

Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation

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ABSTRACT

In recent times, aggressive outbursts have been on the rise in schools in India. Adolescence, a period of volatile emotional expressions, is associated with more aggressive behavior and inadequate self-regulation. Recent social cognitive theorists have conceptualized aggressive behavior as a dynamic interaction between latent social knowledge structures, like normative beliefs, and cognitive capacities for self-regulation. However, very few studies have explored the role of these constructs together in adolescent aggression. Therefore, the present study aims to explore the role of cognitive control, normative beliefs about aggression, and effortful control as predictors of aggression. The study sample comprised 235 school-going adolescents of both genders in the age range of 15-19 years, recruited from schools via convenience sampling method. The data was collected using self-report questionnaires. The data was analyzed using SPSS 23.0. Multiple regression analysis of data revealed a significant negative contribution of cognitive control and a positive contribution of normative beliefs in aggression ($\beta = -0.36, p < .001$ & $0.25, p < .001$ respectively). This study thus highlights the need for targeting specific information-processing errors and cognitive regulatory processes that are strong determinants of aggression. Considering adolescents as the major workforce of the nation, identification of risk and introduction of interventions in schools would benefit their healthier tomorrow.

Keywords: *Aggression, Cognitive Control, Normative Beliefs About Aggression, Effortful Control, School, India*

Adolescence is a critical developmental period characterized by significant physical, psychological, and social changes. It is a phase during which there is a “pile-up” of emotional stressors (Petersen, 1988) as they attempt to understand and manage their changing bodies, relationships, and responsibilities. It is a period marked by experiences of higher intensity of affect as well as changes in their interpersonal and social context and, consequently, the need to adjust to new experiences (Collins & Steinberg, 2007). Self-regulation failures and experiencing negative emotions in this phase are also common. Self-regulation involves the coordination of behaviors with cognition and emotion; it may draw from adolescents’ broader cognitive and emotion regulation abilities (Tangney et al., 2004).

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Received: February 24, 2023; March 27, 2023; Accepted: March 31, 2023

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Adolescence is a relevant time to study self-regulation as cognitive abilities associated with self-regulation are not fully developed until late adolescence or early adulthood whereas tendencies to take risks and seek thrilling and novel experiences seem to increase significantly throughout this phase, resulting in a discrepancy between increased susceptibility to poor regulation and lower ability to exercise self-control (Pokhrel et al., 2013).

Aggression is one of the leading causes of global adolescent morbidity and mortality with as much as 5.5% of mortality in adolescents being caused by aggressive behavior (Muarifah et al., 2022). Aggression has been defined as the intention to harm another living being (Baron & Richardson, 1994), and not simply the delivery of harm. It is a manifest response "aimed at the injury of a target" (Berkowitz, 1989; Dollard et al., 1939; Feshbach, 1964). It can manifest itself in various forms, including physical, verbal, and relational aggression, and can cause significant harm to the victim (Crick & Grotpeter, 1995). In the Indian scenario as well, we see an alarming proportion of adolescents in schools displaying aggressive behaviors like hitting, kicking, biting, scratching, being destructive, teasing, or being verbally abusive towards other schoolmates and adults. Studies on non-clinical samples in India have found the prevalence of aggression in school-going adolescents and youth to be as high as 53%. (Kumar et al., 2021; Ajanappa et al., 2020; Sidhu et al., 2019; Kumari et al., 2018; Sharma & Marimuthu, 2014; Malhi et al., 2014). Aggression in youth and adolescents is not specific to a single diagnosis (American Psychiatric Association, 2013; Young et al., 2019) and is also a part of human behavior. A momentary expression of anger sometimes may spoil the future of the adolescents and involvement in aggressive activities may be fatal for the victim as well as the perpetrator. It is thus, a matter of great concern for all including parents, teachers, psychologists, social reformers, and others.

