The development of a new cyberbullying attitude measure

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ABSTRACT

Three studies were conducted to validate a new positive attitude towards cyberbullying measure. Our developed measure is a self-report assessment that consists of nine items. Study 1 (N = 166) used exploratory factor analysis and found two distinct factors: Harmful Cyberbullying Attitudes (HCA; five items) and General Cyberbullying Characteristics (GCC; four items) that both had adequate reliability. The factor structure was replicated using confirmatory factor analysis in Study 2 (N = 336). Additionally, our new measure correlated significantly with existing measures of cyberbullying attitudes and cyberbullying behaviors. Finally, Study 3 (N = 159) further replicated the results of Study 2 and also showed that our HCA measure predicted cyberbullying perpetration above and beyond other cyberbullying attitude measures. Overall, our research suggests that our new cyberbullying attitude measure is reliable and valid.

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Cyberbullying is defined as repeated behavior intended to inflict harm on individuals or groups delivered via electronic media (Tokunaga, 2010). The past decade has seen a burgeoning growth of empirical research elucidating the psychological mechanisms that predict cyberbullying perpetration (see Kowalski, Giumetti, Schroeder, & Lattanner, 2014 for a meta-analysis). Although several variables reliably predict cyberbullying perpetration, the development and accessibility of positive attitudes towards cyberbullying has emerged as a key predictor of cyberbullying perpetration (Barlett & Gentile, 2012; Barlett, 2015; Barlett, Gentile, & Chew, 2016; Boulton, Lloyd, Down, & Marx, 2012; Doane, Pearson, & Kelley, 2014; Heirman & Walrave, 2012). An important challenge for researchers studying cyberbullying in an ever-changing technological landscape is creating, implementing, and/or locating reliable and updated self-report questionnaires that are easy to administer. Several recent empirical and review papers have made similar strides in reviewing and assessing measures of cyberbullying perpetration (Berne et al., 2013; Patchin & Hinduja, 2015; Thomas, Connor, & Scott, 2014; Ybarra, Boyd, Korchmaros, & Oppenheim, 2012) with the aim of rigorously testing such questionnaires using a variety of statistical tests aimed at testing reliability, validity, and the factor structure of these measures. Although several cyberbullying attitude measures have been

created and implemented none of them have been put through such empirical statistical rigor. Reliability and predictive validity evidence has been shown in the empirical work using a pro-cyberbullying attitude measure, we argue that such evidence is ad hoc and exploratory. Therefore, the purpose of the current work is to create a new cyberbullying attitude measure while statistically testing the internal consistency, factor structure, and validity.

1. The existing cyberbullying attitude measures

We are aware of five published self-report measures of pro-cyberbullying attitudes; however, the evidence of empirical validation has been slow in coming. The first is the Barlett and Gentile (2012) cyberbullying attitude measure, which is a nine item self-report assessment. Although Barlett et al. (2016) showed that the correlation between early cyberbullying attitudes and later cyberbullying behavior was significant – showing predictive validity – there are several limitations with this measure. Barlett (2015) noted poor reliability with this measure, and several of the items of this measure must be updated. For instance, one item references "MySpace", a social networking website that is rarely used today. The second is the 20-item cyberbullying attitude measure employed by Barlett et al. (2014). Unlike the Barlett and Gentile (2012) assessment, this questionnaire has good internal consistency and updated items. Furthermore, Barlett et al. (2014) found evidence for predictive validity. However, this measure has a large number of items, which may limit the ability to administer this

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scale. Third is the cyberbullying attitude measure used by Doane et al. (2014), which asks participants to rate the valence (i.e., good or bad, harmful or beneficial, and unenjoyable or enjoyable) of several cyberbullying behaviors. Although this measure has been shown to correlate with cyberbullying behavior (predictive validity), this scale has several limitations including a large number of items (e.g., if six cyberbullying items are used, this scale becomes an 18-item questionnaire) and the internal consistency of this measure is unknown as it was not reported in the Doane et al. (2014) study. Fourth is the Heirman and Walrave (2012) measure. This is a four item questionnaire that has good reliability; however, the correlation between cyberbullying attitudes and perpetration was never reported − thus providing no evidence of validity. Finally, Boulton et al. (2012) had participants indicate their attitudes to examples of cyberbullying behaviors on several items (e.g., "The behavior is not so bad"). This measure is limited by only showing significant correlations with certain types of cyberbullying behaviors (i.e., social network bullying and text bullying), but not others (i.e., multimedia upload bullying), making the predictive validity evidence of this measure unreliable. Also, Boulton et al. (2012) did not report internal consistency and the number of items could get large as the number of cyberbullying behaviors increase.

We believe that in certain circumstances these five cyberbullying attitude measures can be useful, but not in others. For instance, some longitudinal work may not have the space available to include an 18−20 item measure along with their other assessments. It is not our intention to criticize these measures or the studies that have used these measures to estimate cyberbullying attitudes. However, it is clear that these measures have limitations, and our aim is to develop a cyberbullying attitude measure that is reliable, valid, and has a small number of items, thereby addressing the limits of the aforementioned assessments. Further, we will submit our measure to the rigors of appropriate scale validation statistical techniques − which has yet to be done for the previous self-report cyberbullying attitude measures.

