

# Social Interaction Deficits: Difference in Pure and Co-Occurring Reactive and Proactive Aggression

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## ABSTRACT

Research on aggression has focused mainly on the dichotomy of proactive and reactive aggression, but not the co-occurring proactive and reactive aggression subtype, despite its prevalence. The present study investigated the differences between proactive-reactive, proactive and reactive aggression on forgiveness and empathy, and the mediating effect of empathy on aggression to forgiveness in different aggression subtypes. Participants were 1,359 elementary schoolchildren (825 males and 534 females, aged 6 to 11). Results from two one-way analyses of variance showed that proactive-reactive aggressors were the least forgiving and empathetic. Although reactive aggressors were more forgiving and empathetic than proactive aggressors, both aggressive groups were less forgiving and empathetic than non-aggressive students. Additionally, results from multiple regression analyses showed that the mediating effect of empathy on aggression to forgiveness existed in all aggression subtypes. This study contributes by extending research area to co-occurrence of reactive and proactive aggression and characteristics of those students.

**Keywords:** Proactive-reactive aggression; Forgiveness; Empathy; Hong Kong; Elementary schoolchildren

## INTRODUCTION

School bullying has been continuously happening in Hong Kong and this trend is spreading out into elementary schools [1]. With reference to a worldwide survey conducted by Organization for Economic Cooperation and Development [2], the rate of school bullying was the highest in Hong Kong among 72 countries and regions. There were 32.3% of Hong Kong students (i.e., 1,615 of 5,000 students) revealed that they had suffered different forms of school bullying in a month, which was a triple (i.e., 10.7%) and nearly a double (i.e., 18.9%) of those reported in Taiwan and United States [2]. A local study conducted by Wong showed that 22.5% of elementary students admitted enacting physically aggressive behaviors in the past six months. In the meanwhile, 31.7% of children in elementary schools reported being physically bullied [3], which are comparatively higher than those reported in similar studies conducted in the United States (i.e., 10.6%) [4] and the United Kingdom (i.e., 12.5%) [5]. With the intention to safeguard all children's rights against school bullying incidents, extensive research studies have been conducted to identify the underlying causes to and risk factors for childhood

aggression, as well as to examine its developmental trajectories [6].

These earlier researches in the area of aggression very often simply classified participants into bullies or bully-victims [7]. However, researches in past decades have univocally pointed out the multidimensional nature of aggression [8,9]. In fact, numerous researches have suggested distinctions between types of aggression instead of considering aggression as a single construct. Reactive and proactive aggression, in particular, is two functional dimensions that were proven to characterize aggressive behaviors [10].

However, enquiring further to the theoretical distinctions between the two types of aggression, some researchers resolutely support the trichotomous nature rather than the dichotomous nature between proactive and reactive aggression [11,12]. That is, instead of considering proactive aggression and reactive aggression as two distinctive subtypes of aggression, they may be regarded as two aspects of aggression that could co-occur within the same individual [12]. Fite and her colleagues conducted a confirmatory factor analysis (CFA) and results supported the three-factor (i.e., proactive aggression, reactive aggression and co-

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occurrence of both proactive and reactive aggression) model. They argued that researches that overlook the co-occurrence of reactive and proactive aggression are significantly limited in their generalizability [9]. Camodeca, Goossens, Terwogt and Schuengel [13] also attempted to understand proactive and reactive aggression in dimensional terms, and described children who scored high in both proactive and reactive aggression using Dodge and Coie's [8] proactive and reactive aggression questionnaire rated by teachers as "pervasively aggressive". It thus becomes imperative to consider the co-occurrence of proactive and reactive aggression among elementary schoolchildren. Since proactive-reactive aggressors are high in both proactive and reactive aggression scores, it is comprehensible that they share some similarities with reactive and proactive aggressors.

With these in regard, we could hence subdivide aggressive children in various subgroups; namely, pure proactive aggressors, pure reactive aggressors and proactive-reactive aggressors characterized by their co-occurrence of proactive and reactive aggression. The current study attempted to investigate the association among forgiveness and empathy across aggression subtypes and to clarify the mediating effect of empathy on aggression to forgiveness in different aggression subtypes among elementary schoolchildren.

### Functional differences

Researches point to differences among proactive and reactive aggression in their underlying purposes [8]. Proactive aggression is enacted as an instrumental means to acquire external reinforcements or rewards (e.g. material or territorial gain or social dominance), while reactive aggression is regarded as aggressive behaviors stemmed from rages and impulsivity [14]. Proactive aggression typically involves bullying others in an organized, rational and instrumental fashion, without being empathetic of the victims [15]. More specifically, proactive aggression is motivated by the belief in social effectiveness of aggression, which instrumental goals can be effectively attained through the use of aggressive behaviors [16]. Proactive aggressors' over-optimistic attitude on aggression can be explained by social learning theory that expectations on the positive outcomes for aggressive behaviors are likely to be reinforced by past successful experiences [16]. In contrast, reactive aggression typically occurs as a fear-induced defensive response that revolve around a hostile attributional bias in external situations, even though the situations are benign or ambiguous [17]. It can be elucidated by the frustration-aggression model that aggression is a response of perceived threats [18]. Thus, reactive aggression is driven by frustration and anger, whereas proactive aggression is driven by external rewards and reinforcements.

### Social cognitive differences

Significant differences on social cognitive aspect have also highlighted among these subtypes [19]. The social information processing (SIP) model [14] underlines the rationale of reactive and proactive aggression, as well as explains the distinctive natures and characteristics of these two types of aggression [19]. Basically, SIP model suggests that response to environmental

stimuli includes six sequential mental processing steps [14]; they are

The cognitive distortions (i.e., social information deficits and biases) among reactive and proactive aggressors occur during different steps of the SIP model. Specifically, reactive aggressors are associated with deficits in early stages (i.e., steps 1 and 2) of SIP model, for example encoding the social cues related to threats selectively and generating distorted hostile bias in relation to the provocation situations [20]. Unlike the reactive counterpart, proactive aggressors experience no deficits in steps 1 and 2, however, they are often related to deficits in later stages (i.e., steps 3, 4 and 5) of SIP model [21]. It is worth noting that proactive aggressors tend to prioritize instrumental goals over social relational goals, and hold a positive view of the usefulness of aggressive tactics and its outcomes [21].

