*Original Article*

# Effects of Cyberbullying and Coping Strategies on Depression

Krittisak Anuroj, MD[1]

[1] Department of Psychiatry, Faculty of Medicine, Srinakharinwirot University, Bangkok, Thailand

***Background:*** Cyberbullying is associated with depression in adolescents. Coping strategies may serve to buffer against cyberbullying's effect on depression. Studies on cyberbullying's effects on depression and effects of respective coping in Thai adolescents are scarce.

***Objectives:*** To elucidate the effect of cyberbullying on depression in a sample of Thai urban secondary school students, and the effect of coping strategies on depression in cyberbullied subgroup.

***Materials and Methods:*** Stratified random sampling was performed. A total of 895 students completed the questionnaires. Depressive symptoms were measured using Patient Health Questionnaire-Adolescent, Thai version (PHQ-A), at the 0th baseline and 6th month outcome follow-up. Cyberbullying victimization was measured with items from Cyber-Aggression perpetration and victimization scale, Thai version. Potential confounders and coping strategies endorsement were collected. Statistical analyses of effects on 6th-month depressive symptoms were carried out with generalized linear models.

***Results:*** From generalized linear model adjusted for age, gender, academic major, parental education level, perceived relationship difficulties, perceived learning difficulties, perceived social support, and baseline depressive symptoms, cyberbullying victimization predicted higher depressive symptoms at 6th month. From the model, having cyberbullying-victimization score of 1 SD above the mean predicted an increase in depression severity by one level. In cyberbullied participants, coping by consulting adults predicted lower depressive symptoms at 6th month, while coping by self-talk predicted higher depressive symptoms at 6th month. Other strategies failed to predict depressive symptoms at 6th month. Clinical implications are discussed.

***Conclusion:*** In the present study sample, cyberbullying victimization predicted higher depressive symptoms. Coping by consulting adults predicted lower depressive symptoms, while self-talking predicted higher depressive symptoms. More studies in Thai context are needed.

***Keywords:*** Cyberbullying; Depressive symptom; Adaptation, psychological; Adolescent; Thai

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Depression, or major depressive disorder, is characterized by persistent and pervasive depressed mood and anhedonia[1]. In adolescent, depression is the leading disease burden of disability, having moved up from 8th rank in 1990 to 4th rank in 2019[2]. Depression is a multifactorial condition that has both genetic and psychosocial contributions and can be precipitated by adverse socio-environmental experiences[3]. Substantial portions of human experience come from social interactions. Internet is a major communication medium and has supplanted various offline communication methods. Socializing online (social networking) is also a new phenomenon brought about by internet and many preexisting stressful phenomena in social interactions have pervaded into this new communication channel; bullying is no exception. Bullying across internet is referred to as 'cyberbullying'. It is broadly defined as the repeated acts through the internet, using information, or communicating with the intention to cause harms to others[4]. Modes of bullying can range from text, images, videos, to the acts of seclusion, exposing secrets, and impersonation[4–8]. Social networking, widely popular with adolescents, can therefore bring about the problem of cyberbullying[9]. The situation of cyberbullying in Thai adolescents can be expected to grow in parallel with internet access and utilization of online social media. As of 2018, it was estimated that up to 91 percent of Thai adolescents have access to the internet[10].

Cyberbullying has been associated with depression, suicidality, social phobia, somatization, low self-esteem, and academic problem[11-14]. Among these conditions, major depressive disorder (henceforth "depression") is the most commonly encountered in Thai population. With a lifetime prevalence of 1.8 percent, depression affects nearly a million of Thai population[15]. Given that cyberbullying is a known contributing factor for depression, it can be a target for intervention to reduce depression. However, cyberbullying is a relatively new construct in Thailand. There are still

**Correspondence to:**

Anuroj K.

Department of Psychiatry, Faculty of Medicine, Srinakharinwirot University, 62 Moo 7, Ongkharak, Ongkharak Nakhon Nayok 26120, Thailand.