Adolescent aggression is a complex phenomenon influenced by various factors, such as individual characteristics, family and peer relationships, and environmental and cultural factors which have been elaborately explored in many existing studies (Green et al., 1998). Current approaches attempt to examine self-regulation deficits that lead individuals to behave aggressively. Negative emotions often trigger self-regulation failure (Marlatt & Gordon, 1985; Sinha, 2009); likewise, when people become upset, they sometimes act aggressively (Anderson & Bushman, 2002). Inadequate self-regulation has frequently been related to aggressive behavior (Denson et al., 2012; Olson et al., 2011). The neural networks in the brain responsible for self-regulation show suboptimal development during adolescence compared to adulthood (Chambers et al., 2003; Spear, 2013). Due to the still maturing neurocircuitry, especially the networks involving prefrontal cortical regions, adolescents tend to show poorer inhibitory control (i.e., ability to control a prepotent response) and higher impulsivity and risky decision-making tendencies. Thus, current models attempt to explore the individual differences in aggressive outbursts with regard to cognitive deficits in emotion and behavior regulation along with social-cognitive information processing errors. Understanding these underlying mechanisms will facilitate a multi-faceted approach toward addressing the underlying causes and risk factors essential for effectively addressing adolescent aggression.

Among the social-information processing models is the Integrative Cognitive Model (ICM) which integrates socio-cognitive theories of personality and its approach to trait anger (Mischel & Shoda, 1995; Cervone & Shoda, 1999). Wilkowski and Robinson (2008) incorporated the idea that individuals who are low in trait anger are more capable of recruiting the cognitive resources necessary to control hostile and angry thoughts. By

“cooling down”, these individuals are thought to be better able to recruit limited-capacity cognitive resources and employ more controlled and effortful processes to counteract aggressive tendencies. In the ICM, effortful control is proposed to be the primary mechanism that self-regulates aggressive thoughts and behaviors. The current study attempts to specifically understand the role of cognitive control, normative beliefs about aggression, and effortful control.

Cognitive control is ‘the ability to flexibly adjust behavior in the context of dynamically changing goals and task demands’ (Carter & Krus, 2012). Executive functions like cognitive control refer to top-down higher-order cognitive abilities, which enable individuals to successfully function in everyday lives, as well as adapt to new situations (Anderson & Bushman, 2002; Pessoa, 2009; Zelazo & Carlson, 2012). Executive functions require “mental effort” and are involved in the facilitation of goal-directed behaviors including self-regulation of undesirable behaviors (e.g., aggression; Zelazo & Carlson, 2012). Denny (2014) also examined the relationship between cognitive control and aggression, a behavioral outcome of anger, and highlighted the importance of cognitive control for anger regulation. They suggested that cognitive representation of an event influences the emotional experience when holding relatively constant the duration and subject of a person’s thoughts. Denson and colleagues found that provocation led to increased anger rumination, which depleted cognitive control capacity, which in turn led to increased aggression (Denson et al., 2011).

Researchers further suggest that self-regulation is rooted in temperament (Eisenberg et al., 2004; Rothbart & Bates, 2006), which implies that it has a biological basis. One of the major components of temperament is effortful control. The ability to voluntarily shift attentional focus, suppress behavior, and activate it when necessary—even when doing so may not be the person’s default response—is known as effortful control (EC), which is seen as the foundation of voluntary self-regulation (Rothbart & Bates, 2006). High EC enables individuals to regulate their attention, behavior, and response flexibility as needed and as a result, they are more likely to be socially suitable and well-adjusted. Studies have also implicated that the areas of the brain associated with executive attention (which is involved in EC; Rothbart & Bates, 2006) and overall regulatory skills continue to mature throughout adolescence (Collins & Steinberg, 2006; Keating, 2004; Zeman et al., 2006). In the Integrative Cognitive Model (ICM), effortful control is proposed to be the primary mechanism that self-regulates aggressive thoughts and behaviors (Wilkowski & Robinson, 2008). Eisenberg et al., (2009) found that for individuals high in anger proneness, low levels of effortful control were associated with high levels of externalizing problems. Therefore, it has been suggested that emotional-driven behavioral issues are predicted by poor levels of effortful control.

