Abstract

Purpose; The purpose of this study was to investigate the influence of family crisis such as parental neglect on elementary school students’ offline school bullying and to analyze the mediating effects of ADHD symptoms, cyber bullying victimization, and anger on that influence. A total of 634 students in fourth, fifth, and sixth grade at four elementary schools in the capital area participated in this study. Their parental neglect, cyber bullying victimization, offline school bullying, ADHD symptoms and anger levels were examined by a survey. The collected data were analyzed using structural equation modeling and the mediating effects were verified by bootstrapping. The major findings were as follows. To begin with, the result showed that parental neglect could increase offline school bullying directly. Next, parental neglect could increase offline school bullying indirectly by mediating cyber bullying victimization, ADHD symptoms, and anger. In details, four paths were statistically significant at 95% confidence level. First, parental neglect increased cyber bullying victimization, and increased cyber bullying victimization augmented offline school bullying. Second, parental increased anger level, this increased anger augmented offline school bullying. Third, parental neglect increased cyber bullying victimization, and increased cyber bullying victimization raised anger level, this raised anger augmented offline school bullying. Fourth, parental neglect increased ADHD symptoms, and increased ADHD symptoms raised anger level, this raised anger finally augmented offline school bullying. The results of this study suggest that child maltreatment such as parental neglect and emotional problems such as ADHD symptoms and anger should be considered in developing school bullying prevention and intervention programs.

Keywords Crisis, Parental Neglect, School Bullying, Cyber Bullying, ADHD

1. Introduction

School bullying is a very serious and chronic problem in Korea. The incidents of brutal school bullying of Busan middle school female students in 2017, which shocked the entire country, show how solid and serious the school bullying is[1]. More seriously, many of these perpetrated students have already been punished for their bullying behaviors, but they did not feel guilty and repeatedly committed bullying. In response to this, there is a growing voice for the reform of the Youth Protection Act to reinforce the punishment for school bullying[2]. School bullying in Korea is spreading beyond the boundaries of schools to social problems.

In fact, the management of school bullying has been an important task for the Ministry of Education and the authorities of local educational districts in Korea for a long time. They have made various efforts in order to reduce school bullying. Most of all, the Act on the Prevention of and Countermeasures against Violence in Schools was enacted in 2004[3]. Based on the Act,
the Ministry of Education establishes and operates a basic plan to prevent and intervene school bullying every five years. Currently, the 3rd plan has been in operation since 2015[4]. It includes building a safety infrastructure around schools such as expanding CCTV, installing violence prevention environment, and expanding student protection personnel. Also, it empathizes on education programs protecting victimized students and counselling perpetrated students.

However, recent statistics on school bullying indicate that those efforts seem to be ineffective. According to the results of the national survey on school bullying administered in 2019 by the Ministry of Education, the rate of students who were victimized by school bullying was 1.6%, an increase of 0.3% from 1.3% in 2018[5]. The details of the results would be more concerned. At the school level, the rate of school bullying victimization among elementary school students was 3.6%, an increase of 0.8% from 2.6% of previous year. In particular, the rate of perpetration of bullying in elementary school was 1.6%, up nearly 60% from that in 2018.

Along with the statistical increase in school bullying, it should be noted that the format of school bullying is changing. While off-line school bullying directly causing on-site damage such as physical violence is stagnant, cyber bullying causing emotional and social harm through the Internet and/or smartphones has been increasing. According to the 2018 Cyber Bullying Survey by the Korea Communications Commission and the Korea Internet & Security Agency, 20.8% of Korean adolescence conducted cyber bullying perpetration or experienced bullying victimization[6]. These rates are 4.3% and 3.4% higher than those of last year, respectively. Unlike offline school bullying, the impact of cyber bullying can be very large and broad in that it is not subject to time and space constraints. Considering these results, the Korean government’s multifaceted efforts for decreasing school bullying are now in doubt.