### Emotional differences

In addition, proactive and reactive aggression might differ in emotional aspect. For example, Bettencourt, Talley, Benjamin and Valentine [22] reported that reactive aggressors were poor in emotion regulation, whereas proactive aggressors were extraordinary good in regulating their emotions. Fung and her colleagues extended this work by showing that impulsivity was an unique predictive trait for reactive aggressors [10]. More specifically, reactive aggressors are relatively weak at inhibiting their instinctive responses while objectively evaluating environmental circumstances before making the most appropriate decisions [14]. A meta analysis conducted by Card and Little also confirmed that reactive aggressors have emotional dysregulation, whereas proactive aggressors show no problem in this aspect [23]. With this in regard, emotional dysregulation has been frequently reported as a typical characteristic that distinguishes reactive aggressors, proactive aggressors and socially adjusted students [23].

### Differences in sociability

Apart from the social cognitive and emotional aspects, recent investigations have suggested that proactive and reactive aggressors might also differ in sociability [24]. Fonaine found that reactive aggressors were hot-tempered, and they were less able to control themselves when they were provoked by others [25]. Hence, they are unwelcome among their peer groups [11] and are prone to greater level of peer rejection and social exclusion victimization [26]. Abundant evidences support that reactive aggressors have elevated social anxiety and loneliness [27]. Conversely, proactive aggressors were reported to have more friends as they showed leadership charisma and a sense of humor [28]. Day and his colleagues argued that proactive aggressors also acquire better problem-solving and social interaction skills [11]. Although proactive aggressors did not exhibit distinctively better sociability or social acceptance compared with socially adjusted students, they were more socially adaptive [23] and were relatively less rejected by their peers [29] compared with their reactive counterpart.

## Forgiveness and aggression

Thus, the literature supports the notion that reactive and proactive aggression might involve distinct social cognitive processes, as well as emotional regulation and social interaction abilities. A construct that is particularly informative yet understudied in this area is forgiveness. Forgiveness plays an important role in interpersonal relationships, and it entails multidimensional (e.g. cognitive, emotional and social) efforts to deal with the arisen interpersonal stress [30]. According to Worthington and Scherer [31], forgiveness is a response to interpersonal transgressions, which the victims hold a proactive choice of whether or not to employ this coping response. Forgiveness is not forgetting the offence and not reconciling with the offender, but rather addressing the affective, cognitive and behavioral effects of the offense [32]. Transformations may occur within the victims who choose to forgive [31]. Specifically, negative feelings, thoughts and judgement may cease, in the meanwhile, constructive behaviors toward the offender may also increase [31]. McCullough, Hoyt and Rachal [33] describe forgiveness as involves two aspects: Internal and External.

The former refers to the intrapersonal transformation of emotion and cognition, whereas the latter refers to the expression of prosocial behaviors in an interpersonal context.

In response to interpersonal offense, victims normally experience a series of negative emotions, including anger, hostility, fear and anxiety [34]. These negative emotions are often released by taking revenge, demanding an apology or excusing the hurt or denying and avoiding [31]. Research suggests that the process a victim goes through to forgive an offender may diminish the negative emotional and cognitive effects on him or her by replacing with more positive one, subsequently the use of maladaptive responses may be negated.

To the best of our knowledge, Dinic and Raine's study is the only one that attempted to investigate the relationship between reactive and proactive aggression, and forgiveness. Dinic and Raine highlight that both reactive and proactive aggression are negatively correlated with forgiveness even though these two are associated with different personality. Regarding the HEXACO model of personality (i.e., honesty-humility, emotionality, extraversion, agreeableness, conscientiousness and openness), Dinic and Raine showed that agreeableness is more negatively correlated to reactive aggression, which corresponds to immediate retaliation or displaced aggression, whereas honesty-humility is more negatively correlated to proactive aggression, which corresponds to premeditated and instrumental aggression. In addition, reactive aggression is associated with emotional dysregulation and adjustment problems (e.g. depression and anxiety), whereas proactive aggression is associated with externalizing behaviors and antisocial behaviors. With respect to these personalities and personal attributes, both reactive and proactive aggressors showed a high tendency to response to interpersonal offense by using aggressive behaviour. They found that these two types of aggressors were negatively correlated with the absence of negative and presence of positive affective, cognitive and behavioral responses to wrongdoing. However, the comparison of the level of forgiveness across

aggression subtypes is still remain unclear. Hence, the present study aimed to fill this research gap [35].

## Forgiveness and empathy

In the social psychological determinative model of forgiveness, empathy is designated to be the determinant (i.e., most prominent psychological variable) of forgiveness [36]. Forgiveness therapies emphasize that the ability to forgive is closely associated with the ability to empathize with others, that is, the victims have to be able to empathize so that to overcome any negative impacts experienced [37]. The primary emotional experience prerequisite for the initiation of forgiveness is the establishment of empathy, given that forgiveness is initiated principally by emotion [38]. It was reported that individuals with lower empathetic ability, for example, narcissists and antisocial personality disorder patients cannot establish the empathy required forgiving, and therefore they rarely forgive the offender when an offensive incident happens [36]. Given that both reactive and proactive aggressors are low in empathy [39], it is therefore, of great interest to study the mediating effect of empathy on aggression to forgiveness in different types of aggressors. It was speculated that the mediating effect would exist in both reactively and proactively aggressive elementary schoolchildren. To the author's knowledge, the present study has pioneered into the examination of this mediating effect in the area of reactive and proactive aggression.

## Empathy and aggression

Empathy, as an multidimensional construct, entails both emotional and cognitive aspects [40]. It is defined as understanding other's perception, feeling and experience without communicating his or her understanding concisely to that person [41]. Feshbach explains empathy as involving three components [42]:

With the interaction of cognitive and affective empathy, it contributes to the perception of empathetic arousal and the development of empathetic experience in our everyday lives [42]. A lack of empathy was discovered in proactive aggressors as they tended to choose instrumental goals over social relation goals [8]. In addition, the tendency for proactive aggressors to display aggressive behaviour has been found to be heightened owing to aggressors' callous-unemotional traits; characterized by their lack of guilt, remorse and empathy [43]. Proactive aggressors believe it is justifiable to exploit the weak for the pursue of instrumental goals, whereas reactive aggressors do not hold such belief [39]. Given these findings, it was speculated that proactive aggressive elementary schoolchildren would have lower cognitive and affective empathy skills than reactively aggressive students and both aggressive groups would have lower cognitive and affective empathy skills than non-aggressive students.