1.1. Overview of the current research

Three studies were conducted to develop and validate a new cyberbullying attitude measure. All three studies examined reliability, distributional properties, and sex differences in our new measure. The factor structure of our new measure was assessed in Studies 1 (exploratory) and 2 (confirmatory). Studies 2 and 3 correlated our new measure with three other existing cyberbullying attitude measures (concurrent validity) and cyberbullying perpetration (predictive validity) measures. Finally, Study 3 tested the incremental validity of our new measure against other similar measures to examine whether our new measure better predicted cyberbullying perpetration.

2. Study 1

The first study was conducted to examine the factor structure, distributional properties, and internal consistency of a new cyberbullying attitude measure.

3. Method

3.1. Participants

One hundred and sixty-six (59.60% female) undergraduate students from a small liberal arts US college participated in the current study. The majority of the participants were Caucasian (71.1%). The average age of the sample was 20.13 ($SD = 1.13$). The majority of the students were in their third or fourth years of their undergraduate education (52.10%). Due to the brevity of the study, no incentives were provided.

4. Materials

Demographics. A demographic questionnaire was used to assess participant's age, sex, ethnicity, and year in school.

Cyberbullying Attitudes. We created a new positive attitude towards cyberbullying measure. This measure consisted of ten items. Participants were asked to indicate their level of agreement to the items on a 1 (*strongly disagree*) to 5 (*strong agree*) rating scale. All items were summed such that higher scores indicate higher pro-cyberbullying attitudes (Table 1 displays the relevant items).

4.1. Procedure

Members of a research team administered paper-pencil versions of the short survey to other students on campus. Each research assistant would approach another student on campus to ask whether they would complete a short survey. If the individual agreed, participants completed the informed consent before the demographic and cyberbullying attitude questionnaires. Once finished, participants were thanked and fully debriefed.

5. Results

5.1. Exploratory factor analysis

An exploratory factor analysis with Varimax rotation showed that the 10-item scale yielded two factors; however, one item ("If someone wrongs me, it is best to attack them online rather than in person") did not load onto a single factor above 0.50. When this item was removed, an identical factor analysis showed that two factors were retained that accounted for 51.10% of the variance. Table 1 displays the factor loadings for each item on their respective factor. We labeled Factor 1 Harmful Cyberbullying Attitudes (HCA; $\alpha = 0.71$) and Factor 2 General Cyberbullying Characteristics (GCC; $\alpha = 0.62$).

5.2. Descriptive information

Frequency statistics for both factors showed that both HCA ($Z = 12.79$, $p < 0.05$) and GCC ($Z = 4.20$, $p < 0.05$) were significantly positively skewed. The means for HCA ($M = 6.37$; $SD = 2.32$) and GCC ($M = 8.08$, $SD = 2.57$) were near the floor of each factor, but a substantial range of scores was found (HCA: 5−19; GCC: 4−16).

5.3. Correlations

Both parametric (Pearson correlation) and non-parametric (Spearman correlation) tests showed that HCA and GCC significantly correlated with each other ($r = 0.49$, $p < 0.001$; $rho = 0.48$, $p < 0.001$, respectfully).

5.4. Sex differences

Both parametric (independent *t*-test) and non-parametric (Mann-Whitney U) tests showed significant sex differences. For HCA, males scored ($M = 7.40$, $SD = 2.98$) significantly [$t(162) = 5.12$, $p < 0.05$, $d = 0.80$; Mann-Whitney U = 1899.50, $Z = 5.04$, $p < 0.05$] higher than females ($M = 5.65$, $SD = 1.32$). For GCC, males ($M = 9.00$, $SD = 2.74$) scored significantly [$t(162) = 3.98$, $p < 0.05$, $d = 0.63$; Mann-Whitney U = 2135.50, $Z = 3.76$, $p < 0.05$] higher than females ($M = 7.44$, $SD = 2.25$).

Table 1
Factor loadings for each item in Study 1.

Item	HCA	GCC
1. Teasing or making fun of others with harmful comments online is fun to me	0.81	
2. It is alright to send harmful online messages/posts to another	0.79	
3. It makes me feel good to attack others online when they deserve it.	0.69	
4. I have no reservations about using technology to hurt others when they deserve it	0.55	
5. Harming others via electronic media is acceptable to do	0.54	
6.School/University rules will be ineffective at stopping cyberbullying		0.77
7. Sending mean electronic messages to others is less harmful than face-to face communication		0.62
8. Attacking others online can be justifiable		0.63
9.Because I am not face-to-face with another person while online, I feel I can say whatever I want, even if it is mean or harmful		0.54

Note: Only the highest factor loadings are shown.

6. Conclusion

The results suggest that a nine-item questionnaire to assess cyberbullying attitudes consists of two subscales, one assessing positive attitudes towards harming others online (HCA) and the other assessing attitudes towards general cyberbullying characteristics (GCC). The internal consistency for the HCA subscale was adequate (alpha above 0.70), but the data were skewed (as is common with other cyberbullying assessments; e.g., Barlett, Prot, Anderson, & Gentile, in press). Finally, males scored significantly higher than females on our attitude measure, which is consistent with the larger cyberbullying perpetration literature in college-aged samples (Barlett & Coyne, 2014).