The consequences of school bullying victimization are very serious. Not only do victims experience emotional problems such as depression and anxiety[7], they also cause various learning problems such as deterioration of learning ability and poor academic achievement[8]. And, many victims suffer from social problems like poor friendships and maladjustment in school life[9]. If repeated, there is possibility that victims make extreme choices, such as suicide[10]. Given this, school bullying need more systematic prevention and guidance than any other problems. In order to effectively prevent school bullying, it is most important to understand what are the causes of school bullying and the substantial paths through which those causes influence school bullying. In that sense, current research studies need to be focused indicating that child maltreatment including parental neglect and emotional problems such as ADHD symptoms or anger could give a negative impacts to school bullying directly and indirectly.

Previous studies have shown that child maltreatment including parental neglect could cause offline school bullying as well as cyber bullying victimization and perpetration[11][12][13], and can lead to emotional problems such as ADHD and anger[14][15][16][17]. Furthermore, some researchers have found that emotional problems such as ADHD symptoms and anger could increase offline school bullying and cyber bullying victimization and perpetration[18][19][20][21]. Considering these studies, there is sufficient possibility that a structural relationship among child maltreatment including neglect, offline school bullying, cyber bullying, ADHD symptoms and anger exist. And, this structural relationship can provide important information and insights regarding how to prevent and intervene school bullying.

However, although these research studies have shown the relationships between parental neglect, school bullying, cyber bullying, ADHD symptoms and anger, most of them has focused only on simple relationship or mediation between those variables. It is difficult to find the research that analyzes the systematic structure among parental neglect, school bullying, cyber bullying, ADHD symptoms and anger. In particular, there are few studies that analyze specific paths through which parental neglect influence offline school bullying by mediating of cyber
bullying and emotional variables such as ADHD symptoms and anger. Therefore, this study investigates the structural relationships among parental neglect, school bullying, cyber bullying, ADHD symptoms and anger, and examines the specific paths through which parental neglect influences school bullying in this structural relationship.

2. Theoretical Background

2.1. Parental neglect, offline school bullying, cyber bullying

Parental neglect is the behaviors of a parent not to provide the basic protection or support that a child should receive in order to achieve normal physical, emotional and social development, but to abandon his/her responsibility[22]. The Child Welfare Act classifies parental neglect as a type of child maltreatment, along with physical, mental, and sexual harassment of children[23]. Recently, child abuse including neglect from parents has been steadily increasing in Korea[24]. One of the main reasons for this increase is the collapse of family. According to the Statistics Korea, the divorce rate of Korean households has been rapidly increasing[25]. The breakdown of the family may lead to neglect of the children.

The negative impact of child maltreatment including parental neglect on children may vary, but recent studies have consistently demonstrated that child maltreatment is closely related to school bullying. School bullying is the aggressive behaviors that one or more school aged children intentionally and repeatedly cause physical, emotional, and social damage to a target[26]. Bullying can be characterized by perpetrator’s intentions, the persistence and repeat of violence, and imbalance of power between the bully and victim.

School bullying usually occurs in two forms, offline school bullying or cyber bullying[27]. Offline school bullying is a traditional form of bullying in which the perpetrator inflicts physical and verbal harm on the victim face to face. On the other hand, cyber bullying refers to psychological and emotional harassment of a target(individual or group) in cyber space by using social network services(SNS) such as messenger, Facebook, Twitter and etc. In Korea, cyber bullying is growing more rapidly than offline school bullying.

Research analyzing family factors on school bullying found that child maltreatment was the main factor that could increase the school bullying[11]. First, child maltreatment including parental neglect was significantly related to rejection and bullying victimization[12]. Researcher found that children who have been maltreated by their parents tended to become an easy target of rejection and bullied by their peer. And, they were less likely to protect themselves when being rejected or bullied[13]. In particular, physical or emotional neglect in childhood was significant impacts not only on offline school bullying, but also on cyber bullying victimization[28].

Second, evidences from research indicated that child maltreatment including parental neglect can cause bullying or violent behaviors. According to the study of Chapple, Tyler, and Bersani[29], children neglected by their parents and rejected by their peer tended to commit school bullying more during their late adolescence. In addition, adolescent who was neglected physically or emotionally in childhood was more likely to be perpetrators of cyber bullying as well as offline school bullying behaviors[28].