## Overview of the study

To date, most research studies on reactive and proactive aggression have been conducted in the Western context [44]. It is of great importance to examine whether these findings are applicable to diverse cultural settings or they are specifically applicable to Western population.

Aggressive behavior is intolerable in traditional Chinese value system, given that it destroys social harmony and hinders social functioning [45]. Thus, it is highly prohibited in school settings. Aggressive Chinese children are being labeled as “naughty kids” and they are severely punished by school personnel. These children usually face difficulties in forming relationship with peers as well as experience school maladjustment [46]. Compared with aggressive Western children (i.e., in United States) who develop biased self-perception [47], aggressive Chinese children perceive themselves negatively and experience more intensive depression [48]. It is predicted that the outcomes associated with aggression may be universal, nonetheless, the consequences that Chinese children face may be worse [46]. In a society that sanctions aggression regardless of subtypes and views aggression negatively raise the question as to whether the findings on reactive and proactive aggression from Western settings are applicable to Hong Kong children.

Despite intensive researches that examined the comparative differences between proactive and reactive aggression, Raine and his colleagues [17] have pointed out that not many researches aim at exploring the heterogeneity of aggression. Therefore, this study adapted a more precise taxonomy of aggression to investigate the characteristics of reactive aggression, proactive aggression, and proactive-reactive aggression in Chinese elementary schoolchildren aged 6 to 11. A control group (i.e., students who score low in both reactive and proactive aggression scales) was also included as a baseline.

We have pioneered into the investigation of forgiveness across aggression subtypes and the mediating effect of empathy on aggression to forgiveness in different aggression subtypes, and examined the association of empathy across aggression subtypes. Since proactive-reactive aggressors are students scored high on both reactive and proactive aggression scales, they are supposed to be the most aggressive children. We anticipated their levels of forgiveness and empathy are the lowest among the four groups. No hypothesis is proposed concerning the comparison of forgiveness and empathy across aggressive subtypes because of the dearth of literature on these groups; except that, based on Dodge and Coie’s work [8], proactively aggressive elementary schoolchildren were anticipated to have lower levels of cognitive and affective empathy than reactively aggressive students and both aggressive groups were anticipated to have lower level of cognitive and affective empathy than non-aggressive students. Additionally, the mediating effect of empathy on aggression to forgiveness was anticipated to exist in all three types of aggressors.

### Significance of the study

Childhood aggression is widely recognized as predisposing to both significant psychological health problems as well as to criminality in adulthood. Researchers found that 17.7% of reactive aggressors [49] and 12.5% of proactive aggressors [27] have depression. Reactive aggressors are more likely to commit crimes like arson, stealing and manslaughter either impulsively or in retaliation in adulthood [50]. They are also more likely to join triad societies [51]. On the other hand, proactive aggressors usually have a criminal history before their thirties [52], and are

more likely to commit murder [53]. Both of these adult outcomes cast an enormous burden on society in terms of financial costs and reduced occupational functioning, social functioning, and quality of life for both victims and perpetrators.

Although previous studies have shown that reactive and proactive aggression may develop as early as 4.4 and 6.8 years old respectively [26], very few interventions target for these young aggressive children based on the reactive-proactive aggression model [24]. It is hoped that this study may allow us to thoroughly understand the differences in forgiveness and empathy between aggression subtypes, as well as the mediating effect of empathy on aggression to forgiveness in different aggression subtypes. Hence, help researchers and school personnel to design suitable programmes for the children at risk of developing aggressive behavior, so that these children could gain access to early intervention easily without being labeled as “naughty”.

Our empirical findings may shed light on the design of future forgiveness and empathy interventions to combat reactive and proactive aggression among elementary schoolchildren. At an education level, these interventions are anticipated to enhance teaching efficacy in schools - improved discipline during class-time and more harmonious school atmosphere. Specifically, these interventions are expected to constitute an important turning point in the lives of young high-risk schoolchildren of developing reactive and proactive aggression, before antisocial behavior is crystallized. It will also have significant long-term positive consequences of ultimately reducing the occurrence of crimes such as homicide, family violence and triad activities. As a result, the financial and social costs of penalized delinquency and the pressure on prisons may be considerably reduced.

## RESEARCH METHODOLOGY

### Participants

Participants were 1,359 students between the ages of 6 and 11 years ( $M=8.24$ ,  $SD=1.17$ ), all from 6 state primary schools in Hong Kong. Sixty-one percent of the participants were male, ( $n=825$ ), and 39% ( $n=534$ ) were female. Students were in elementary 1 to elementary 6 (equivalent to grade 1 to grade 6 in US systems).

### Procedure

Ethical approval was obtained from the ethics committee of Hong Kong Shue Yan University. Six state elementary schools in Hong Kong were selected, based on their representativeness to the general population in terms of geographical locations, academic level, socioeconomic status, demographics, and religion. They are located in wide-ranging areas in Hong Kong, including Teun Man, Tin Shui Wai, Sha Tin, Wong Tai Sin, Tseung Kwan O and Hong Kong Island.

Written consent was obtained from all the parents or guardians of the students who expressed their willingness to participate. Before the study started, students were informed of its purpose and they were told their participation was voluntary and that

they could discontinue with the study at any time with no consequences. The student questionnaire was distributed in paper form, where the students complete the questionnaire in a classroom setting over the course of 30 minutes on average. A total of 3,235 students (1,898 males and 1,416 females) completed the questionnaire.

## Instruments

**Reactive-Proactive Aggression Questionnaire (RPQ) [17]:** The RPQ is a scale developed to measure children's self perceived level of reactive and proactive aggression. It consists of 23 behavioral items rated on a 3-point scale (i.e., 0="never", 1="sometimes", 2="often"); with 11 items assess reactive aggression (e.g. "Got angry or mad or hit others when teased"; "Reacted angrily when provoked by others"; "Felt better after hitting or yelling at someone") and 12 items assess proactive aggression (e.g. "Had fights with others to show who was on top"; "Vandalized something for fun"; "Used physical force to get others to do what you want"). Ratings are summed to yield a total aggression score, a reactive aggression score and a proactive aggression score.