One of the aspects of research on social cognition and aggressive behavior has primarily focused on normative beliefs about aggression. According to Huesmann and Guerra (1997), normative beliefs represent mental scripts, and these beliefs play an important role in influencing behaviors. The General Aggression Model (Anderson & Bushman, 2002) states that normative beliefs are brought to the situation as a highly accessible knowledge structure and can influence other cognitive and emotional processes such as attention to threat-related information, encoding of social information, and emotional arousal. Cross-sectional and longitudinal studies have shown that normative beliefs regarding the acceptability of aggression have been found to predict higher levels of engagement in aggression (Huesmann & Guerra, 1997; Krahe & Busching, 2014; Nelson, et al., 2008; Werner & Nixon, 2005).

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India is home to 253 million adolescents, accounting for 20.9% of the country's population (Gupta et al., 2017). They are, thus, the future of the nation, forming a major demographic and economic force. It is important to emphasize that the promotion of positive mental health among adolescents is a matter of national interest and priority. Studies show that nearly 50% of adult psychiatric disorders begin before the age of 14 years (Kessler et al., 2005). Certain familial or psychological factors operating in childhood or adolescence may be modifiable and amenable to intervention at an early stage if identified timely. Preventive efforts may not only improve the mental health of youth but could have far-reaching consequences in reducing adult psychiatric morbidity (Sagar, 2011).

Studies done so far have not examined the role of these variables together in predicting aggression among adolescents. The principal objective of this preliminary study is to offer the groundwork upon which further studies may be developed as well as support existing models. Future research should be guided by the knowledge gained from this study to determine which areas may warrant additional inquiry and which are less likely to yield fruitful results. Therefore, the current study aims to understand the role of cognitive control, effortful control, and normative beliefs about aggression in predicting the aggressive behavior of school-going adolescents.

Given previous studies, the following specific hypotheses were posed: (1) cognitive control will significantly and negatively predict aggressive behavior among school adolescents (2) normative beliefs about aggression will significantly and positively predict aggressive behavior among school adolescents (3) effortful control will significantly and negatively predict aggressive behavior among school adolescents.

METHODOLOGY

Sample

A cross-sectional study of quantitative approach and correlational design was done with convenience sampling. 235 adolescents participated in the study who were aged between 15 to 19 years ($M = 17.24$ years; $SD = 1.15$), had a minimum of ten years of formal school education in an English-medium school, and could speak and understand English fluently, with no history or present psychiatric illness, and both of whose parents were at least high school graduates. Data was collected from March to September 2022. The sample consisted of 106 boys (46.4%) and 126 girls (53.6%) from high ($n = 79$; 33.6%) and senior high schools ($n = 156$; 66.4%) in India.

Instruments

The following measures were used in this study:

- ***Consent and Assent Form:*** The parent consent form and participant assent form were prepared to provide the participants and their parents with details of the research, the purpose of the study, and finally to obtain their consent/ assent for participation in the study.
- ***Socio-demographic Data Sheet:*** The socio-demographic data sheet was prepared to elicit necessary information regarding the participant's name, age, gender, standard/ grade in school, family type, domicile, and religion.
- ***Aggression Questionnaire (Buss & Perry, 1992):*** The aggression questionnaire is the gold standard for the measurement of aggression and it contains 29 items that assess physical aggression, verbal aggression, anger, and hostility. A five-point scale is used: (1) Never or hardly applies to me, (2) Usually does not apply to me, (3)

Sometimes applies to me, (4) Often applies to me and (5) Very often applies to me. Two items (7 and 18) are worded in the direction opposite to aggression and are reverse-scored. The total score for aggression is the sum of these scale scores which can range from 29 to 145. Higher scores indicate a higher level of aggression in the individual. It is suitable for administration in both adults and adolescents. The test-retest reliability of this tool is 0.78. Cronbach's alpha values range from 0.75 to 0.85 for the four subscales. In the present study, internal-consistency reliability was found to be adequate with Cronbach's alpha value being 0.84.