7. Study 2

Results from Study 1 showed the factor structure and internal consistency of a new measure of cyberbullying attitudes. Study 2 sought to replicate these findings and tested both concurrent and predictive validity of our new measure.

8. Method

8.1. Participants

Three hundred and thirty-six (66.4% female) undergraduate students from a large US Midwestern University participated in the current study for partial course credit. The majority of the participants were Caucasian (76.8%). The average age of the sample was 19.47 ($SD = 2.04$). The majority of the students were in their first or second year of undergraduate education (75.00%).

9. Materials

The same demographic and new cyberbullying attitude measures from Study 1 were used. In addition, the following questionnaires were used:

Cyberbullying Attitudes. Three additional cyberbullying attitude measures were used to test the concurrent validity of our newly developed attitude measure. The first was the Barlett and Gentile (2012) cyberbullying attitude measure. This is a nine-item questionnaire that asks participants to rate their level of agreement to the items on a 1 (*strongly disagree*) to 5 (*strong agree*) rating scale. A sample item includes, "Teasing others on Facebook, email, or text messages is fun." Certain items were reverse coded prior to being summed, such that higher scores indicate positive attitudes towards cyberbullying.

The second cyberbullying attitude measure was the Barlett et al. (2014) scale. This is a 20-item questionnaire that asks participants to rate their level of agreement to the items on a 1 (*strongly disagree*) to 5 (*strong agree*) rating scale. A sample item includes, "I like to make fun of others over the Internet, whether I know them or not." All items were summed, such that higher scores indicate positive attitudes towards cyberbullying.

The third cyberbullying attitude measure was the Doane et al. (2014) attitude measure. This is an 18-item questionnaire. Participants are told that "For me, to [insert behavior] in the forthcoming month is _____." We used six cyberbullying behaviors from the Doane et al. (2014) malice subscale of the Cyberbullying Experiences Questionnaire. For each behavior, participants rated the questions on three six-point scales from 0 (*bad*) to 5 (*good*), 0 (*harmful*) to 5 (*beneficial*), and 0 (*unenjoyable*) to 5 (*enjoyable*). All these items were averaged such that higher scores indicate more cyberbullying attitudes.

Cyberbullying Perpetration. Three measures were used to assess cyberbullying perpetration. The first was the Ybarra, Diener-West, and Leaf (2007) questionnaire. This is a three item questionnaire that asks participants how frequently they engaged in several cyberbullying behaviors in the past year on a 1 (*never*) to 6 (*almost everyday/everyday*) rating scale. A sample item includes, "Spread rumors about someone online, whether they were true or not." These items were summed, such that higher scores indicate more cyberbullying.

The second was the cyberbullying scale from Ang and Goh (2010). This is a nine item measure that asks participants how often they engaged in several cyberbullying behaviors in the past year on a 1 (*never*) to 5 (*about a few times every week*) rating scale. A sample item includes, "I spread rumors or gossip about someone online." These items were summed, such that higher scores indicate more cyberbullying.

The final cyberbullying perpetration questionnaire was the Doane et al. (2014) cyberbullying experiences questionnaire malice subscale. This is a six-item questionnaire that asks participants how often they engaged in the various listed cyberbullying behaviors in a 1 (*never*) to 6 (*everyday/almost everyday*) rating scale. A sample item includes, "Have you been mean to someone electronically?" Items were summed, such that higher scores indicate more cyberbullying perpetration.

9.1. Procedure

Data was collected as a part of a larger mass testing study. All questionnaires were completed online using the Qualtrics data collection software. Due to the online nature of the data collection, participants were free to complete the surveys at their convenience. Upon completion of the online informed consent, participants completed a variety of questionnaires, including the aforementioned measures, but also other questionnaires that are not imperative to the current work. After all questionnaires were completed, all participants read an online debriefing before being thanked.

10. Results

10.1. Confirmatory factor analysis

MPLUS using maximum likelihood estimation to address missing data was used to conduct a confirmatory factor analysis. This model consisted of the items presented in Table 1 loading onto their respective factor. Additionally, based on the results of Study 1, we allowed both factors to correlate. Finally, modification indices from preliminary model testing showed that Item 2 (from Table 1; "It is alright to send harmful online messages/posts to another") needed to correlate with the other four items from the HCA subscale. Results showed a good model fit, χ^2 (df = 22) = 56.53, $p < 0.05$, CFI = 0.97, TLI = 0.96, RMSEA = 0.07 (90% CI: 0.05 to 0.09), SRMR = 0.03. Results suggests a two factor model (HCA $\alpha = 0.86$; GCC $\alpha = 0.64$).

10.2. Descriptive information

Frequency statistics showed that both the HCA ($Z = 18.79$, $p < 0.05$) and GCC ($Z = 6.78$, $p < 0.05$) were significantly skewed. Indeed, the means for HCA ($M = 6.98$; $SD = 3.46$) and GCC ($M = 8.17$, $SD = 3.04$) were near the floor of each factor, but a substantial range of scores was found (HCA: 5–25; GCC: 4–20).

10.3. Sex differences

Table 2 shows the results from both parametric (independent t-tests) and non-parametric (Mann-Whitney U tests) tests to determine if males significantly differed from females in all cyberbullying perpetration and cyberbullying attitude measures. For all variables, males scored significantly higher than females.