The Chinese version of RPQ (C-RPQ) [10] was used. The C-RPQ has a strong internal consistency in Chinese elementary schoolchildren, and has previously been reported as .89 for proactive aggression, .88 for reactive aggression and .83 for total aggression [10]. Additionally, the construct, convergent, criterion and discriminant validity of the C-RPQ has been demonstrated with a sample of Hong Kong school students [10].

**Enright Forgiveness Inventory (EFI) [54]:** Participants are asked to recall a recent incident that they were hurt by an offender and then answer questions about how they currently feel about (e.g. "I feel warm toward him/her"; "I feel hostile toward him/her"), act toward (e.g. "Regarding the person, I do or would show friendship"; "Regarding the person, I do or would neglect") and think about (e.g. "I think he/she is worthy of respect"; "I think he/she is evil") the offender. Three domains of forgiveness: namely affect, behavior and cognition are measured, and both positive and negative items are included in each domain. The scale consists of 60 items, and each domain comprises 20 items. Each item is rated on a 6-point Likert scale from 1 (i.e., strongly disagree) to 6 (i.e., strongly agree). Responses to EFI items are summed (i.e., negative items are reversed scored) to create an affect score, a behavior score and a cognition score. A total forgiveness score is also created by summing up the above three scores, resulting in total scores ranging from 60 (i.e., indicate a low degree of forgiveness) to 360 (i.e., indicate a high degree of forgiveness). A higher score indicates a respondent is more forgiving.

The EFI also includes a 5-item pseudo-forgiveness scale places with the same 6-point Likert scale, responses on this scale are separated from the first 60 items. It assesses the instances of condoning, excusing and denying (e.g. "There really was no problem now that I think about it"; "The person was not wrong in what he/she did to me"). According to the rule of thumb for interpreting the response of EFI [55], responses of individuals who scored 20 or higher on the pseudo-forgiveness scale (i.e., a cutoff of 20) are removed from further analysis, because the

respondents are not showing genuine forgiveness. The EFI concludes with a 1-item construct validation question assessing the extent to which the respondent has forgiven the offender. It is rated on a 5-point Likert scale from 0 (i.e., not at all) to 5 (i.e., complete forgiveness).

In the present study, we used the Taiwan Chinese version of EFI [56] that had been previously adopted in Hong Kong [30]. High internal consistency of the Taiwan Chinese version was reported; Cronbach's alpha of .98 for EFI total, .95 for affect subscale, .93 for behaviour subscale and .96 for cognition subscale [30].

**Interpersonal Reactivity Index (IRI) [57]:** The IRI has been widely used as a self-report measure of empathy in many studies concerning aggressive behavior [39]. It contains 4 subscales; each with 7 items and a total of 28 items are measured. The four subscales are namely: perspective taking (PT), fantasy (FS), empathetic concern (EC) and personal distress (PD). The PT subscale examines one's ability of taking the view point of others (e.g. "I sometimes find it difficult to see things from the "other guy's" point of view"); the FS subscale examines one's ability of putting oneself into the feelings and actions of fictional characters in movies or novels (e.g. "I really get involved with the feelings of the characters in a novel"); the EC subscale assesses the tendency of feeling sympathy for other's unfortunate (e.g. "I often have tender, concerned feelings for people less fortunate than me"); and the PD subscale assesses the tendency of feeling personal anxiety and unease upon some tense interpersonal situations (e.g. "In emergency situations, I feel apprehensive and ill-at-ease"). Each item is rated on a 5-point Likert scale from 1 (i.e., extremely uncharacteristic of me) to 5 (i.e., extremely characteristic of me). A total score of 28 can be obtained for each subscale, and a higher score in a subscale represents a higher functioning in each aspect of empathy.

Satisfactory internal and test-retest reliability in all four IRI subscales were yielded [40]. Confirmatory factor analysis (CFA) indicated a significant fit for a four-factor model. Additionally, inter-correlations among responses to the subscales were weak ( $r$  ranged from .07 to .33), which indicated that different constructs are measured by these subscales. The convergent validity of the Chinese version of IRI (C-IRI) employed in this current study is supported by previous studies, through examining the relationships between responses to the C-IRI subscales and other psychological and empathy measures [39].

## Classification criteria

Students were classified into four categories; namely, reactive aggressor, proactive aggressor, proactive-reactive aggressor and non-aggressor (i.e., control), based on their scores on the RPQ-Proactive Aggression (RPQ-P) and RPQ-Reactive Aggression (RPQ-R) subscales. The grouping criterion of one standard deviation (SD) was adopted from previous studies [58] and it was employed to distinguish each type of elementary schoolchildren. Hanish and Guerra [58] argued that most studies in this area have employed criteria ranging from .5 to 1 SD. The more stringent criteria were embraced and was thus adopted in this study. Students scored +1 SD above the mean on RPQ-P and scored below the mean on RPQ-R were labeled as proactive

aggressors. Similarly, students with RPQ-R score +1 SD above the mean and RPQ-P score below the mean were labeled as reactive aggressors. Whereas, proactive-reactive aggressors were students who scored at +1 SD on both RPQ-P and RPQ-R. Lastly, non-aggressors were those who scored -1 SD below the mean for both RPQ-P and RPQ-R.

Based on the above criteria, 1,359 elementary schoolchildren were retained for the analyses, and they were divided into four target groups. Of these persons, 163 (12%) were categorized as proactive-reactive aggressors, 41 (3%) were categorized as

proactive aggressors, 123 (9%) were categorized as reactive aggressors and 1,032 (76%) were categorized as non-aggressive. The remaining 1,876 students did not fall into any of the predetermined aggression subtypes, and their responses were excluded from further analyses. These students were, on average, 8.29 years old (SD=1.21); 53% of them were male (n=994), and 47% were female (n=882).

The relative proportion of retained students in each group was consistent with previous studies [59,60,61] (Table 1).