- ***Cognitive Control and Flexibility Questionnaire- Cognitive Control over Emotions Subscale (Gabrys et al., 2018)***: The Cognitive Control and Flexibility Questionnaire (CCFQ) is an 18-item self-report questionnaire measuring two factors that make up cognitive flexibility, cognitive control over emotion and appraisal and coping flexibility. The cognitive control over emotion dimension was composed of nine items that assess cognitive control processes such as attention, inhibition, and set-shifting that could be helpful in regulating negative thoughts and emotions elicited during a distressing situation (item numbers 2, 4, 7, 8, 11, 14, 15, 16, and 18). Participants responded to each item on the measure using a Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). This questionnaire showed high internal reliability (Cronbach's alpha = .90) for this dimension within a student sample. Greater scores on these subscales of the CCFQ suggested that individuals may appraise the situation as more controllable rather than as a perceived threat and perceive to have more cognitive control over their emotions. In the present study, internal consistency reliability for the Cognitive Control over Emotions Subscale was found to be adequate with Cronbach's alpha value of 0.86.
- ***Normative Beliefs About Aggression Scale (Huesman & Guerra 1997)***: The normative beliefs about aggression scale (NOBAGS) is a 20-item measure designed to measure a child's, adolescent's, or young adult's perception of how acceptable it is to behave aggressively both under varying conditions of provocation and when no conditions are specified. Participants were asked whether various aggressive behaviors were wrong or ok and responded using a four-point scale with 1 = perfectly ok and 4 = really wrong. The authors (Huesmann & Guerra, 1997) report reliability coefficients ranging between .65 and .90 for the various subscales and found that normative beliefs about aggression correlate significantly with actual aggressive behavior. The 20 NOBAGS items formed a reliable scale ($\alpha = 0.87$) and were reverse coded and then averaged together to such that higher numbers indicated greater acceptability of aggressive behaviors.
- ***Adult Temperament Questionnaire (ATQ)- short form: Effortful Control subscale (Evans & Rothbart, 2007)***: The Effortful Control (EC) subscale of the ATQ-short form (Evans & Rothbart, 2007) was used. The scale comprises 19 items to be rated on a 7-point Likert scale (1 = extremely untrue of you; 7 = extremely true of you). Effortful control (Rothbart & Rueda, 2005), includes attentional and inhibitory control (ability to inhibit inappropriate behavior). The EC scale is divided into three subscales: inhibitory control (7 items), attentional control (5 items), and activation control (7 items). Attentional Control is the capacity to focus attention as well as to shift attention when desired. Inhibitory Control is the capacity to suppress inappropriate approach behavior. Activation Control is the capacity to perform an action when there is a strong tendency to avoid it. 10 items in the EC subscale are reverse-scored. Internal consistency for the full scale in the original version was 0.78. ATQ-SF (EC Subscale) is a reliable tool for the measurement of temperament

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in adolescents (Evans & Rothbart, 2007). In the present study, the internal consistency reliability was found to be sufficient with Cronbach's alpha value of 0.71.

Procedure

The research study was reviewed and approved by the Departmental Research Committee. Before the administration of the tools, written permission was sought from the concerned authorities in charge of the schools. All the participants were apprised of the nature and purpose of the research and their willingness was ascertained before targeting them for participation. Assent from adolescents less than 18 years of age and informed consent from parents were obtained prior to the administration of the psychological assessment scales. Informed consent was obtained prior to the administration of the psychological assessment scales from adolescents 18 years and above. They were assured that had the right to withdraw at any time from the study. The researcher assured that no attempt was made to invade the personal identities of the subjects and it would not form the subject of research. Respondents were assured that the information provided would be kept strictly confidential and will be used exclusively for research purposes only. No financial or non-financial incentives were provided to the participants for their participation in the study.

The respondents for testing sessions were contacted personally in their classrooms to obtain their cooperation and inform them about the testing schedule. Those willing to participate were given the questionnaires in a packet. Participants were seated individually at desks and were asked to remain silent while filling out the questionnaires. Strict supervision was exercised to see that the participants do not discuss or take help from each other while answering the questions. The general testing conditions were satisfactory. Completion of the entire set of forms took approximately twenty minutes to half an hour. Participants were debriefed at the end of the session. Appropriate statistical measures were applied to analyze the data.