**Phone:** +66-37-395085 ext. 60803

**Email:** thymelancille@gmail.com

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methodological inconsistencies and paucities of literatures on its impact on Thai adolescent depression.

The course of depression in cyberbullied adolescents can be perpetuated further by the lack of protective factors, whether by the true absence of such factors, or underutilization of available resources. From individual perspective, coping strategy (repertoire and skills) is an aspect of intrapersonal protective factors that the person utilizes when facing stressors and contributes to successes (or failures) in adaptation and subsequent mental health difficulties[3]. Coping strategies have been studied in cyberbullied children and adolescent, and are roughly categorized as (1) technical/ technological coping (2) asserting and confronting (3) retaliation by bullying (4) avoidance (5) consulting others (6) distraction[16-21]. Generally, it was found that cyberbullied children and adolescent use lower problem-focused coping[22]. This may have led to researches aiming to mitigate effect of bullying through coping skill training[23]. However, aside from an emerging evidence of mitigating effect of social support on psychological wellbeing in cyberbullied children and adolescent[24] and that emotion-focused coping worsened depression[25], literatures on effectiveness of individual coping strategies in preventing psychiatric sequelae of cyberbullying are still scarce. Generally speaking, adoption of coping strategies is known to vary in type or extent by cultures[26-29]. Their effectiveness may also differ culturally[30,31]. Effectiveness of cyberbullying coping strategies, therefore, warrants culture-specific examination in Thai context.

## Objective

The present study aimed to explore the effects of cyberbullying on depression and the effectiveness of specific coping strategies in Thai adolescents.

## Materials and Methods

### *Study design*

This is a single-site cross-sectional observational study.

### *Sample size, setting, and participants*

Sample size was calculated using G*Power version 3.1.9.4 to detect a small effect size, with 7 predictors in final model, considering a margin of error β of 0.8 and 0.05 significance level in a linear regression equation[32,33]. The calculation indicated the need for a sample size of at least 725 participants to carry out the intended statistical analysis.

A total of 895 students participated in the present study. The students were from a demonstration school in urban area of Bangkok. Inclusion criteria were: (1) students in Mathayom Suksa 1 to 6; (2) within the age range of 13 to 18 years old (higher prevalence of individuals in this age group involved in cyberbullying[34]); (3) fluent in Thai language. The students in special education programs (which mainly included students with intellectual disability and autism spectrum disorder) and those who reported not using internet in the past year, were excluded from the sample. Data were collected in July 2020 and January 2021 (henceforth the $0^{th}$ and $6^{th}$ month, respectively).

Stratified random sampling was performed; 725 participants were divided into 6 strata (classes Mathayom Suksa 1 to 6), each with at least 121 participants. In each stratum, computerized random number was used to select classes until there were at least 121 participants in the stratum. Each selected class had all its students recruited. From each Mathayom Suksa level, between three to five classrooms were randomly selected to meet the required 121 participants. A total of 1,034 students were approached, of which 975 consented to participate at $0^{th}$ month. Twenty students submitted grossly incomplete questionnaires and therefore were excluded. Among the remaining 955 participants, 895 were present to the follow-up data collection at $6^{th}$ month. The other 60 participants did not respond to contact.

### *Variables*

Dependent variable was the depressive symptom score at $6^{th}$ month. Potential independent variables included depressive symptom score at $0^{th}$ month (as covariate), cyberbullying victimization experience score, endorsement of specific coping strategies, age, biological sex, parental education level, class, academic major, GPA, perceived difficulties in relationship, perceived difficulties in studying, and perceived social support.

### *Measurement*

Depressive symptoms were obtained using Thai version of Patient Health Questionnaire-Adolescent version (PHQ-A), which is a self-rated questionnaire that quantifies nine major depressive disorder symptom frequency in 4-point Likert scale[35]. The scores were coded in 1 to 4 schemes; possible scores ranged between 9 to 36. Summed PHQ-A scores were entered into statistical analysis. For the purpose of illustration, percentage of participants in each level of severity is presented in Table 1.