**Table 1:** Proportion of aggressive schoolchildren in current and previous studies.

Parameters	Groups			
	Proactive-Reactive %	Proactive%	Reactive %	Non-aggressive %
Current study	12	3	9	76
Chan, Fung, & Gerstein, (2013)	19	3	11	66
Dodge, Laird, Lochman, Zelli, & Conduct Problems Prevention Research Group, (2002)	11	3	7	79
Vitaro, Brendgen, & Tremblay, (2002)	10	3	7	81

Specifically, proactive-reactive aggressors comprised the largest group (i.e., 12%) among the three types of aggressors; followed by pure reactive aggressors (i.e., 9%) and pure proactive

aggressors (i.e., 3%). Demographic characteristics of the four target groups are shown in Table 2.

**Table 2:** Demographic information.

Gender	Groups				
	Proactive-Reactive (n=163)	Proactive (n=41)	Reactive (n=123)	Non-aggressive (n=1,032)	Excluded (n=1,876)
Boys, n (%)	129 (79)	17 (41)	101 (82)	578 (56)	994 (53)
Girls, n (%)	34 (21)	24 (59)	22 (18)	454 (44)	882 (47)
Age					
Mean	8.41	8.32	8.09	8.21	8.29
SD	1.18	1.16	1.03	1.19	1.21

**Data analysis**

Two one-way analyses of variance (ANOVAs) were conducted to assess the main effect of types of aggressors on level of forgiveness and empathy. Types of aggressors served as the independent variable (IV), whereas students’ self-reported forgiveness and empathy were the dependent variables (DVs). Post-hoc comparisons using Tukey HSD test were conducted to assess the differences in forgiveness and empathy between different types of aggressors. Additionally, multiple regression analyses were also conducted to assess the mediating effect of empathy on aggression to forgiveness in different types of aggressors.

All of the analyses were conducted using version 20 of SPSS statistics.

**RESULTS**

**One-way analyses of variance**

To examine the hypothesis that types of aggressors would differ on the level of forgiveness and empathy, two one-way ANCOVA were performed on 2 DVs respectively: EFI forgiveness scores (i.e., including affect, behaviour, cognition, total forgiveness and 1-item forgiveness) and IRI empathy scores (i.e., including

perspective taking, fantasy, empathetic concern, personal distress and total empathy). Again, the type of aggressors was entered as the IV. The results of this study supported our hypothesis.

There was a statistically significant difference between groups on EFI affect score ( $F(3, 1355)=7307.90, p < .05$ ), behaviour score ( $F(3, 1355)=8880.60, p < .05$ ), cognition score ( $F(3, 1355)=8698.92, p < .05$ ), the total score ( $F(3, 1355)=9147.36, p < .05$ ) and the 1-item forgiveness score ( $F(3, 1355)=891.00, p < .05$ ) as determined by one-way ANOVA. Tukey post-hoc tests

revealed that proactive-reactive aggressors were significantly ( $p < 0.05$ ) less forgiving than reactive aggressors, proactive aggressors and non-aggressive students in terms of all the aforementioned EFI scores (Table 3). Although reactive aggressors scored significantly ( $p < 0.05$ ) higher than proactive aggressors on all the EFI subscales, both aggressive groups scored significantly ( $p < 0.05$ ) lower than non-aggressive students (Table 3).

**Table 3:** Mean and standard deviation of aggression subtypes for enright forgiveness inventory.

Mean Differences					
EFI	Mean (SD)	Proactive	Reactive	Non-aggressive	F (3, 1355)
<b>Affect</b>					
Proactive-Reactive	50.61 (1.07)	-5.12*	-8.87*	-12.88*	7307.90*
Proactive	55.73 (1.12)		-3.75*	-7.76*	
Reactive	59.48 (1.02)			-4.02*	
Non-aggressive	63.50 (1.08)				
<b>Behaviour</b>					
Proactive-Reactive	55.99 (1.39)	-4.94*	-9.97*	-15.82*	8880.60*
Proactive	60.93 (1.46)		-5.03*	-10.88*	
Reactive	65.96 (1.35)			-5.85*	
Non-aggressive	71.80 (1.16)				
<b>Cognition</b>					
Proactive-Reactive	48.49 (1.59)	-5.56*	-11.29*	-17.93*	8698.92*
Proactive	54.05 (1.38)		-5.73*	-12.37*	
Reactive	59.78 (1.23)			-6.64*	
Non-aggressive	66.42 (1.38)				
<b>Total</b>					
Proactive-Reactive	154.48 (4.02)		-30.93*	-47.50*	9147.36*
Proactive	171.29 (4.05)	-16.81*	-14.12*	-30.69*	
Reactive	185.41 (3.63)			-16.57*	
Non-aggressive	201.98 (3.47)				
<b>1-item Forgiveness</b>					
Proactive-Reactive	1.65 (.48)	-.81*	-1.69*	-2.01*	891.00*
Proactive	2.46 (.51)		-.88*	-1.20*	

Reactive	3.34 (.48)	-.32*
Non-aggressive	3.66 (.47)	

Similar results were reported for IRI empathy scores. A one-way ANOVA of types of aggressors on IRI perspective taking score ( $F(3,1355)=1326.73, p<0.05$ ), fantasy score ( $F(3,1355)=3116.52, p<0.05$ ), empathetic concern score ( $F(3,1355)=1904.56, p<0.05$ ), personal distress score ( $F(3,1355)=1970.93, p<0.05$ ) and the IRI total score ( $F(3,1355)=2192.91, p<0.05$ ) revealed a significant main effect. The Tukey post-hoc tests indicated that

proactive-reactive aggressors compared with the other three groups were significantly ( $p<0.05$ ) less empathetic in terms of all the aforementioned IRI scores (Table 4). Although reactive aggressors scored significantly ( $p<0.05$ ) higher than proactive aggressors on all the IRI subscales, both aggressive groups scored significantly ( $p<0.05$ ) lower than non-aggressive students (Table 4).