Third, research studies analyzing the relationship between offline school bullying and cyber bullying generally agree that the victimization of bullying can lead to bullying perpetration. In details, the victimization of offline school bullying can cause offline school bullying or cyber bullying perpetration[30][31]. Also, the victimization of cyber bullying can cause offline school bullying or cyber bullying perpetration[31][32][33]. Taken these previous research studies together, it can be assumed that parental neglect can cause cyber bullying victimization, and then the cyber bullying victimization caused by parental neglect can produce offline school bullying.
2.2. Parental neglect, ADHD symptoms, anger and school bullying

ADHD is an emotional behavior disorder with attention deficit, hyperactivity and impulsiveness as the main symptoms[34]. ADHD is diagnosed when it is determined that those main symptoms are shown in two or more places for more than six months and have serious negative effects on school or family life[35]. According the research analyzing the relationship between child maltreatment like parental neglect and ADHD symptoms, child maltreatment may increase ADHD symptoms[14][15]. In particular, inattention, which is main symptom of ADHD, was highly correlated with parental neglect[16]. Regarding ADHD symptom and school bullying or cyber bullying, to begin with, evidences from previous research have shown that ADHD symptom were significantly related to offline school bullying. Adolescent with ADHD symptoms were more likely not only to conduct bullying other but also to be victims of bullying[18][36][37]. In particular, children diagnosed with ADHD experience more physical, verbal, and social bullying victimization than those without ADHD[38]. Although relatively small number of research studies have been conducted in terms of the relationship between ADHD symptoms and cyber bullying, the studies discovered that ADHD symptoms also had significant negative effects on cyber bullying victimization and perpetration. Adolescent with ADHD symptoms were more likely not only to be victim but also to be perpetrator of cyber bullying[19][39][40][41].

Child maltreatment also has negative impacts on emotional problems such as anger. When children were maltreated or neglected by their parents, children experienced problems on anger level, understanding anger, or anger expression[17][42][43]. According to the result of previous research analyzing the relationship between anger and school bullying, anger was a very major predictor of not only school bullying, but also cyber bullying[20][21]. Especially, results from previous research showed that anger could mediate the negative effects of child maltreatment on problem behaviors like bullying[44]. Considering these previous research studies together, it can be assumed that parental neglect can increase ADHD symptoms and anger and then those increased ADHD symptoms and anger can cause offline school bullying as well as cyber bullying.

3. Methods

3.1. Hypothetical model

Based on the analysis of previous research, this study established a hypothetical model of the structural relationships among parental neglect, ADHD symptom, anger, cyber bullying victimization, and offline school bullying as shown in <Figure 1>.

Figure 1. Hypothetical model.
3.2. Participants

The participants of this study were 634 students in fourth, fifth, and sixth grade at four elementary schools located in the capital area in Korea. Because the survey employed in this study was responded through self-report, the participants were limited to 4th-6th grade with a minimum level of literacy to read and respond accurately to the survey. The demographic information(gender and grade) of the participants are shown in Table 1.

Table 1. Demographics of participants.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>N</th>
<th>Ratio(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>male</td>
<td>316</td>
<td>49.8</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>316</td>
<td>49.8</td>
</tr>
<tr>
<td>Non response</td>
<td>2</td>
<td></td>
<td>.3</td>
</tr>
<tr>
<td>grade</td>
<td>4th</td>
<td>188</td>
<td>29.7</td>
</tr>
<tr>
<td></td>
<td>5th</td>
<td>213</td>
<td>33.6</td>
</tr>
<tr>
<td></td>
<td>6th</td>
<td>233</td>
<td>36.8</td>
</tr>
</tbody>
</table>

3.3. Measurement

3.3.1. Parental neglect

Parental neglect was assessed using the 4 items of neglect, which were employed in the National Survey of Children and Youth implemented by The Ministry for Health, Welfare and Family Affairs[45]. For each item, the participants were asked to respond on a 4-Likert scale. The higher average of responses indicated higher level of parental neglect. The internal reliability of this measurement analyzed using Chronbach’s α was .602.

