valid
Masquerading	0.879	Valid
Pseudonyms	0.851	Valid
Outing and trickery	0.638	Valid
Cyberstalking	0.712	Valid

Table 4: Value of loading factor (forms-indicators)

Item	Value of loading factor	Information
HA1	0.844	Valid
HA2	0.792	Valid
HA3	0.732	Valid
HA4	0.759	Valid
DE5	0.859	Valid
DE6	0.906	Valid
DE8	0.604	Valid
FL9	0.862	Valid
FL10	0.877	Valid
FL11	0.587	Valid
FL12	0.506	Valid
IM13	0.766	Valid
IM14	0.791	Valid
IM15	0.835	Valid
IM16	0.720	Valid
MA17	0.856	Valid
MA18	0.834	Valid
MA19	0.841	Valid
MA20	0.769	Valid
PS21	0.887	Valid
PS22	0.884	Valid
PS23	0.865	Valid
PS24	0.865	Valid
OAT25	0.796	Valid
OAT26	0.682	Valid
0AT28	0.799	Valid
CY29	0.723	Valid
CY30	0.825	Valid
CY31	0.799	Valid
CY32	0.675	Valid

Convergent validity test results in the table represented the value of Average Variance Extracted (AVE) > 0.5. The Average Variance Extracted (AVE) value of the cyberbullying variable was 0.513, and the Average Variance Extracted (AVE) value of each form of cyberbullying was attached in Table 5.

Table 5: Value of Average Variance Extracted (AVE)

Forms	Value of AVE	Information
Harassment	0.613	Significant
Denigration	0.641	Significant
Flaming	0.528	Significant
Impersonation	0.608	Significant
Masquerading	0.682	Significant
Pseudonyms	0.776	Significant
Outing and trickery	0.579	Significant
Cyberstalking	0.574	Significant

3.2. Discriminant Validity

Based on the results of discriminant validity test, it denoted that the root value of the Average Variance Executed (AVE) in each form of cyberbullying was higher than the root value of the Average Variance Extracted (AVE) in the other forms of cyberbullying Thus, discriminant validity criteria were fulfilled. The root value of the Average Variance Extracted (AVE) cyberbullying variable was inserted in Table 6.

Table 6: Root Value Average Variance Extracted (AVE) cyberbullying

	Harass-ment	Denigrat-ion	Flaming	Imperso-nation	Masque-rading	Pseudon-yms	Outing and trickery	Cyber-stalking
Harassment	**0.783**	0.651	0.660	0.484	0.505	0.429	0.505	0.513
Denigration	0.761	**0.801**	0.651	0.579	0.514	0.449	0.635	0.627
Flaming	0.660	0.727	**0.727**	0.556	0.552	0.414	0.626	0.662
Impersona-tion	0.484	0.579	0.556	**0.779**	0.772	0.657	0.554	0.604
Masquerad-ing	0.505	0.514	0.552	0.772	**0.826**	0.705	0.534	0.590
Pseudonyms	0.429	0.449	0.414	0.657	0.705	**0.875**	0.436	0.549
Outing and trickery	0.505	0.635	0.626	0.554	0.534	0.436	**0.761**	0.681
Cyberstal-king	0.513	0.627	0.662	0.604	0.590	0.549	0.681	**0.758**

3.3. Construct Reliability Test

Construct reliability testing was administered by testing the outer model indicated from the composite reliability and Cronbach alpha values. The Test was done by referring to the value of composite reliability and Cronbach

alpha > 0.7. This concluded that the scale in this study was reliable. The value of composite reliability and Cronbach alpha was in Table 7.

Table 7: Value of composite reliability and Cronbach alpha cyberbullying

Variable	Composite reliability	Cronbach alpha	Information
Cyberbullying	0.934	0.923	Reliable

The results of the construct reliability test in table 6 revealed that the cyberbullying scale had reliability. This was shown from the composite reliability value of 0.934 and Cronbach Alpha 0.923. The construct validity and reliability tests produced valid and reliable items to reflect the forms of cyberbullying, namely the items on numbers 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31 and 32. Based on the results of the analysis, the study employed the outer model testing, which revealed that the measurement model in this study was acceptable inasmuch as the forms and indicators of cyberbullying were able to reflect the cyberbullying variable.