**Table 4:** Mean and standard deviation of aggression subtypes for interpersonal reactivity index.

Mean Differences					
IRI	Mean (SD)	Proactive	Reactive	Non-aggressive	F (3, 1355)
<b>Perspective Taking</b>					
Proactive-Reactive	16.93 (1.18)	-2.64*	-3.33*	-5.57*	1326.73*
Proactive	19.56 (.50)		-.70*	-2.94*	
Reactive	20.26 (.44)			-2.24*	
Non-aggressive	22.50 (1.15)				
<b>Fantasy</b>					
Proactive-Reactive	17.19 (.84)	-2.83*	-5.31*	-7.13*	3116.52*
Proactive	20.02 (.91)		-2.47*	-4.30*	
Reactive	22.50 (.50)			-1.83*	
Non-aggressive	24.32 (.95)				
<b>Empathetic Concern</b>					
Proactive-Reactive	18.82 (1.23)	-2.57*	-3.88*	-5.26*	1904.56*
Proactive	21.39 (.49)		-1.30*	-2.69*	
Reactive	22.69 (.46)			-1.39*	
Non-aggressive	24.08 (.82)				
<b>Personal Distress</b>					
Proactive-Reactive	17.10 (.83)	-2.34*	-4.26*	-5.10*	1970.93*
Proactive	19.44 (.50)		-1.92*	-2.76*	
Reactive	21.36 (.48)			-.837*	
Non-aggressive	22.19 (.84)				
<b>Total</b>					



Proactive-Reactive	70.03 (4.00)	-10.38*	-16.77*	-23.06*	2192.91*
Proactive	80.41 (2.28)		-6.39*	-12.68*	
Reactive	86.80 (1.60)			-6.29*	
Non-aggressive	93.09 (3.58)				

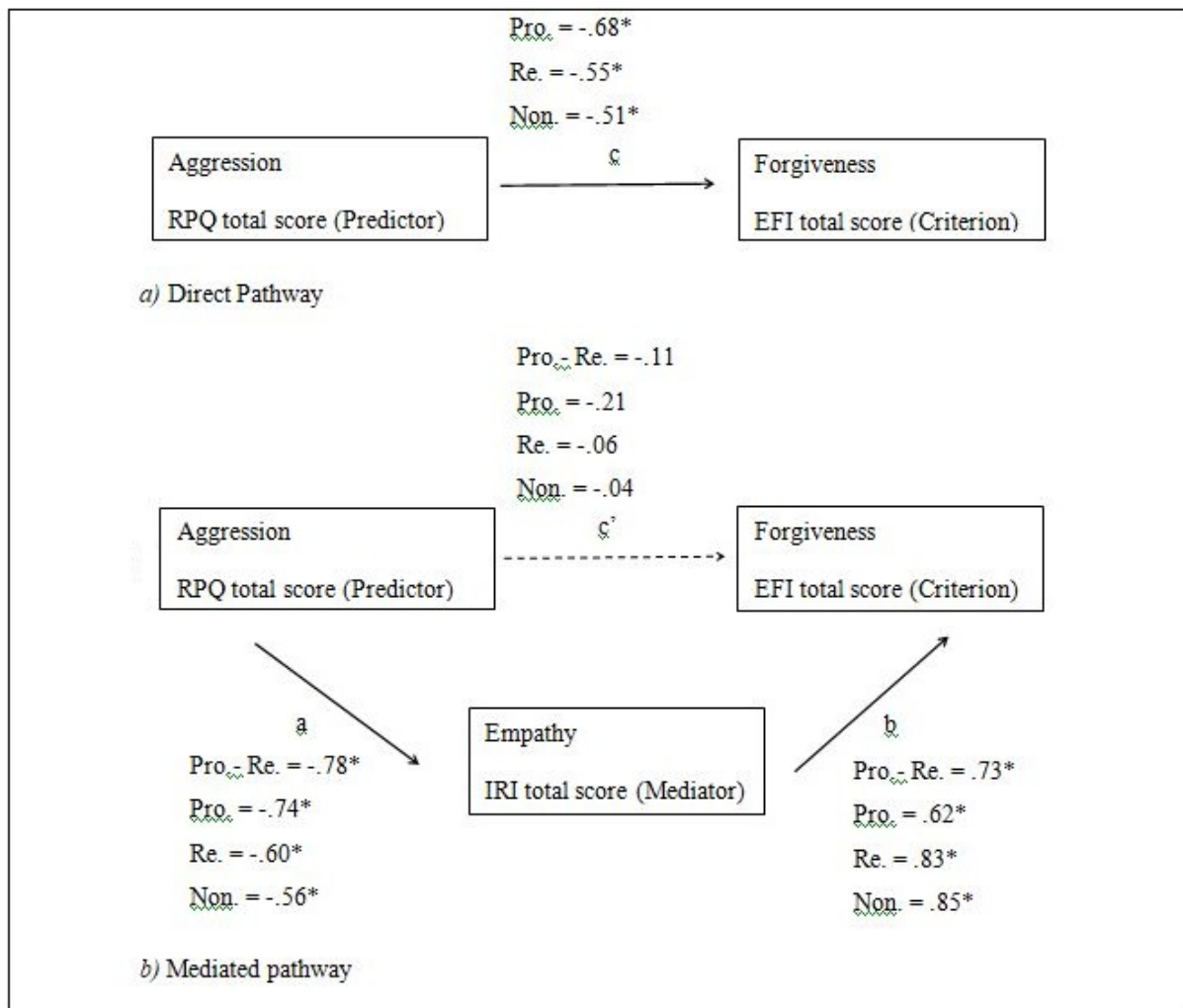
Notes. Higher scores mean higher in the empathy scores. IRI=Interpersonal Reactivity Index.

\*p< .05.

**Multiple regression analyses**

Multiple regression analyses were conducted to assess the mediating effect of empathy on aggression to forgiveness in different types of aggressors (Figure 1 for the proposed

mediation model). The RPQ aggression total score, the EFI forgiveness total score and the IRI empathy total score were used for these analyses.



**Figure 1:** Indirect effect of aggression on forgiveness through empathy, Notes: RPQ=Reactive-Proactive Aggression Questionnaire; EFI=Enright Forgiveness Inventory; IRI=Interpersonal Reactivity Index; Pro.- Re.=Proactive-Reactive; Pro.=Proactive; Re.=Reactive; Non.=Non-aggressive. \*p< 0.05.