Cyberbullying victimization, collected at $0^{th}$ month, was assessed with an instrument modified from Cyber-aggression perpetration and victimization scale-Thai version. The instrument is a self-rated questionnaire that quantifies frequency of participants' cyberbullying victimization experiences in 9 aspects. Each item is rated in a 5-point Likert scale, ranging from "never" to "always". The instrument underwent translation, content-validation, face-validation, and tryouts in Thai secondary school students. The victimization subscale had reliability from Cronbach's alpha of 0.89[36,37]. For the present study, one additional item, "online impersonation" was added to the instrument while the other items remained the same. Possible scores ranged from 10 to 50. Response from all items were summed up into a score and entered statistical analysis.

Coping strategies were assessed by the instrument using strategies initially populated from previous researches[22,35-37] and converted into self-report statements. This self-rated instrument is intended to evaluate the strategies that were used by the participants to deal with the difficulties

**Table 1**. Descriptive data of sample demographics, baseline depressive symptom score, and the outcome depressive symptom score

| | n (%) | Mean (SD) |
|---|---|---|
| Age | | 14.6 (1.8) |
| Class | | |
| Mathayom Suksa 1 | 176 (19.7) | |
| Mathayom Suksa 2 | 166 (18.5) | |
| Mathayom Suksa 3 | 146 (16.3) | |
| Mathayom Suksa 4 | 141 (15.8) | |
| Mathayom Suksa 5 | 126 (14.1) | |
| Mathayom Suksa 6 | 140 (15.6) | |
| Academic major | | |
| Secondary school (no major) | 488 (54.5) | |
| Science & math | 169 (18.9) | |
| Arts & foreign languages | 238 (26.6) | |
| Gender | | |
| Male | 390 (43.6) | |
| Female | 505 (56.4) | |
| Religion | | |
| Buddhism | 852 (95.2) | |
| Christian | 31 (3.5) | |
| Muslim | 8 (0.9) | |
| Other | 4 (0.4) | |
| Parental formal education duration (year) | | 16.5 (2.0) |
| Perceived relationship difficulties | | |
| Absent | 208 (23.2) | |
| Rarely present | 284 (31.7) | |
| Occasionally present | 260 (29.1) | |
| Frequently present | 84 (9.4) | |
| Always present | 59 (6.6) | |
| Perceived academic difficulties | | |
| Absent | 156 (17.4) | |
| Rarely present | 249 (27.8) | |
| Occasionally present | 291 (32.5) | |
| Frequently present | 141 (15.8) | |
| Always present | 58 (6.5) | |
| Perceived social support | | |
| Never available | 16 (1.8) | |
| Rarely available | 78 (8.7) | |
| Occasionally available | 197 (22) | |
| Frequently available | 348 (38.9) | |
| Always available | 256 (28.6) | |
| Cyberbullying victimization | | 14.7 (4.7) |
| Never experienced cyberbullying | 90 (10.1) | |
| Experienced cyberbullying | 805 (89.9) | |

**Table 1**. Cont.

| | n (%) | | Mean (SD) | |
|---|---|---|---|---|
| Depressive symptoms (PHQ-A)[a] | 0th month | 6th month | 0th month | 6th month |
| Mean PHQ-A score | - | - | 16.9 (5.2) | 16.3 (5.2) |
| No depression | 224 (25) | 309 (34.5) | | |
| Mild depression | 406 (45.4) | 327 (36.5) | | |
| Moderate depression | 177 (19.8) | 161 (18) | | |
| Severe depression | 46 (5.1) | 72 (8) | | |
| Very severe depression | 42 (4.7) | 26 (2.9) | | |

[a] PHQ-A Thai version's severity are as follows: (1) 9 to 13 = No depression; (2) 14 to 18 = Mild depression; (3) 19 to 23 = Moderate depression; (4) 24 to 28 = Severe depression; (5) 29 to 36 = very severe depression

caused by cyberbullying, e.g., "When I am cyberbullied, I consult with someone my age". The inventory consists of 10 items. Each item is rated by the participants in a 7-point Likert scale, ranging from "totally disagree" to "totally agree". The Cronbach alpha of the instrument was 0.64. Data were collected at 0th month. Response (1 to 7) to each item were individually entered into statistical analysis.