Several steps were performed to process and analyze the data using SPSS version 23.0 for Windows (Kirkpatrick, 2015). Firstly, the data set was controlled in terms of data entering by using frequencies, and percentage scores. Cronbach's alpha (α) was computed to examine the reliability of the items of all the tools used in the study. All the measures used were found to have internal consistency reliability (Cronbach's alpha) greater than 0.70 ($n= 235$). Data cleaning and screening procedure were done to identify missing values and to check the normality and outliers. To determine whether the data had a normal distribution, the kurtosis and skewness values were calculated. As the skewness and kurtosis values showed an acceptable range in the region of ± 1 limits, it was concluded that the scores did not show a significant deviation from the normal distribution. Also, Mahalanobis distance values were calculated to determine the outliers and there were no extreme values in the data set that would negatively affect the analyses. Thus, all participants were included in the analyses. Secondly, to describe the data, descriptive statistics were used. Demographic analyses were done using χ^2 test; t-test and analysis of variance (ANOVA) to examine differences between groups with regard to aggression. In addition, Pearson product-moment correlations were computed to reveal the relationship between the variables. Thirdly, stepwise multiple regression analysis was carried out to examine the role of cognitive control, normative beliefs about aggression, and effortful control as predictors, effortful, and aggression as the criterion variable to test the hypotheses of the study.

RESULTS

Table No. 1: Showing the socio-demographic profile of the sample (N=235) and comparison of means across demographic variables of the sample with regard to aggression

Variables	N (%)	Aggression $\bar{X} \pm SD$	t-test/ F statistic (p-value)
Age	235 (100%)	17.24 ± 1.15	-
Gender			
Male	109 (46.4%)	83.39 ± 13.77	0.09 (p=.928)
Female	126 (53.6%)	83.21 ± 16.73	
Education			
Secondary	79	83.03 ± 16.90	0.09 (p=.859)
Higher-secondary	156	83.42 ± 14.64	
Domicile			
Rural	18 (7.7%)	80.61 ± 11.70	0.77 (p=.444)
Urban	217 (92.3%)	83.51 ± 15.67	
Family Type			
Nuclear	168 (71.5%)	84.16 ± 16.01	1.38 (p=.170)
Joint	67 (28.5%)	81.10 ± 13.61	
Religion			
Hindu	183 (77.9%)	83.73 ± 15.59	2.71 (p=.101)
Muslim	4 (1.7%)	72.50 ± 11.56	
Christian	37 (15.7%)	83.08 ± 14.68	
Sikh	5 (2.1%)	82.60 ± 20.09	
Jain	3 (1.3%)	73.00 ± 4.36	
Others	3 (1.3%)	84.67 ± 17.04	

In the present study, demographic variables examined were age, gender, education, family type, domicile, and religion. No significant differences were found along the socio-demographic parameters.

Table 2: Showing descriptive statistics and correlation between study variables

Study Variables	$\bar{X} \pm SD$	1	2	3	4
1. Aggression	83.29 ± 15.40	1			
2. Cognitive Control	31.80 ± 10.70	-0.39***	1		
3. Normative Beliefs about Aggression	41.02 ± 7.77	0.29***	-0.12	1	
4. Effortful Control	77.35 ± 14.83	-0.36***	0.55***	-0.29***	1

Note. *** $p < .001$, two-tailed test.

Descriptive statistics, including means and standard deviations, were computed for each variable in the sample (Table 2). Pearson’s correlation coefficient was computed to examine intercorrelations between study variables. Aggression was found to have a moderate and negative correlation with cognitive control ($r = -0.39$; $p < .001$) and effortful control ($r = -0.36$; $p < .001$). Furthermore, aggression had a low and positive correlation with normative beliefs about aggression ($r = 0.29$; $p < .001$). Cognitive control was found to have a high positive correlation with effortful control ($r = 0.55$; $p < .001$). Normative beliefs about aggression were found to have a low and negative association with effortful control ($r = -0.29$; $p < .001$).

Table 3: Predicting Aggression from Cognitive Control, Normative Beliefs about Aggression, and Effortful Control in the groups

Predictors	B	SE (B)	β	R	R ²	F (df); p-value	Conclusion
Cognitive Control	-0.52	0.09	-0.36	0.46	0.21	30.66 (1, 234); p<.001	Hypothesis 1 accepted
Normative Beliefs About Aggression	0.49	0.12	0.25				Hypothesis 2 accepted

Multiple regression analysis was performed using cognitive control, effortful control and normative beliefs about aggression as predictors. Stepwise regression is the iterative creation of a regression model in which the independent variables to be utilized in the final model are chosen step by step. It entails incrementally adding or eliminating potential explanatory factors, with each iteration requiring statistical significance assessment. Keeping in mind the same logic, stepwise regression was used. Table 3 presents stepwise multiple regression analysis results performed by utilizing aggression as the criterion and cognitive factors as predictors. Cognitive control is a significant and negative predictor of aggression whereas normative beliefs about aggression is a significant and positive predictor of aggression. 21% of the variance in aggression is explained by cognitive control and normative beliefs about aggression.