First, it was found that aggression was negatively associated with forgiveness in all four groups; proactive-reactive ( $\beta = -0.68$ ,  $t(161) = -11.78$ ,  $p < 0.05$ ), proactive ( $\beta = -0.68$ ,  $t(39) = -5.71$ ,  $p < 0.05$ ), reactive ( $\beta = -0.55$ ,  $t(121) = -7.29$ ,  $p < 0.05$ ) and non-

aggressive ( $\beta = -0.51$ ,  $t(1030) = -18.96$ ,  $p < 0.05$ ). It was also found that aggression was negatively related to empathy in all the groups; proactive-reactive ( $\beta = -0.78$ ,  $t(161) = -15.96$ ,  $p < 0.05$ ), proactive ( $\beta = -0.74$ ,  $t(39) = -6.94$ ,  $p < 0.05$ ), reactive ( $\beta = -0.60$ ,  $t(121) = -7.29$ ,  $p < 0.05$ ) and non-

(121)= -8.27,  $p < 0.05$ ) and non-aggressive ( $\beta = -0.56$ ,  $t(1030) = -21.65$ ,  $p < 0.05$ ). Lastly, results indicated that the mediator, empathy, was positively associated with forgiveness in all the groups; proactive-reactive ( $\beta = 0.73$ ,  $t(161) = 9.90$ ,  $p < 0.05$ ), proactive ( $\beta = 0.62$ ,  $t(39) = 4.20$ ,  $p < 0.05$ ), reactive ( $\beta = 0.83$ ,  $t(121) = 14.26$ ,  $p < 0.05$ ) and non-aggressive ( $\beta = 0.85$ ,  $t(1030) = 45.3$ ,  $p < 0.05$ ) (Refer Table 5 for the coefficients).

Table 5: Coefficients for the mediation effect.

Variables	95% CI				Boot SE	Boot CI	
	$\beta$	a	t	Lower		Upper	Lower
<b>Proactive-Reactive</b>							
Agg. to For. (c path)	-	68*	-11.78	-1.12	-0.8		
Agg. to Emp. (a path)	-	78*	-15.96	-1.23	-0.96		
Agg. to For. (c' path)	-0.11	1	-1.53	-0.36	0.05		
Emp. to For. (b path)	.73*	9.9	0.58	0.87			
Agg. to Emp. to For.	-.57*				0.09	-0.73	-0.39
<b>Proactive</b>							
Agg. to For. (c path)	-	68*	-5.71	-3.17	-1.51		
Agg. to Emp. (a path)	-.74*		-6.94	-1.88	-1.03		
Agg. to For. (c' path)	-0.21	1	-1.44	-1.78	0.3		
Emp. to For. (b path)	.62*	4.2	0.57	1.64			
Agg. to Emp. to For.	-.46*				0.17	-0.79	-0.11
<b>Reactive</b>							
Agg. to For. (c path)	-	55*	-7.29	-2.54	-1.46		
Agg. to Emp. (a path)	-	60*	-8.27	-1.19	-0.73		
Agg. to For. (c' path)	-0.06	6	-0.96	-0.62	0.21		
Emp. to For. (b path)	.83*	14.26	1.62	2.14			

Agg. to Emp. to For.	-	50*	0.07	-0.62	-0.36		
<b>Non-aggressive</b>							
Agg. to For. (c path)	-.51*	6	-18.9	-1.94	-1.58		
Agg. to Emp. (a path)	-	56*	-21.6	-2.18	-1.82		
Agg. to For. (c' path)	-0.04	4	-1.86	-0.25	0.01		
Emp. to For. (b path)	.85*	45.3	0.79	0.86			
Agg. to Emp. to For.	-.47*				0.02	-0.51	-0.44

Notes. CI=Confidence Interval; SE=Standard Error; Agg.=Aggression; For.=Forgiveness; Emp.=Empathy. a. Standardized  $\beta$ . \* $p < .05$ .

Because both the a path (i.e., aggression to empathy) and b path (i.e., empathy to forgiveness) were significant, mediation analyses were tested using bootstrapping method with bias-corrected confidence estimates [62,63]. In the present study, the 95% confidence interval of the indirect effects was obtained with 5,000 bootstrap re-samples [64]. Results of the mediation analysis confirmed the mediating role of empathy in the relation between aggression and forgiveness in all four groups; proactive-reactive ( $\beta = -0.57$ ; CI= -0.73 to -.39), proactive ( $\beta = -0.46$ ; CI= -0.79 to -.11), reactive ( $\beta = -0.50$ ; CI= -0.62 to -.36) and non-aggressive ( $\beta = -0.47$ ; CI= -0.51 to -.44). In addition, results indicated that the direct effect of aggression on forgiveness became insignificant when controlling for empathy; proactive-reactive ( $\beta = -0.11$ ,  $t(161) = -1.53$ ,  $p = 0.13$ ), proactive ( $\beta = -0.21$ ,  $t(39) = -1.44$ ,  $p = 0.16$ ), reactive ( $\beta = -0.06$ ,  $t(121) = -0.96$ ,  $p = 0.34$ ) and non-aggressive ( $\beta = -0.04$ ,  $t(1030) = -1.86$ ,  $p = 0.06$ ), thus suggesting full mediation in all four groups (Refer Table 5 for the coefficients for the mediation effect and Figure 1 for the results). The results of this study supported our hypothesis that the mediating effect of empathy on aggression to forgiveness would exist in all aggressive groups.

## DISCUSSION

The first purpose of this study was to examine the concurrent correlates of proactive aggression, reactive aggression, and proactive-reactive aggression in an Asian sample. The results supported our hypothesis that the three types of aggression would have different correlates. Specifically, the three groups of Hong Kong elementary schoolchildren aggressors differed significantly in self-reported forgiveness and empathy. Building on the work of Raine and his colleagues [17], this study expanded the trichotomy of aggression cross-culturally. Consistent with previous studies conducted in Western societies [9,61], our results showed that there were different concurrent correlates for Hong Kong proactive-reactive aggressive elementary schoolchildren.

More specifically, we hypothesized that proactive – reactive aggressors would be significantly less forgiving and less empathetic than proactive aggressors, reactive aggressors and non-aggressive students. This hypothesis was supported. The proactive-reactive aggressors compared with the other groups, as expected, differed significantly on the EFI forgiveness subscores (i.e., affect, cognition and behaviour) and total score, as well as IRI empathy subscores (i.e., perspective taking, fantasy, empathetic concern, personal distress) and total score. Students who are high on both types of aggression reported the lowest levels of forgiveness and empathy, suggesting that proactive-reactive aggressors should be the focus of future investigations. To the best of our knowledge, there is no theoretical theory or model that explains proactive-reactive aggressors' deficiency of forgiveness and empathy at the moment. Further research on the causality and the complexity of this relationship would be beneficial to the understanding of proactive-reactive aggressors, as well as the implementation of prevention and intervention programme for them.