3.3.2. Cyber bullying victimization

In order to assess the level of cyber bullying victimization, the part of cyber bullying victimization in the cyber bullying & victimization questionnaire(CBVQ) of Campfield was employed[46]. The survey items were translated to suit Korean elementary school students and the validity of translation was checked by an professor who majored in English. Then two elementary school teachers checked whether or not the level of vocabulary and sentence complexity was appropriate for the elementary school students to respond. The scale was composed of 9 items for self-evaluation using the 5-Likert scale. The higher score of responses meant higher level of cyber bullying victimization. The internal reliability of the cyber bullying victimization scale in this study analyzed using Chronbach’s α was .716.

3.3.3. Offline school bullying

Offline school bullying was assessed using the 6 items of bullying perpetration, which were employed in the National Survey of School Bullying implemented by the Ministry of Education, Science and Technology[47]. Each item was presented in a short sentence form for elementary school students to respond easily. The participants were asked to respond to each item on a 5-Likert scale. The higher score of responses represented higher levels of offline bullying perpetration. The internal reliability of the off-line school bullying scale analyzed using Chronbach’s α was .532.

3.3.4. ADHD symptoms

ADHD symptoms were assessed using Choi’s ADHD symptoms scale[48]. The scale consisted of 18 questions of attention deficit and hyperactivity/impulsiveness, and was designed to be evaluated using the 4-Likert scale. The higher score of responses indicated higher level of ADHD
symptoms. The internal reliability of the ADHD symptoms scale analyzed using Chronbach’s α was .898.

3.3.5. Anger

In order to measure the anger level of the participants, the part of anger expression scale for children (AESC) developed by Steele, Legerski, Nelson, and Phipps was employed [49]. The preparation process for the survey items was the same as that for the items used in cyber bullying victimization. The scale was composed of 10 items for self-evaluation using the 4-Likert scale. The internal reliability of the scale analyzed using Chronbach’s α was .906.

3.4. Data collection

The data were collected through the following process. First, four elementary schools which agreed to participate in the study were selected by the convenience sampling. Second, surveys were mailed to a head teacher or vice-principal at each school by the researcher of this study. Third, at each school level, the head teachers or vice-principals distributed surveys to teachers who were in charge of each class. Fourth, the teacher in charge of each class distributed and collected surveys to his/her students. Fifth, the head teachers or vice-principals of the schools collected all the surveys from teachers and mailed them to the researcher of this study. Of the total 639 surveys returned to the researcher, 5 surveys were excluded due to incorrect or incomplete responses (e.g., all responses to the same number, non-responded more than two scales, etc.).

3.5. Data analysis

The collected data were analyzed using the structural equation model. The analysis procedure was as follows. First, correlation and descriptive analyzes were conducted to determine if there was a problem of multicollinearity of the measured variables. Second, the hypothetical model was modified based on the effect analysis and a fitness analysis was conducted to verify whether or not the modified model was acceptable. Third, direct effects between variables in the modified model were analyzed. Lastly, mediating effects of ADHD symptoms, cyber bullying victimization, and anger on the influence of parental neglect on offline school bullying were examined. To analyze multiple mediating effects, bootstrapping was performed after each path from parental neglect to offline school bullying was constructed with phantom variables.

4. Results

4.1. Descriptive statistics and correlation of variables

Correlation between the measured variables showed that all the variables had a significant positive correlation. In details, parental neglect was found to have a positive relationship with ADHD symptoms ($r = .209 \ p < .01$), anger ($r = .260 \ p < .01$), cyberbullying ($r = .127 \ p < .01$), and school violence ($r = .174 \ p < .01$). ADHD symptoms were also positively correlated with anger ($r = .677 \ p < .01$), cyberbullying ($r = .157 \ p < .01$), and school violence ($r = .179 \ p < .01$). Anger was also positively correlated with cyberbullying ($r = .217 \ p < .01$) and school violence ($r = .233 \ p < .01$), and cyberbullying was positively correlated with school violence ($r = .222 \ p < .01$). As a result of examining the correlation coefficient, VIF and Tolerance, the correlation coefficients were less than .70, the VIF values were less than 2 and the tolerance limits were larger than .5. It showed that the problem of multicollinearity did not occur.
Table 2. Descriptive statistics and correlation of variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parental neglect</th>
<th>ADHD symptoms</th>
<th>Anger</th>
<th>Cyber bullying victimization</th>
<th>Offline school bullying</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD symptoms</td>
<td>.209**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>.260**</td>
<td>.677**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyber bullying victimization</td>
<td>.127**</td>
<td>.157**</td>
<td>.217**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offline school bullying</td>
<td>.174**</td>
<td>.179**</td>
<td>.233**</td>
<td>.222**</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1.044</td>
<td>1.818</td>
<td>1.783</td>
<td>1.110</td>
<td>1.099</td>
</tr>
<tr>
<td>SD</td>
<td>.179</td>
<td>.496</td>
<td>.619</td>
<td>.214</td>
<td>.213</td>
</tr>
</tbody>
</table>