10.4. Correlations

Results from both parametric (Pearson correlation) and non-parametric (Spearman correlation) tests are shown in Table 3. Consistent with Study 1, HCA and GCC were correlated ($r = 0.68$, $p < 0.05$; $rho = 0.65$, $p < 0.05$, respectfully). Showing concurrent validity, both HCA and GCC correlated the three established cyberbullying attitude measures ($rhos > 0.40$, $ps < 0.01$). Finally, showing predictive validity, both HCA and GCC correlated with the three cyberbullying perpetration measures ($rhos > 0.31$, $ps < 0.01$).

11. Conclusion

The results of this study confirmed the factor structure of the new scale that was produced in Study 1. Furthermore, analyses demonstrated that the new scale had good concurrent validity, as the two factors were significantly correlated with three existing measures of cyberbullying attitudes (Table 3). Analyses also indicate that our new measure has excellent predictive validity. Both the new subscales correlated significantly with the three measures of cyberbullying behavior.

12. Study 3

Studies 1 and 2 showed that our measure has good psychometric properties. Study 3 sought to further test this by replicating the results of the previous two studies and testing our new scale's incremental validity.

13. Method

13.1. Participants

One hundred and fifty-nine (52.9% male) undergraduate students from a large US Midwestern University participated in the current study for partial course credit. The majority of the participants were Caucasian (79.4%). The average age of the sample was 19.30 ($SD = 1.32$). The majority of the students were in their first year of undergraduate education (58.3%).

14. Materials

The same questionnaires from Study 2 were used in Study 3.

14.1. Procedure

Data was collected as a larger Scale Validation study. All questionnaires were completed online using the Qualtrics data collection software. Due to the online nature of the data collection, participants were free to complete the surveys at their convenience. Upon completion of the online informed consent, participants completed a variety of questionnaires, including the aforementioned measures, but also other questionnaires that are not imperative to the current work. After all questionnaires were completed, all participants read an online debriefing before being thanked.

15. Results

15.1. Descriptive information

Frequency statistics showed that both HCA ($Z = 6.80$, $p < 0.05$) and GCC ($Z = 3.85$, $p < 0.05$) were significantly skewed. Indeed, the means for HCA ($M = 8.52$; $SD = 4.74$) and GCC ($M = 8.89$, $SD = 3.65$) were near the floor of each factor, but a substantial range of scores

Table 2
Sex differences in key variables in Study 2.

Variable	Males		Females					
	M (SD)	N	M (SD)	N	t	df	d	Z[a]
Hostile Cyberbullying Attitudes	8.59 (4.45)	111	6.15 (2.45)	215	6.39**	324	0.71	6.79**
General Cyberbullying Characteristics	9.67 (3.39)	112	7.38 (2.52)	213	6.90**	323	0.77	6.19**
Cyberbullying Attitudes (Doane)	3.45 (0.60)	108	3.17 (0.26)	213	5.81**	319	0.65	4.95**
Cyberbullying Attitudes (Barlett 1)	36.75 (16.62)	107	26.95 (10.78)	209	6.32**	314	0.71	5.96**
Cyberbullying Attitudes (Barlett 2)	18.67 (6.18)	109	15.39 (5.13)	211	5.05**	318	0.57	4.94**
Cyberbullying Perpetration (Ang)	12.04 (4.21)	112	10.97 (3.75)	214	2.31*	324	0.26	3.35**
Cyberbullying Perpetration (Doane)	14.05 (6.91)	111	10.48 (5.02)	213	5.31**	322	0.59	4.83**
Cyberbullying Perpetration (Ybarra)	4.82 (2.71)	111	3.63 (1.23)	215	5.46**	324	0.61	4.68**

*$p < 0.05$, **$p < 0.01$; Barlett 1 = Barlett et al. (2014) and Barlett 2 = Barlett and Gentile (2012).
[a] The Z-value refers to the significance test of the Mann-Whitney U test.

Table 3
Correlations between variables in Study 2.

	1	2	3	4	5	6	7	8	9
1: Hostile Cyberbullying Attitudes	–	0.65**	0.43**	0.60**	0.61**	0.41**	0.51**	0.50**	0.81**
2: General Cyberbullying Characteristics	0.68**	–	0.40**	0.45**	0.58**	0.31**	0.46**	0.38**	0.88**
3: Cyberbullying Attitudes (Doane et al.)	0.33**	0.31**	–	0.40**	0.44**	0.33**	0.44**	0.40**	0.39**
4: Cyberbullying Attitudes (Barlett 1)	0.58**	0.50**	0.30**	–	0.58**	0.45**	0.42**	0.41**	0.50**
5: Cyberbullying Attitudes (Barlett 2)	0.67**	0.60**	0.36**	0.66**	–	0.37**	0.36**	0.43**	0.60**
6: Cyberbullying Perpetration (Ang & Goh)	0.47**	0.32**	0.20**	0.44**	0.39**	–	0.48**	0.43**	0.32**
7: Cyberbullying Perpetration (Doane et al.)	0.47**	0.42**	0.39**	0.38**	0.37**	0.43**	–	0.47**	0.46**
8: Cyberbullying Perpetration (Ybarra et al.)	0.45**	0.34**	0.32**	0.39**	0.46**	0.48**	0.45**	–	0.42**
9: Cyberbullying Attitudes (New Composite)	0.91**	0.85**	0.33**	0.55**	0.67**	0.39**	0.45**	0.40**	–
Mean	6.98	8.17	3.26	30.27	16.51	11.34	11.70	4.03	19.47
SD	3.46	3.05	0.43	13.83	5.72	3.94	5.97	1.95	5.34

** $p < 0.01$.
Numbers below the diagonal are Pearson correlations and numbers above the diagonal are Spearman correlations. Barlett 1 = Barlett and Gentile (2012) and Barlett 2 = Barlett et al. (2014).