In measuring perceived difficulties, participants were presented two statements i.e. "I am troubled by academic issues" and "I am troubled by relationship issues", while perceived support was presented in the statement "I am supported by my friends and family during distress". Each item is rated by the participants in a 5-point Likert scale, ranging from "least agreed" to "most agreed". Cronbach alpha of the three items (with perceived support's score inverted) was 0.43.

Other demographic data were obtained from self-reported predefined questionnaire. Age, biological sex, parental education level, class, and academic major were deemed as distal risk factors (for depressed symptoms at 6th month) and were collected at 0th month. Perceived difficulties (learning and relationship) and perceived support were deemed as proximal factors and therefore were collected at 6th month.

### *Procedure*

The school's academic division allocated time during guidance classes for participation in this research (one period for 0th month and another period for 6th month for each class). Classes were held in spacious room with abundant space for participants to privately rate the questionnaires. Research assistants (PhD students) carried out the informed consent process and had ensured participants of the anonymity and voluntariness of participations. The assistants explained research objectives and were present throughout the collection process to answer questions. Questionnaires were paper-based and were collected into a sealed box. As consents from parents were waived in the review by Human Research Ethics Committee of Srinakharinwirot University (since the study involved minimal risks) signatories from parents were not obtained.

### *Bias*

As this was a questionnaire-based study directly dealing with emotional and behavioral problems, there might be possibility of response bias. To minimize socially desirable responses, anonymity was warranted in the process of data dissemination and collection.

Main results are presented from complete cases. Since the data were collected twice, there were a possibility of non-response attrition bias. Post-hoc analysis of non-responders is outlined in the following section.

### *Statistical analysis*

Statistical analyses were performed using software SPSS version 22 (licensed to Srinakharinwirot University). Missing value analysis was performed to test whether data were missing completely at random. The missing continuous data was imputed with expectation-maximization algorithm. Missing categorical data (gender and religion) were substituted with sample modes. Initially, potential correlations between independent variables and 6th month PHQ-A score were explored using univariate analysis (ANOVA for categorical variables and Spearman rank correlation for continuous variables). Variables with p-value approaching significant threshold (at least $p<0.1$) were entered into final statistical model. Known confounders (age, gender, and perceived difficulties and support) were also entered into the final model. Generalized linear model was employed for multivariate analysis. Gamma was defined as the distribution based on observed data distribution and the canon logarithmic link function was used. Potential confounders found in univariate analysis were controlled as the association between cyberbullying victimization and 6th-month PHQ-A score was examined. Then, subgroup of students who reported ever experiencing cyberbullying was analyzed with generalized linear models for the effects of coping strategies on their 6th month PHQ-A scores. Finally, 2-way interactions between each coping strategy and other independent variables, were explored in generalized linear models. A 2-tailed p-value of $<0.05$ was considered statistically significant.

Post-hoc analyses were conducted to address non-

responders of the 6th month depression score. The missing PHQ-A score was substituted in 3 ways: with 0th-month score plus … (1) sample mean change in the score, (2) mean plus one standard deviation of the change, and (3) mean minus one standard deviation of the change. Missing predictors collected at 6th month (perceived relationship and academic difficulties and perceived social support) of non-responders were substituted with means. Statistical analyses were then repeated.

### *Ethical considerations*

The study protocol was approved by Human Research Ethics Committee of Srinakharinwirot University (identification number: SWUEC314/2562E).