Note: **p<.01

4.2. Fitness of modified model

According to the result of effect analysis between the variables of the hypothetical model established through theoretical background, all direct effects except ADHD tendency → offline school bullying were found to be significant. Thus, ADHD tendency → offline school bullying was removed from the hypothetical model. As a result of fitness analysis of the modified model, \( \chi^2(1) = .357, p > .05 \) was found to be acceptable as shown in Table 3. The other fit indices (GFI, AGFI, RFI, RMSEA) were also appropriate levels. Thus, the modified model was accepted as the final research model.

Table 3. Fit index of modified model.

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p</th>
<th>GFI</th>
<th>AGFI</th>
<th>RFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Model</td>
<td>.357</td>
<td>1</td>
<td>.550</td>
<td>1.000</td>
<td>.997</td>
<td>.993</td>
<td>.000</td>
</tr>
</tbody>
</table>

4.3. Effect analysis between variables

According to the results of effect analysis between the variables, as shown in Table 4, all direct effects of the variables in modified model were significant as the followings: parental neglect → ADHD symptoms (\( \beta = .209, t = 5.367 \)), parental neglect → cyber bullying victimization (\( \beta = .099, t = 2.470 \)), parental neglect → anger (\( \beta = .114, t = 3.884 \)), parental neglect → offline school bullying (\( \beta = .109, t = 2.770 \)), ADHD symptoms → cyber bullying victimization (\( \beta = .136, t = 3.405 \)), ADHD symptoms → anger (\( \beta = .637, t = 21.610 \)), cyber bullying victimization → anger (\( \beta = .103, t = 3.539 \)), cyber bullying victimization → offline school bullying (\( \beta = .172, t = 4.421 \)), anger → offline school bullying (\( \beta = .167, t = 4.191 \)). The results indicated that parental neglect of elementary school students could influence ADHD symptoms, cyber bullying victimization, anger, and offline school bullying. Similarly, ADHD symptoms increased cyber bullying victimization, anger, and offline school bullying, and cyber bullying victimization increased anger and offline school bullying. The standardized regression weight between the variables in the modified model are shown in Figure 2.

Table 4. Direct effect between variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate</th>
<th>Standardized regression weight (( \beta ))</th>
<th>SD</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental neglect → ADHD symptoms</td>
<td>.581</td>
<td>.209</td>
<td>.108</td>
<td>5.367***</td>
</tr>
<tr>
<td>Parental neglect → Cyber bullying victimization</td>
<td>.119</td>
<td>.099</td>
<td>.048</td>
<td>2.470*</td>
</tr>
<tr>
<td>Parental neglect → Anger</td>
<td>.396</td>
<td>.114</td>
<td>.102</td>
<td>3.884***</td>
</tr>
</tbody>
</table>
4.4. Examination of mediating effects

The mediating effects of ADHD symptoms, cyber bullying victimization, and anger on the influence of parental neglect on offline school bullying were examined. To analyze the effects of multiple mediation, bootstrapping was performed after each path from parental neglect to offline bullying was set using phantom variables. As a result of analysis, the four paths were statistically significant at 95% confidence level. In details, parental neglect → cyber bullying victimization → offline school bullying (b = .020, p = .045), parental neglect → anger → offline school bullying (b = .023, p = .004), parental neglect → cyber bullying victimization → anger → offline school bullying (b = .002, p = .019), and parental neglect → ADHD symptoms → anger → offline school bullying (b = .027, p = .002) were significant as shown in Table 5.

Table 5. Indirect effect of parental neglect on offline school bullying.