Table 4
Sex differences in key variables in Study 3.

Variable	Males		Females					
	M (SD)	N	M (SD)	N	t	df	d	Z[a]
Hostile Cyberbullying Attitudes	8.82 (4.37)	77	7.97 (4.74)	71	1.13	146	0.19	1.74
General Cyberbullying Characteristics	9.48 (3.42)	80	8.06 (3.60)	69	2.46*	147	0.41	2.85**
Cyberbullying Attitudes (Doane)	2.13 (1.12)	75	1.55 (0.76)	70	3.65**	143	0.61	3.45**
Cyberbullying Attitudes (Barlett 1)	36.25 (17.48)	72	38.79 (24.81)	70	−0.71	140	−0.03	−0.10
Cyberbullying Attitudes (Barlett 2)	18.38 (6.42)	78	18.81 (8.13)	69	−0.36	145	−0.06	−0.27
Cyberbullying Perpetration (Ang)	12.92 (6.34)	79	11.70 (4.78)	69	1.32	146	0.22	1.16
Cyberbullying Perpetration (Doane)	14.33 (7.40)	80	10.77 (4.85)	69	3.41**	147	0.56	3.01**
Cyberbullying Perpetration (Ybarra)	4.98 (2.65)	80	3.69 (1.29)	70	3.70**	148	0.61	3.29**

* $p < 0.05$, ** $p < 0.01$; Barlett 1 = Barlett et al. (2014) and Barlett 2 = Barlett and Gentile (2012).
[a] The Z-value refers to the significance test of the Mann-Whitney *U* test.

was found (HCA: 5–25; GCC: 4–20). The internal consistency for both HCA and GCC was acceptable ($\alpha = 0.94$ and 0.77, respectfully).

15.2. Sex differences

Table 4 shows the results from both parametric and non-parametric sex difference tests. Consistent with results from Study 2, males were significantly higher in GCC, cyberbullying attitudes (Doane et al. (2014) measure), and cyberbullying (Doane et al (2014) and Ybarra et al. (2007) measures) compared to females. Interestingly, in this smaller sample there were no significant sex differences for HCA, cyberbullying attitudes (Barlett et al. (2014) and Barlett and Gentile (2012) measures), and cyberbullying (Ang and Goh (2010) measure).

15.3. Correlations

Results from both parametric (Pearson correlation) and non-parametric (Spearman correlation) tests are shown in Table 5. Consistent with Study 1, HCA and GCC were correlated ($r = 0.81$, $p < 0.05$; $rho = 0.76$, $p < 0.05$, respectfully). Showing concurrent validity, both HCA and GCC correlated the three established cyberbullying attitude measures ($rhos > 0.40$, $ps < 0.01$). Finally, showing predictive validity, both HCA and GCC correlated with the three cyberbullying perpetration measures ($rhos > 0.32$, $ps < 0.01$).

15.4. Incremental validity

In order to show incremental validity of our scale over the other cyberbullying attitude measures, three hierarchical linear regressions were conducted (c.f. Hunnsley & Meyer, 2003). Each regression had a different cyberbullying perpetration measure as a dependent variable. The Barlett et al. (2014), Barlett and Gentile (2012), and Doane et al. (2014) cyberbullying attitude measures were entered into the first step and our new HCA subscale was entered into the second step.[1] Table 6 displays the results from these analyses. In short, our positive attitudes towards harmful cyberbullying behavior (HCA) predicted cyberbullying perpetration (Ang and Goh (2010) and Ybarra et al. (2007) measures) above and beyond the other three cyberbullying attitude measures. When GCC was entered into these regressions in place of the HCA subscale, results showed that GCC did not account for unique variance above the other variables in the model.

16. Conclusion

The internal consistency and distributional properties of our new measure were adequate. Further, our new measure showed concurrent and predictive validity. Most importantly, our new HCA attitude measure predicted two (of the three) measures of cyberbullying perpetration while controlling for the other similar attitudes. This suggests that the new measure of cyberbullying attitudes is a significant predictor of cyberbullying perpetration while controlling for other existing measures.

17. Discussion

Cyberbullying has become a world-wide social problem that

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[1] We chose to analyze each subscale separately rather than the total score, because of the factor structure of the scale identified in Studies 1 and 2.

Table 5
Correlations between variables in Study 3.