With respect to the comparison of empathy across aggression subtypes, the results of this study supported our assumption that proactive aggressors would have lower cognitive and affective empathy skills than reactive aggressors. Our findings are coherence with the conceptualization of proactive aggression as a product of social learning [65]. Accordingly, since proactive aggressors apply aggression in a planned matter to obtain desired goals and control others, their levels of cognitive and affective empathy would logically be lower than reactive aggressors. In addition, our findings are consistent with previous reports showing that both proactive and reactive aggressors had lower levels of cognitive and affective empathy than non-aggressive students [39]. Although proactive and reactive aggressors show different characteristics and attributes, both aggressive groups are associated with high rates of aggressiveness [11]. Arguably, proactive and reactive aggressors would have a lower level of cognitive and affective empathy compared with non-aggressive students.

Finally, the current study adds to the literature by suggesting that proactive aggressors have lower levels of forgiveness than reactive aggressors, and both aggressive groups have lower levels of forgiveness than non-aggressive students. It was not surprising that similar results were obtained for the comparison of forgiveness across aggression subtypes, given that the ability to forgive is closely related with the ability of establishing empathy with others [37]. To date, very few research studies (to our knowledge) have focused on the investigation of forgiveness in the area of reactive and proactive aggression. One possible reason for that may be the misconception that aggressors are never victimized by their peers, and that they have never suffered from depression and/or any other psychological related health issues. In fact, researchers [66] found that both proactive and reactive aggressors have experienced both face-to-face and online forms of peer victimization. Furthermore, 12.5% of children proactive aggressors [49] and 17.7% of children reactive aggressors were found to suffer from depression [27]. It is therefore of great importance to develop specific forgiveness intervention programme for children aggressors, regardless of their aggression subtypes, to help them understand the

appropriate approach to response to interpersonal transgressions. By learning to forgive and by letting go of resentment towards the offenders, it may reduce their use of aggressive behaviour, as well as help them to be more relaxed and be less depressed.

Another purpose of this study was to investigate the mediating effect of empathy on aggression to forgiveness in different types of aggressors. As stated earlier, until the current study, no research had been conducted on this mediating effect in Hong Kong or elsewhere. Given the previous research using antisocial personality disorder patients [67] and borderline disorder patients [68], we anticipated the mediating role of empathy to exist in all aggressive groups. This prediction was supported as the direct effect of aggression on forgiveness became insignificant when controlling for empathy in proactive-reactive, proactive, reactive and non-aggressive groups. Our findings are consistent with the social psychological determinative model of forgiveness, which being able to empathize with others is prerequisite for a person to replace the feeling of revenge with forgiveness [37]. The present study confirmed that the level of forgiveness was determined by both the level of aggression and empathy. Specifically, a higher level of aggression together with a lower level of empathy resulted in a lower level of forgiveness, and this was applicable to proactive-reactive, proactive, reactive and non-aggressive groups.

The current findings offer some preliminary support for the generalizability to Hong Kong children of the association between proactive-reactive, proactive and reactive aggression, and forgiveness and empathy targeted in this study. Additionally, our results suggest the potential need to change how prevention and intervention programme are designed for aggressive children at least in Hong Kong. It is less often that the interventions for aggressive children in Hong Kong, consider the uniqueness of each aggression subtype, however, it was well-demonstrated in our study, that aggressors might have different forgiveness and empathy skills. Therefore, it would seem critical for mental health professionals, researchers and school personnel to accurately assess the level of reactive and proactive aggression of these children and also to design a tailored programme for each type of aggressor. Furthermore, since empathy fully mediated the association between aggression and forgiveness in all aggression subtypes, efforts must be made to ensure the aggressive children to be able to empathize, so that they can overcome any negative impacts experienced and eventually forgive their offenders.

## LIMITATION

The current study is not without limitations. First, unequal group sizes affected the statistical power of the analyses in this study. Second, since self-report questionnaires were employed for both aggression and its correlates, the participants might not have been honest about their own behaviour (i.e., social-desirability effect) or they may have perceived their behaviour differently than other people (i.e., common shared variance). A multi-informant approach including also teacher ratings and parent ratings could have provided a more comprehensive assessment of children's aggression, empathy and forgiveness, as well as could have strengthened the validity and reliability

estimates of these constructs by reducing biases. Third, the validity of the findings may have been threatened by choosing a highly selective sample (i.e., elementary schoolchildren that scored high on a self-report aggression questionnaire).

## CONCLUSION

Despite these all limitations, the present study clarified the differences between proactive-reactive, proactive and reactive aggression on forgiveness and empathy in a sample of Asian elementary schoolchildren. In addition, it was confirmed that empathy fully mediated the relationship between aggression and forgiveness in all aggression subtypes. The trichotomy of aggression is novel but important in this line of research, given that proactive-reactive aggressors are high in both proactive and reactive scores. Based on the current findings, more resources should be provided to investigate the differences between the three aggression subtypes. Future research of proactive and reactive aggression should investigate the differences between proactive-reactive aggressors, proactive aggressors and reactive aggressors in their personal characteristics. It will not only widen our understanding of the uniqueness of each aggression subtypes, it will also assist mental health professionals in their line of work. Mental health professionals and school personnel working with Asian aggressive children should pay extra-attention to the three different subtypes of aggression (i.e., proactive-reactive, proactive and reactive) to develop unique intervention and prevention programme for each aggression subtype.

## FUTURE DIRECTIONS

Future studies are needed to determine whether or not the current results can be replicated in other locales and with populations other than elementary schoolchildren. Also, it seems essential that more complex statistical analyses be employed; for example structural equation modeling (SEM), to examine the overall pattern in the causal relationships between aggression, empathy and forgiveness. Before that can happen, nonetheless, a conceptual model must be suggested to elucidate how all the variables examined in the current study might affect one another. An examination of such a model will not only widen our theoretical understanding about the relationship among proactive-reactive, proactive and reactive aggression, and empathy and forgiveness, it will also contribute to mental health professionals' ability to productively help aggressive individuals.

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