<table>
<thead>
<tr>
<th>Path</th>
<th>Estimate</th>
<th>P</th>
<th>95% Bia corrected CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental neglect → Cyber bullying victimization</td>
<td>.020</td>
<td>.045</td>
<td>.003 – .062</td>
</tr>
<tr>
<td>Parental neglect → Anger → Offline bullying</td>
<td>.023</td>
<td>.004</td>
<td>.012 – .045</td>
</tr>
</tbody>
</table>
5. Discussion

The results of this study showed that parental neglect could increase offline school bullying directly and indirectly. Particularly, four indirect paths from parental neglect to offline school bullying by mediating ADHD symptoms, cyber bullying, and anger were identified. Discussion regarding the results of the study is as follows.

5.1. Direct effects of parental neglect on offline school bullying

According to the results, parental neglect increased offline bullying directly. This finding is consistent with previous studies showing the child maltreatment including parental neglect could give negative impacts on offline school bullying[11][12][13][28]. The following explanation can be made about how parental neglect leads to offline school bullying. First, it may be caused by the absence of discipline from parents on moral and social norms preventing problem behaviors such as school bullying. In fact, parents’ discipline at home is essential for the acquisition of the social norms and moral rules for elementary school students[50]. However, students who are neglected by their parents may not have the sufficient opportunity to acquire those social norms and moral rules. As a result, they may not recognize well that they should not engage in harming others such as offline school bullying. Second, it is possible that offline school bullying repeatedly occur by parental neglect. In the case of school bullying, how parents respond to the initial outbreak will further determine whether an additional bullying occurs or not. In this regard, similar offline school bullying may occur repeatedly in neglected children due to the lack of proper parental involvement in initial stage. The previous research studies showing that parental involvement is one of the most effective variables in preventing school bullying support this explanation[51][52].

5.2. Indirect effects of parental neglect on offline bullying perpetration

Results indicated that parental neglect increased offline bullying indirectly. In details, four indirect paths from parental neglect to offline school bullying were identified. First, parental neglect increased offline school bullying through cyber bullying victimization. Parental neglect increased the cyber bullying victimization and the increased victimization augmented offline school bullying. This finding is in line with previous studies showing that parental neglect could increase cyber bullying victimization and offline school bullying[28][29], and at the same time, it provides a more systematic view of the structural relationships among these variables. The following explanation may be possible regarding this path.

First of all, due to parental neglect, elementary school students are more likely to be exposed to cyber environments such as smartphones or Internet games and this exposure could cause cyber bullying victimization. Currently as smartphones spread rapidly, youth smartphone or internet addiction is becoming a social problem in Korea[53]. In particular, elementary school students who have not fully developed their self-regulation ability are more likely to be addicted to smartphones or Internet games unless they are properly guided by their parents. In this regard, elementary school students who are neglected by their parents may be more likely to experience cyber bullying victimization by being exposed to the cyber environment through smartphones or Internet games. The findings from previous studies showing that smartphone or Internet use time are associated with cyber bullying victimization support this explanation[54][55][56].
Once cyber bullying victimization occurs by parental neglect, it can be explained by Akers’ social learning theory regarding how cyber bullying victimization can lead to offline school bullying[57]. According to the theory of social learning, violent behavior like offline school bullying can be learned through the experience of another violent behavior. It means that the more neglected students are exposed to violent behaviors like school bullying, the more easily they learn regarding school bullying. From the perspective of social learning theory, the results of this study can be interpreted that elementary school students learn about bullying through cyber bullying victimization and they engage in similar bullying easily when encountering subjects with lower power hierarchies than themselves.

Second, the result indicates that parental neglect increased offline bullying through anger. Parental neglect raises anger and that the raised anger augments offline school bullying. This finding is consistent with previous studies showing that parental neglect can increase anger and offline school bullying[20][21], and also provides a more systematic view of the structural relationships among these variables. The path leading parental neglect to offline school bullying through anger can be explained by Agnew’s general strain theory[58]. General strain theory argues that juvenile delinquency is a way to relieve the tension experienced by negative stimuli from the outside. From the perspective of general strain theory, the results of this study can be interpreted that if elementary school students experience negative stimuli like neglect, they may experience tension and anger, and commit offline school bullying in order to release them.