	1	2	3	4	5	6	7	8	9
1: Hostile Cyberbullying Attitudes	–	0.76**	0.43**	0.64**	0.44**	0.49**	0.39**	0.55**	0.89**
2: General Cyberbullying Characteristics	0.81**	–	0.47**	0.42**	0.41**	0.32**	0.38**	0.43**	0.95**
3: Cyberbullying Attitudes (Doane et al.)	0.40**	0.44**	–	0.38**	0.46**	0.42**	0.58**	0.54**	0.50**
4: Cyberbullying Attitudes (Barlett 1)	0.46**	0.31**	0.38**	–	0.54**	0.50**	0.40**	0.50**	0.52**
5: Cyberbullying Attitudes (Barlett 2)	0.23**	0.16	0.34**	0.57**	–	0.31**	0.37**	0.44**	0.42**
6: Cyberbullying Perpetration (Ang & Goh)	0.34**	0.17*	0.39**	0.34**	0.14**	–	0.52**	0.55**	0.40**
7: Cyberbullying Perpetration (Doane et al.)	0.24**	0.26**	0.59**	0.29**	0.32**	0.35**	–	0.54**	0.42**
8: Cyberbullying Perpetration (Ybarra et al.)	0.46**	0.35**	0.57**	0.36**	0.35**	0.48**	0.55**	–	0.50**
9: Cyberbullying Attitudes (New Composite)	0.97**	0.93**	0.45**	0.41**	0.21*	0.30**	0.28**	0.44**	–
Mean	8.52	8.89	1.84	18.58	37.41	12.34	12.64	4.36	19.11
SD	4.74	3.65	1.00	7.23	21.33	5.67	6.57	2.21	8.88

** $p < 0.01$.
Numbers below the diagonal are Pearson correlations and numbers above the diagonal are Spearman correlations. Barlett 1 = Barlett and Gentile (2012) and Barlett 2 = Barlett et al. (2014).

Table 6
Results from the regression analyses in Study 3.

Predictor	Cyberbullying (Ang and Goh)				Cyberbullying (Ybarra et al.)				Cyberbullying (Doane et al.)			
	R^2	F	ΔR^2	β	R^2	F	ΔR^2	β	R^2	F	ΔR^2	β
Step 1	0.20	10.45**			0.39	26.80**			0.35	22.22**		
Cyberbullying Attitude (Barlett 1)				0.31**				0.06				0.04
Cyberbullying Attitude (Barlett 2)				-0.12				0.11				0.13
Cyberbullying Attitude (Doane et al.)				0.30**				0.55**				0.52**
Step 2	0.23	9.11**	0.03*		0.44	24.70**	0.05**		0.35	16.53**	0.00	
Cyberbullying Attitude (Barlett 1)				0.25*				-0.03				0.04
Cyberbullying Attitude (Barlett 2)				-0.12				0.13				0.13
Cyberbullying Attitude (Doane et al.)				0.24**				0.47**				0.52**
Hostile Cyberbullying Attitudes				0.19*				0.26**				0.00

* $p < 0.05$, ** $p < 0.01$; Barlett 1 = Barlett and Gentile (2012) and Barlett 2 = Barlett et al. (2014).

poses myriad psychological and behavioral problems for victims. Researchers have argued that one way to inform interventions aimed at reducing cyberbullying perpetration is to study the variables that predict online aggressive behavior (e.g., Barlett, 2016). However, one challenge in studying behavior juxtaposed with ever-changing online landscape is developing and utilizing valid and reliable measures. Our new questionnaire, especially the HCA subscale, is useful because it uses updated items (unlike the Barlett and Gentile (2012) measure), is short (unlike the Doane et al. (2014) and Barlett et al. (2014) measures), and shows good scale properties. These findings are novel and important to the study of cyberbullying by giving attention to the study of cyberbullying attitudes — an important predictor of cyberbullying perpetration (e.g., Barlett & Gentile, 2012) — attention that has only been given to cyberbullying perpetration (Berne et al., 2013; Patchin & Hinduja, 2015; Thomas et al., 2014; Ybarra et al., 2012).

17.1. Internal consistency of our new measure

Study 1 showed that our new positive attitudes towards cyberbullying measure captures two unique factors that have good internal consistency. The first factor estimates attitudes towards harmful cyberbullying actions (HCA) and the second general cyberbullying characteristics (GCC). These results were replicated in Study 2 using confirmatory factor analysis procedures. Finally, both Studies 2 and 3 further supported our new measure with good reliability. Other cyberbullying attitude measures that have less than 10 items have inadequate reliability (c.f., Barlett & Gentile, 2012). The Cronbach's alpha of the HCA subscale was comparable to other longer scales of the same construct (Barlett et al., 2014; Doane et al., 2014).

17.2. Concurrent and predictive validity of our new measure

The results of Study 2 and Study 3 indicated that our new cyberbullying attitude measure significantly correlated with three existing measures of cyberbullying attitudes — demonstrating strong concurrent validity. In addition, results from all our studies showed that both subscales (HPA and GCC) correlate strongly with each other. It should be noted that results from Studies 2 and 3 also showed that the other cyberbullying attitudes significantly correlated with each other — showing concurrent validity for the other measures of positive attitude towards cyberbullying that we assessed.

Predictive validity was assessed in Studies 2 and 3. First, results indicated that both HCA and GCC correlated significantly with three cyberbullying perpetration measures. These findings are important, as research has demonstrated the importance of the cyberbullying attitude to behavior link (e.g., Barlett & Gentile, 2012; Barlett, 2015; Barlett et al., 2016; Boulton et al., 2012; Doane et al., 2014; Heirman & Walrave, 2012).