## Results

### *Descriptive data*

Complete cases consisted of 895 students from class Mathayom Suksa 1 to 6 (mean age = 14.6 years, SD = 1.8). Of these, 56.4% were female and 43.6% were male. Ninety-five percent were Buddhists. Mean parental formal education duration were 16.5 years (SD = 2.0). Ninety percent of the participants experienced to cyberbullying victimization. As for baseline depressive symptoms, only 25% had no depressive symptoms; 45.4% had mild symptoms; 19.8% had moderate symptoms; the remaining 9.8% had severe or very severe symptoms. At 6th month, 34.5% had no symptoms; 36.5% had mild symptoms; 18% had moderate symptoms; 10.9% had severe or very severe symptoms. The 6th month PHQ-A score's distribution was right-skewed. Details of sample characteristics are presented in Table 1.

The independent variable that contained highest missing data was parental education level, with a missing rate of 3.7%. Other variables at 0th month had the missing rates between 0.10 to 1.15%. There were no missing data from the 6th month responders. However, the missing data were not completely at random. Imputations and substitutions followed the aforementioned methods.

### *Main results*

One-way ANOVA comparing means of PHQ-A score at the 6th month follow-up indicated significant differences between group means for gender (F = 5.3, p-value = 0.02) and academic major (F = 24.6, p-value <0.01). As for religion, other religious groups besides Buddhists were remarkably small, and there were no statistically significant differences between group means (F = 1.2, p-value = 0.29). Analysis of class (Mathayom) showed significant mean differences (F = 10.7, p-value <0.01), with mean increasing as class level went up. However, the analysis of data also revealed the same results with 'age' variable. Class was deemed a redundant variable and was dropped out from further analyses. Academic majors, on the other hand, did not seem to cluster together to specific class levels and were retained in the further analyses.

Spearman rank-correlations were used to investigate associations between cyberbullying victimization and independent variables (age, perceived relationship difficulties, perceived social support, perceived academic difficulties, PHQ-A, parental education, GPA). Significant positive correlations were observed for age (correlation coefficient = 0.24, p-value <0.01), perceived relationship difficulties (correlation coefficient = 0.38, p-value <0.01), perceived academic difficulties (correlation coefficient = 0.22, p-value <0.01), and PHQ-A score at 0th month baseline (correlation coefficient = 0.59, p-value <0.01). Significant negative correlations were observed for parental education level (in year, correlation coefficient = -0.07, p-value = 0.03), and perceived social support (correlation coefficient = -0.33, p-value <0.01). There was no significant correlation with GPA.

Generalized linear model was adjusted for age, academic major, gender, parental education level, perceived relationship difficulties, perceived academic difficulties, perceived social support, and PHQ-A score at 0th month baseline. Cyberbullying victimization predicted higher 6th-month PHQ-A score, as shown in upper section of Table 2. In this analysis, the three predictor variables (age, gender, and parental education level) failed to predict 6th-month PHQ-A score after baseline PHQ-A score was added to the model.

### *Post-hoc: missing data*

Analysis of the 6th month's non-responders revealed cyberbullying rate of 90% (similar to whole participant's rate), and a baseline PHQ-A score of 18.0 (SD = 6). Approaches in substituting their 6th month PHQ-A scores did not yield any statistically significant differences models are not shown.

### *Subgroup analysis: coping strategies and their effects*

There were 803 participants who reported experiencing cyberbullying victimization (rating either seldom, occasionally, frequently, or continuously on one or more of the cyberbullying items).

Endorsements of coping strategies (by rating at least 4 out of 7 on the item) are presented in Table 3. The two coping strategies most frequently endorsed (rated as least 4 of 7) by bullied participants were distraction with leisure activities (endorsed by 85.9%) and consulting with peers (endorsed by 61.1%).