Third, the result showed that parental neglect increased offline school bullying by multi-mediating cyber bullying victimization and anger. After parental neglect increased cyber bullying victimization, increased cyber bullying victimization raised anger level. And, this raised anger finally augmented offline school bullying. This finding shows a more systematic representation of the structural relationship among those four variables. The structural relationship can be explained by Agnew’s general strain theory also[58]. It is possible that cyber bullying victimization caused by parental neglect could occur tension and anger from elementary school students and in order to release those tension and anger, they may commit a problem behavior such as offline school bullying.

Fourth, the result indicated that parental neglect increased offline bullying by multi-mediating ADHD symptoms and anger. After parental neglect increased ADHD symptoms, increased ADHD symptoms boosted anger. And, this boosted anger finally triggered offline school bullying. This result is consistent with previous studies showing that parental neglect can increase ADHD symptoms and anger[38][39][40]. At the same time, it provides a more systematic structural relationship among these four variables. Previous research studies investigating how parental neglect affects the brain function of children can provide reasonable explanation about how parental neglect produces ADHD symptoms and anger. According to the study of Teicher, Tomoda and Andersen[59], stress from family such as parental neglect can have a wide range of negative impacts on neurological development of children. In particular, the corpus callosum of brain which plays a key role in self-control by coordinating the left and right hemisphere negatively impacted by the stress. The corpus callosum is closely related to ADHD symptoms and anger control[60][61]. Thus, it is possible that constant and high level stress such as parental neglect can produce ADHD symptoms and anger from elementary school students by giving harmful impacts to their brain. And those ADHD symptoms and anger could finally occur offline bullying by reducing the ability of self-control.

5.3. Limitation

The limitations of this study are as follows. First, there may be a sampling bias. In this study, the participants were selected from four elementary schools in the capital area by convenience sampling rather than random sampling. Therefore, the results of this study may reflect
regional characteristics rather than all elementary school students in Korea. Particularly, cyber bullying or offline school bullying is more likely to be influenced by economic and regional differences such as a city or rural area. Thus, the generalization of the results to other elementary school students in Korea need to be careful. Second, research objectivity may be limited by subjective perceptions of the participants. The data of this study regarding parental neglect, cyber bullying victimization, ADHD symptoms, anger, and offline school bullying were collected based on the subjective perceptions of the participants. Therefore, the level of those variables could be overestimated or underestimated depending on the participants’ perception. Third, there may be limitations on the types of mediating variables. In this study, cyber bullying victimization, ADHD symptoms, and anger were selected as variables mediating parental neglect and offline school bullying. However, parental neglect can cause other types of emotional problems such as depression and anxiety. It is possible that the effects of these mediators are relatively more significant than those of ADHD symptoms and anger. In this case, the paths between parental neglect and offline school bullying violence verified in this study could be changed.

5.4. Conclusion

In this study, one direct and four indirect paths through which parental neglect of elementary school students influenced their offline school bullying were identified. These findings propose that conducting school bullying programs targeting only school bullying itself could be less effective unless considering more fundamental reasons that elementary school students commit school bullying. Furthermore, this study also verified the critical roles of emotional problems such as ADHD symptoms and anger on offline school bullying. It suggests that emotional problems like ADHD symptoms and anger should be considered in developing school bullying intervention programs. Future research will need to identify more regulatory variables that could mitigate the structural relationship between parental neglect and school bullying in order to design more effective school bullying intervention programs.

6. References

6.1. Journal articles


6.2. Thesis degree


6.3. Books


6.4. Additional references

7. Contribution
7.1. Authors contribution

<table>
<thead>
<tr>
<th>Initial name</th>
<th>Contribution</th>
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<tr>
<td>CiO</td>
<td>-Corresponding ☑</td>
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<td></td>
<td>-Play a decisive role in modification ☑</td>
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<td></td>
<td>-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑</td>
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<td>-Participants in Drafting and Revising Papers ☑</td>
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<tr>
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<td>-Someone who can explain all aspects of the paper ☑</td>
</tr>
</tbody>
</table>
7.2. Authors profile

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**Major career**
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