Second, our new HCA subscale significantly predicted two of the three cyberbullying perpetration measures above and beyond the other measures of cyberbullying attitudes. This suggests strong incremental validity and shows the value of our new scale relative to the others we tested it against. It is not surprising that our regression analyses showed that our new HCA subscale did not account for a significant proportion of the variance in the Doane et al. (2014) cyberbullying perpetration measure given that the Doane et al. (2013) cyberbullying attitude measure was included as a predictor and both measures share common behavioral items. Barring this latter finding, incremental validity evidence for our new measure is promising. The GCC subscale of our new measure

did not significantly predict cyberbullying perpetration above the other attitude measures. This suggests that our new HCA measure is the most appropriate measure to use to estimate cyberbullying attitudes.

Finally, results from Studies 1 and 2 showed that males had higher HCA and GCC scores than females — additional validity evidence as research has shown that college-aged males are more likely to cyberbully than females (Barlett & Coyne, 2014). Interestingly, this result was not replicated in Study 3. We are not clear as to why Study 3 yielded non-significant sex differences for our HCA measure. Perhaps the demographic differences between Study 2 and 3 shed light on this discrepancy, in Study 2 the majority of participants were female and in Study 3 the majority of participants were male.

17.3. Choosing the right cyberbullying attitude measure

The current study developed the sixth measure of cyberbullying attitudes. Thus, individuals interested in estimating cyberbullying attitudes have to choose which measure to use for their research. Different research agendas and restrictions will clearly constrain which measure is most appropriate to use; however, we believe that the most reliable and valid assessment often is optimal. The present research shows that our cyberbullying attitude measure is brief (five items for our HCA subscale), face valid, concurrently valid, predictively valid, and has good internal consistency. Most importantly, Study 3 showed incremental validity showing that our HCA measure predicts cyberbullying perpetration above and beyond other (and, in our opinion, less adequate) cyberbullying attitude measures. Finally, the items on our newly developed questionnaire are general and no item names or references any specific website, device, or environment akin to past scales (i.e., Barlett & Gentile, 2012 mentioned MySpace). Unless specific research initiatives dictate otherwise, we advocate for using our HCA measure instead of our GCC measure. Study 3 showed that the GCC measure did not have sufficient incremental validity and the internal consistency for GCC was lower than HCA in all three studies.

Overall, we view our HCA subscale as superior to the other existing measures for several reasons. First, the current research is the first to submit a cyberbullying attitude measure through the rigors of statistical tests used to examine scale validation information, and, thus, researchers can be confident in the use of our new attitude measure. Second, we have disclosed all relevant statistics and scale items, which is often information that is absent from other work using the other five attitude measures. Third, our HCA measure is easy to administer due to its brevity and self-report format. The length of our measure makes this measure more optimal than the Barlett et al. (2014), Boulton et al. (2012), and Doane et al. (2014) measures.

17.4. Limitations and future work

Despite the strengths of the current research, limitations exist that should be addressed with future research. First, cross-cultural evidence for our new attitude measure is desperately needed. Barlett et al. (2014) found significant cross-cultural sex differences in cyberbullying attitudes and perpetration between Japanese and American college students, showing the importance of predicting cyberbullying cross-culturally. Future research should administer our new cyberbullying attitude measure across a variety of cultures.

Second, the current research sampled only college-aged students. Thus, we cannot generalize the veridical nature of our findings to youth. Since the majority of the cyberbullying research so far was conducted among adolescents and prevalence rates mostly stem from this target group, it is not only likely that this population attacks others online, but has repeatedly been shown to do so. Future research should utilize our new cyberbullying measure in cyberbullying work with youth to determine if the relationships observed in the current study are robust to age. However, we speculate that our new measure should be suitable for youth and adults alike. Indeed, Barlett (2015) used the Barlett and Gentile (2012) cyberbullying attitude measures with adolescents and the correlation between cyberbullying attitudes and behavior were similar to the same relation with college-aged participants using the same scales (Barlett & Gentile, 2012).

Third, our data is limited to the correlational nature of the data. Longitudinal work using our new measure would be useful at estimating test-retest reliability. Longitudinal research would also shed further light on the predictive validity of our new attitude measure. We argue that data from Studies 2 and 3 tested predictive validity of our cyberbullying attitude measure and it does in so much as our assessment predicts behavior, but stronger evidence for predictive validity would show that Wave 1 cyberbullying attitudes predict Wave 2 cyberbullying perpetration. Future longitudinal work is needed in this regard.

Fourth, in Studies 2 and 3 the participants completed several measures of cyberbullying attitudes and behavior. While this was essential to show both concurrent and predictive validity, participants were presented with several questionnaires that were likely perceived as repetitive and similar (if not identical). Because the measures in Studies 2 and 3 were embedded in larger departmental studies (i.e., mass testing and scale validation), our measures were inserted into a larger set of questionnaires that assessed other constructs unrelated to the current study. We hope that this helped reduce some of the repetitiveness of completing our measures sequentially. However, future work should attempt to address this shared method bias and make every effort to embed cyberbullying measures with other unrelated measures.