DISCUSSION

Violence among adolescents is on rise in India (Mahajan et al., 2010; Ray & Malhi, 2006; Sharma et al., 2008). Evidence suggests that violence and anti-social behavior get manifested during adolescence in nearly a fifth of young people (Australian Research Alliance for Children & Youth, 2009). Therefore, the present endeavor is undertaken to explore the role of cognitive control, effortful control, and normative beliefs about aggression in predicting the aggressive behavior of school-going adolescents.

Hypothesis 1 aims to examine if cognitive control will negatively predict aggressive behavior among school adolescents. The hypothesis is confirmed by the results of the study. According to the above results, when cognitive control increases by 1 standard deviation, adolescent aggression decreases by -0.36 standard deviation. This finding also corroborates existing literature that suggests superior cognitive control is related to lower dispositional levels of anger and aggression (Fanning et al., 2017; Wilkowski et al., 2015; Wilkowski & Robinson, 2008, 2010; Denson et al., 2012).

The second hypothesis aims to examine if normative beliefs about aggression will positively predict aggressive behavior among school-going adolescents. This hypothesis is also accepted. According to the above results, when normative beliefs about aggression increase by 1 standard deviation, adolescent aggression increases by 0.25 standard deviation. Similar findings have been reported by previous research. In cross-sectional and longitudinal studies, individual differences in children’s normative beliefs about aggression are shown to predict aggressive behavior as rated by peers, teachers, and self-reports (Henry et al., 2000; Huesmann & Guerra, 1997; Zelli et al., 1999). Substantial positive associations are found between self-reported aggression and normative beliefs about aggression (Bailey & Ostrov, 2008; Li et al., 2015). Aggression in its various forms, including physical, verbal, and indirect, is predicted by general normative beliefs about aggression (Lim & Ang, 2009). Normative beliefs are also longitudinally and temporally linked to aggressiveness (Krahe & Busching, 2014). Roos et al., (2015) in their study report aggression among early

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adolescents to be a complex interaction between aggression and aggressogenic cognitions. A study by DeWall et al., (2007) states that individuals who hold more pro-social normative beliefs about aggression (i.e., that aggression is generally unacceptable and that non-aggressive behavior is preferred) display higher levels of effortful control compared to those who hold more permissive normative beliefs about aggression. The study also states that individuals who hold more permissive normative beliefs about aggression tend to have lower levels of self-regulation and are more likely to engage in aggressive behaviors. Another study by Huesmann and Guerra (1997) reports similar results, with individuals who hold more pro-social normative beliefs about aggression having better self-regulation and less aggressive behaviors compared to those with permissive normative beliefs.

The present findings further suggest that both cognitive control and normative beliefs about aggression predict aggression among adolescents which is also explained by recent research. In a study by Li et al. (2015) based on the I(3) theory which assumes that aggressive behavior is dependent on three orthogonal processes (i.e., Instigator, Impellance, and Inhibition), they tested normative beliefs about aggression as an Impellance (stable factor) that might predict aggression when Instigator was absent and Inhibition was high. They report that higher normative beliefs about aggression significantly predict aggressive behavior only when provocation is absent and self-control resources are not depleted. These findings support the current results of the study which indicate that when cognitive resources of self-control, like cognitive control, are available, adolescents are more likely to exert control over their emotions and behaviors and are less likely to act upon their aggressive cognitions even if they consider aggression to be acceptable. This finding is also supported by the Integrative Cognitive Model (ICM) of Aggression which posits that aggressive behavior is the result of the interaction between cognitive, situational, and emotional factors. Adolescents with higher cognitive control are better able to regulate their emotions and thoughts in response to perceived threats and are thus, susceptible to acting upon their normative beliefs of aggression. It also corroborates the suggestions by Nigg (2017) who views cognitive control to be involved in top-down self-regulation that is positively related to other self-regulatory abilities, such as emotion regulation and goal-directed behavior (Eisenberg et al., 2010). For example, children with better cognitive control abilities tend to have better emotion regulation abilities, which in turn can lead to less aggressive behavior (Eisenberg et al., 2010). These results are thus important in providing a nuanced understanding of mechanisms underlying aggressive behavior thereby suggesting the importance of not only situational and emotional factors but also the role of individual differences in the regulation of thoughts and emotions.