4. Discussion

Based on the results of the analysis of construct validity and construct reliability, the forms and indicators forming the construct of cyberbullying were declared as valid and reliable. Thus, all forms and indicators were able to reflect and form a cyberbullying construct. The most dominant form and able to reflect cyberbullying was masquerading with a loading factor of 0.879. Masquerading illustrated the ability of teenagers pretending to be other people by faking emails or alias names. Consequently, teenagers used emails or cell phones, aiming to threaten others. This was supported by valid and reliable indicators reflecting that adolescents found it fun by pretended actions and used it to joke with their friends. They considered this behavior as entertainment in free time. The weakest form to reflect cyberbullying was outing and trickery, with a loading factor of 0.638. The outing illustrated the ability of adolescents to spread the secrets or personal photos of others. Trickery is the behavior of persuading others with tricks in order to get other people's secrets or private photos. Valid and reliable indicators pointed that teenagers like to spread secrets, cheat to get secrets, and gossip about their friends' secrets. The results of previous studies regarding the construct of cyberbullying considered relevant to this study, which also explained the validity and reliability, among others, were conducted by [35]. In the study, they designed the cyberbullying scale to assess cyberbullying based on emotions in adolescents. The study employed the instrument referring to Frick (2004). The instrument was measured by three subscales, namely the first disappointment (11 items, for example, other people's feelings are not important to me), the second is not emotional (8 items, for example, I hide feelings from others) and the third does not care (5 items, for example, I try not to hurt others' feelings). The results revealed that the scale met the requirements of validity and reliability, with Cronbach alpha ranging from 0.79 to 0.81. A similar study was done by [36] who designed the cyberbullying scale to see adolescents' endurance as victims of intimidation and cyberbullying. This study applied a scale that referred to Campbell-Sills and Stein (2007) consisting of 10 statements. The scale included

the following statements administering response sequences such as completely untrue, rarely true, sometimes true, often true, and true almost all the time. The rating of the ten statements was ranged from 0 to 4. The results of the study indicated that the scale met the validity and reliability requirements with a Cronbach alpha value of 0.87. Reference [37] conducted a study on cyberbullying to see cyberbullying behavior in teenagers. This study applied a longitudinal method using Barlett and Gentile Cyberbullying Model (BGCM). That is a learning-based theory suggesting the importance of addressing cyberbullying actions with a positive attitude in predicting cyberbullying actions. The results showed that this learning-based theory fulfilled the validity and reliability requirements with a Cronbach alpha ranged of 0.67 to 0.85. Reference [38] did a study on cyberbullying to see the long-term effects on cyberbullying behavior. The scale referred to the theory of Erdur-Baker and Kavsut (2007), which consisted of 6 statements (for example, I send messages that threaten or hurt via email). The results answered that the cyberbullying scale in this study had met the validity and reliability requirements with a Cronbach alpha value of 0.89. A subsequent study was carried out by [39] to see cyberbullying exposure through bystanders. This study adopted two scales, namely empathy scale and attitude scale. The empathy scale referred to the Olweus and Endresen (2001) scale using a Likert scale consisting of 8 items (for instance, when I see someone sad, I want to cheer them up). Attitude scale was molded to the theory of Ajzen (2006) by using a semantic differential scale. The scale consisted of six scales with seven semantic differential points as a direct measurement of attitude toward inclusion: "I think bullying others via the internet, or cell phone is ..." with the response format (1) good-bad, (2) unpleasant- fun, (3) boring-exciting, (4) brave-coward, (5) funny-not funny, (6) immature-mature. The results showed that the scale met the requirements of validity and reliability with Cronbach alpha 0.72 for wave 1 and 0.73 for wave 2. The results of this study with higher composite reliability and Cronbach alpha values of 0.934 and 0.923 were expected to measure cyberbullying, in particular, to reveal cyberbullying in adolescents. Therefore, it can be a reference in further research related to cyberbullying.

5. Conclusion

Based on the results of the analysis and discussion, it can be recapitulated that 1) the construct of cyberbullying has met the requirements of validity and reliability, 2) the forms and indicators of cyberbullying could significantly shape the construct of cyberbullying. The most dominant form reflecting cyberbullying was masquerading. Meanwhile, the lowest form that reflects cyberbullying was outing and trickery. In this study, a cyberbullying scale measurement model was formed in accordance with empirical data obtained through subjects in the study setting.

6. Limitation and Recommendation

The limitation of this research is that there are not many previous studies that discuss psychometric studies, especially the analysis of construct validity and construct reliability of cyberbullying measuring instruments so that the supporting data is still weak. This study uses factor analysis with the Partial Least Square (PLS) program so that subsequent researchers can use other analysis programs such as Lisrel or AMOS (Analysis of Moment Structures) to analyze the data so that the results are stronger. The next researcher can use the scale of the results of this study to measure cyberbullying because it has been tested in terms of its validity and reliability.

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