Finally, the current study did not measure the variables that predict our new cyberbullying measure. Several theoretical models of cyberbullying perpetration (e.g., the Barlett and Gentile Cyberbullying Model; Barlett & Gentile, 2012) posit that anonymity perceptions and the belief that one's physical prowess is irrelevant in the online world predict cyberbullying attitudes, which predict subsequent cyberbullying perpetration. Additional research should explore how these (and other) variables predict cyberbullying attitudes (assessed via our measure) to examine such theoretical positions.

References

Ang, R. P., & Goh, D. H. (2010). Cyberbullying among adolescents: The role of affective and cognitive empathy, and gender. *Child Psychiatry and Human Development, 41*, 387–397. http://dx.doi.org/10.1007/s10578-010-0176-3.

Barlett, C. P. (2015). Predicting adolescent's cyberbullying behavior: A longitudinal analysis. *Journal of Adolescence, 41*, 86–95. http://dx.doi.org/10.1016/j.adolescence.2015.02.006.

Barlett, C. P. (2016). Past, present, and future theoretical developments in predicting cyberbullying behavior. In M. Wright (Ed.), *A socio-ecological approach to cyberbullying* (pp. 13–28). New York, NY: Nova Science Publishers.

Barlett, C. P., & Coyne, S. M. (2014). A Meta-Analysis of Sex Differences in Cyber-Bullying Behavior: The Moderating Role of Age. *Aggressive Behavior, 40*, 474–488. http://dx.doi.org/10.1002/ab.21555.

Barlett, C. P., & Gentile, D. A. (2012). Attacking others online: The formation of cyberbullying in late adolescence. *Psychology of Popular Media Culture, 1*, 123–135. http://dx.doi.org/10.1037/a0028113.

Barlett, C. P., Gentile, D. A., Anderson, C. A., Suzuki, K., Sakamoto, A., Kumazaki, A., et al. (2014). Cross-cultural differences in cyberbullying behavior: A short-term longitudinal study. *Journal of Cross Cultural Psychology, 45*, 300–313. http://dx.doi.org/10.1177/0022022113504622.

Barlett, C. P., Gentile, D. A., & Chew, C. (2016). Predicting cyberbullying from anonymity. *Psychology of Popular Media Culture, 5*, 171–180. http://dx.doi.org/10.1037/ppm0000055.

Barlett, C. P., Prot, S., Anderson, C. A., & Gentile, D. A. (2016). An Empirical

examination of the strength differential hypothesis in cyberbullying behavior. *Psychology of Violence.* http://dx.doi.org/10.1037/vio0000032 (in press).

Berne, S., Frisén, A., Schultze-Krumbholz, A., Scheithauer, H., Naruskov, K., Luik, P., … Zukauskiene, R. (2013). Cyberbullying assessment instruments: A systematic review. *Aggression and Violent Behavior, 18,* 320—334.

Boulton, M., Lloyd, J., Down, J., & Marx, H. (2012). Predicting undergraduates' self-reported engagement in traditional and cyberbullying from attitudes. *Cyberpsychology, Behavior, and Social Networking, 15,* 141—147. http://dx.doi.org/10.1089/cyber.2011.0369.

Doane, A. N., Kelley, M. L., Chiang, E. S., & Padilla, M. A. (2014). Development of the cyberbullying experiences survey. *Emerging Adulthood, 1,* 207—218. http://dx.doi.org/10.1177/2167696813479584.

Doane, A. N., Pearson, M. R., & Kelley, M. L. (2014). Predictors of cyberbullying perpetration among college students: An application of the Theory of Reasoned Action. *Computers in Human Behavior, 36,* 154—162. http://dx.doi.org/10.1016/j.chb.2014.03.051.

Heirman, W., & Walrave, M. (2012). Predicting adolescent perpetration in cyber-bullying: An application of the theory of planned behavior. *Psicotherma, 24,* 614—620.

Hunnsley, J., & Meyer, G. J. (2003). The incremental validity of psychological testing and assessment: Conceptual, methodological, and statistical issues. *Psychological Assessment, 15,* 446—455. http://dx.doi.org/10.1037/1040-3590.15.4.446.

Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin, 140,* 1073—1137. http://dx.doi.org/10.1037/a0035618.

Patchin, J. W., & Hinduja, S. (2015). Measuring cyberbullying: Implications for research. *Aggression and Violent Behavior, 23,* 69—74. http://dx.doi.org/10.1016/j.avb.2015.05.013.

Thomas, H. J., Connor, J. P., & Scott, J. G. (2014). Integrating traditional bullying and cyberbullying: Challenges of definition and measurement in adolescents — A review. *Educational Psychology Review, 27,* 135—152. http://dx.doi.org/10.1007/s10648-014-9261-7.

Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior, 26,* 277—287. http://dx.doi.org/10.1016/j.chb.2009.11.014.

Ybarra, M., Boyd, D., Korchmaros, J., & Oppenheim, J. (2012). Defining and measuring cyberbullying within the larger context of bullying victimization. *Journal of Adolescent Health, 5,* 53—58. http://dx.doi.org/10.1016/j.jadohealth.2011.12.031.

Ybarra, M. L., Diener-West, M., & Leaf, P. J. (2007). Examining the overlap in internet harassment and school bullying: Implications for school intervention. *Journal of Adolescent Health, 41,* 42—50. http://dx.doi.org/10.1016/j.jadohealth.2007.09.004.