Among the cyberbullied group, Spearman's rho was used to investigate the bivariate correlations between PHQ-A scores (as the dependent variable) and individual coping strategies (as independent variables). Significant correlations were observed for: (1) 'avoidance of bully in real world' (Spearman's rho = 0.07, significance = 0.05), (2) 'self-talk' (Spearman's rho = 0.15, significance <0.01) (3) 'consulting with adults' (Spearman's rho = -0.16, significance <0.01), and (4) 'telling bully to stop' (Spearman's rho = -0.08, significance = 0.02).

The four coping strategies were entered into generalized linear models controlled for significant factors

**Table 2.** Parameter estimates from generalized linear models of (1) main model, displaying effect of cyberbullying victimization on the 6th month PHQ-A scores, and (2) subgroup analysis displaying effect of coping strategies on the 6th month PHQ-A scores

| Models | Parameter | B [a] | p-value |
|---|---|---|---|
| Main model (whole sample) [b] | Cyberbullying victimization score | 0.01 | <0.01 |
| Cyberbullied participants[c] | Avoiding bullies | 0.00 | 0.40 |
| | Consulting with adults | -0.01 | 0.01 |
| | Self-talks | 0.01 | <0.01 |
| | Telling bullies to stop | 0.00 | 0.37 |
| Cyberbullied participants (post-variable reduction) [c] | Consulting with adults | -0.01 | <0.01 |
| | Self-talks | 0.01 | <0.01 |

Dependent variable in all models: 6th month PHQ-A score (all models use gamma distribution with logarithmic link function)
[a] B coefficients are exponentials
[b] Adjusted for: major, perceived relationship difficulties, perceived academic difficulties, perceived social support, and 0th month PHQ-A score
[c] Adjusted for: major, perceived relationship difficulties, perceived academic difficulties, perceived social support, 0th month PHQ-A score, and cyberbullying victimization score

**Table 3.** Endorsement of coping strategies in cyberbullied participants

| Coping strategies | Endorsed (%)[a] |
|---|---|
| Cutting communication from bullies | 31.3% |
| Changing online identity | 26.3% |
| Deleting bullies' messages/media without looking | 28.8% |
| Using 'report' feature | 48.7% |
| Telling bullies to stop | 49.1%[b] |
| Avoiding the bullies | 40.3%[c] |
| Consulting with adults | 37.0%[b] |
| Consulting with peers | 61.1% |
| Self-talks | 46.3%[c] |
| Distraction | 85.9% |

[a] Scales were anchored at 1 (totally disagree), 4 (neutral), and 7 (totally agree); endorsement percentage included participants who rated 5 to 7 in each item.
[b] These strategies had significant negative Spearman's rank-correlation with 6th-month PHQ-A score
[c] These strategies had significant positive Spearman's rank-correlation with 6th-month PHQ-A score

observed in the main result section. Goodness-of-fit statistics for deviance yielded value/df of 0.06 and 0.05 respectively. Omnibus tests found that both models outperformed their intercept-only counterparts. Results are shown in lower section of Table 2. As observed in the second and third models, effects of consulting with adults and self-talks remained significant, with the former predicting lower depressive symptoms and the latter predicting higher depressive symptoms.

Additionally, analyses for 2-way interactions between coping strategies and other independent variables were repeated. No statistically significant interaction effect was found. These models are not shown.

## Discussion

The main result demonstrated the association between cyberbullying and depression in Thai secondary school students , which is consistent with researches in other countries[11-14]. Since the B coefficient is from a logarithmic link function and can be difficult to interpret by clinicians, the author simplifies the result as follows: a 15-point increase in cyberbullying victimization score roughly predicts 1-point increase in the 6th month PHQ-A. In addition, it should be noted that cyberbullying also affected the baseline depressive symptoms, with 7-point cyberbullying score predicting 1-point increase in the baseline PHQ-A score (model not shown), which is also a predictor of endpoint depressive

symptoms. To illustrate further, suppose there is an average male Mathayom 1 student from the sample who has no other psychosocial adversities, but with 20-point cyberbullying victimization score (approximately 1 SD above the sample mean). The person would have a baseline depression score of 12 points, elevated from nil score of 9 but remained in the non-depressed level. The effect of this baseline and cyberbullying score (as from main result model) would result in net 6th-month score of 14 points, shifting his level of depressive symptoms from no symptom to mild symptoms. This aligns with a previous study that found moderate effect size of cyberbullying victimization on depression[24]. Although the present study examined adolescent age group as a whole, considerations should be given to the social-emotional development in different stages of adolescence with regard to victimization. Speculating from developmental perspective, identity and self-esteem may be more vulnerable to damages in early adolescence, as these aspects have yet to be crystallized[38]. There is, however, paucity of data on whether the bullying exert effect differentially on different stages of adolescence[9], and more study is needed to validate this speculation. Nevertheless, on an individual case basis, inquiry about the problem of cyberbullying should be incorporated into assessment of relationship difficulties and would serve as an excellent complement to the integrative case formulation approach. Furthermore, coping strategies, as discussed in the following section, should also be addressed.

Coping strategies in adolescents were explored and categorized in many scales, and generally fell into four categories: ineffective/passive coping, seeking support, emotion-focused coping, and problem- or task-focused coping[39]. Lack of utilization of social support, social withdrawal, and disengagement from the problem are known to be associated with poorer depression[40,41].

Consulting adults is a way of seeking support and can vary from consulting laypersons to mental health professionals. Its nature can incorporate many aspects of coping categories and can vary from ventilating, seeking emotion regulation skill, to seeking solution to the problem. Provision of warm and caring consultation environment, among other factors in therapeutic alliance, can also play the role[42]. It can also be seen as an adaptive developmental process (of learning and trying out strategies) by adolescents. In the present study, consulting adults was associated with lower depressive symptoms with a B coefficient of -0.010, suggesting that the net effects of the elements were productive. Total endorsement of this coping strategy (7 point in the scale) would yield a value of -0.070 in the equation, roughly sufficient to buffer the effect of 13 points of cyberbullying victimization. This strategy may help the adolescents stay resilient and prevent depression after being bullied. It may be argued that the endorsement of this coping strategy actually reflected the presence of supportive adult in the participant's social support or networks inventory. However, analyses of interaction failed to demonstrate the interaction between this coping strategy and perceived social support, thereby suggesting that the strategy might exert its effect independently.

Self-talks represented a group of strategies using participant's internal dialogue. While positive self-talks are beneficial if used judiciously, some self-talks can be maladaptive. For example, dismissing feelings can lead to avoidance and ruminating thoughts can worsen depressed mood[43,44]. The net worsening effect suggests that the nature of self-talks in the present study's samples was generally detrimental, having a B coefficient of 0.014, effect of which was equivalent to that of 2.5 points of cyberbullying victimization. Analysis of interaction did not find its interaction with perceived social supports (or lack thereof), suggesting that the observed effects occurred independently.

Despite their task-focused nature, the three technical coping strategies (using 'report' feature, blocking communication from bullies, and changing online identity) as well as 'telling bullies to stop' did not appear to be statistically significantly associated with better depressive symptoms. 'Blocking communication from bullies' is considered to be an adaptive coping strategy for cyberbullying[45]. It shares similarities with 'changing online identity' in that both had technical and avoidant elements. The positive effect of avoiding the bullying situation may be counterbalanced by its negative effect of being an avoidant strategy, and thus may explain the lack of statistically significant difference in depressive symptoms. The remaining technical coping strategy, using 'report' feature, could vary in its effectiveness depending on how the reports were handled. In addition, with respect to all task-focused coping strategies, it must be noted that cyberbullying is not a discrete stressful situation but rather a stressor that recurs. Thus, the solution to a single bullying event might not be sufficient to alleviate its mental health consequences. This is consistent with the past finding that demonstrated the limitations of task-focused strategy's benefit beyond emotional aspects[46].

The other avoidant coping strategy, 'avoidance of bullies in real world', displayed association with worsened depression in bivariate correlation, which is consistent with the known negative effect of strategies of this category. Normally, it would be relevant only to the victims whose bullying were extended from their offline lives. Although those who endorsed this strategy probably experienced traditional bullying, whether they accurately represented the traditionally bullied subgroup is not known. Since data on traditional bullying were beyond the scope of the present study, subgroup analysis was not possible. The effects of this strategy might have been subjected to dilution.

Among the remaining strategies, 'coping with leisure activities' and 'consulting peers', while appeared to be the popular choices among the samples, showed no statistically significant association with depressive symptoms. 'Coping with leisure activities' mainly provides distractions, and therefore can be categorized as nonproductive disengaged strategy. 'Consulting peers' is categorized as reference-to-others strategy. The nature of the consultation, like those with adults, can also vary. The net nonsignificant results suggested that there were both the

productive and nonproductive elements. In addition, peers might not have sufficient emotional maturity to foster a 'therapeutic alliance' and that peer consultation may not culminate 'group cohesion' as it would be expected from professionally organized group therapy.

Given that coping strategies, like other human's behaviors, are subject to the process of acquisition and maintenance, underutilization of a strategy may therefore signal a deficient strategy repertoire or lack of reinforcement of previously acquired ones. The satisfaction gained from prior experience with particular strategies may also reinforce and consolidate personal preference. On the other hand, coping strategy can be subject to extinction if it lacks the required reinforcements. Coping strategy preference is also known to be affected by upbringing and attachment security[47-49], signaling the role that family play in introducing and differentially reinforcing coping behaviors. The preference can vary by developmental issues as well. For example, dearth of experiences in early adolescence may limit their coping repertoire, resulting in trials and errors of coping techniques; the relatively high impulsivity in early and middle adolescence may influence their tendency to act out; the the strive for autonomy may hinder adolescents, especially those in late stage of development, from confiding in their parents[38,50]. The clinical implication of this study in relation to coping strategies is therefore not as straightforward as to promote one particular coping strategy over another. Previous research has found that even those who cope alone, but with multitude of strategies, do particularly well in overcoming depression and anxiety[51]. With individual differences and developmental considerations in mind, bullied adolescents should be assessed whether or not they are coping effectively. Ineffective or deteriorative strategies such as negative self-talks and emotion-focused strategies should be discouraged[25,52-54]. In adolescents with deficient coping repertoire, effective strategies may be introduced and reinforced as they work through the problem of bullying. Specifically, in cases whose repertoire is deficient due to perceived or actual deficiency of resources, such as lack of adults capable of providing counsel, the role of surrogates (such as caring teachers, school counselors, or even mental health professionals) may be considered. Clinicians may also have special roles in advocating the adolescents' need for community support, such as through contacts with responsible teachers or social services. In cases whose useful coping behaviors were previously acquired but later dropped, obstacles contributing to extinction should be addressed. For example, lack of empathic response of adults when giving advice may have deterred the adolescents from seeking further counsels, even if adults may have done it out of good wills. In such cases, altering their responses may reshape the utilization of strategies.

### *Limitations*

The questionnaires were subject to recall bias. This study was conducted in a single, urban, Buddhist-dominant community. Therefore, generalizability to rural populations or to other religious communities would be limited. Replication in other samples would also be required prior to generalizing the result into wide-scale policies.

## What is already known on this topic?

Cyberbullying has been associated with depression in studies conducted outside Thailand. Emotion-focused coping against cyberbullying was found to be harmful to mental health, but there were no coping strategies that were found to be helpful in dealing with depression.

## What this study adds?

In urban Thai adolescents, cyberbullying is associated with depression. Coping by consulting adults could buffer against depression, while coping by negative self-talking could worsen depression.


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## Potential conflicts of interest

The authors declare no conflict of interest.

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