Unlike existing studies that have established a link between effortful control and aggression, the current results did not support the hypothesis that effortful control would predict aggression. Few studies state that effortful control being a constitutionally based temperamental characteristic is also believed to be molded by life experience including parent-child interactions (Goldsmith et al., 1997). Parenting experiences are found to strongly influence the relationship between effortful control and aggression and low effortful control has been found to be buffered by positive parenting practices (Wang, 2019). Thus, effortful control, maybe a risk factor but need not necessarily lead to negative outcomes in behavior and emotion regulation. Understanding this mechanism better is warranted in future studies.

Limitations

First, only Indian school students were assessed, in a relatively small number, which could have affected sample representativeness. A cross-population study with a large sample of school adolescents from different countries and a wider age range, including those diagnosed with externalizing disorders and juvenile delinquents with aggressive behavior, would be more accurate in revealing the effect of cognitive control, effortful control, and normative beliefs on adolescent aggression. Second, this study only focused on certain cognitive factors that play a role in the regulation and expression of aggression whereas other factors like hostile attribution bias, cognitive style, attribution style, and executive functions are not included in the present study. Indeed, these factors also have an important role to play in the manifestation of adolescent aggression, and their influencing mechanisms and combined effect are worth investigating further. Third, this study mainly used self-report questionnaires. The use of peer, parent, or teacher reports and observational and behavioral measures to assess cognitive functioning and aggression would help improve the effectiveness of the study. Lastly, there might be other social, personal, and environmental factors in addition to normative beliefs about aggression, cognitive control, and effortful control, like individual emotions, personality characteristics, peer influence, family influence, community influence, and media violence exposure that may play an important role in the relationship between cognitive factors and aggression which may also be explored.

Implications

Adolescent aggression is a topic of significant importance for behavioral science, particularly for researchers and practitioners working in the field of education. Aggression is a complex and multifaceted phenomenon that can have significant short-term and long-term impacts on the individual and society as a whole. Display of aggressive behavior shows the inability to manage one's own emotions as well as that of others, thus demonstrating a lack of adequate social-emotional skills among adolescents. Researchers have since long attempted to understand aggression. The current study focuses on school-going adolescents' aggression as initiatives in the current day highlight a growing interest among policymakers, educators, parents, and researchers, toward building socially and emotionally competent students who not only have the skills and mindsets needed to succeed academically, but also nurture healthy social relationships, maintain positive mental health, successfully secure employment, and be an actively engaged workforce for the nation's tomorrow. Thus, this study attempts to explore cognitive regulatory deficits and processes which will aid in understanding the risk and protective factors associated with this behavior, identifying its consequences, and developing evidence-based prevention and intervention programs. Educators and other professionals can work to promote the healthy development of their students and create safe and supportive school environments.

CONCLUSION

The current study shows that cognitive control and normative beliefs about aggression significantly predict aggressive behavior among school-going adolescents in India. This study draws attention to the importance of latent cognitive processes that influence the expression and regulation of aggression among adolescents. As mainstream curricula in schools today emphasize building social and emotional skills, an understanding of adolescent aggression is crucial for their holistic development and for society at large to benefit from their psychological capital.

REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5* (5th ed ed.). Washington, D.C: American Psychiatric Association.
- Australian Research Alliance for Children and Youth. (2009, October). *Violent and antisocial behaviours among young adolescents in Australian communities: An analysis of risk and protective factors*. <https://www.aracy.org.au/publications-resources/>. Retrieved February 24, 2023, from https://www.aracy.org.au/publications-resources/command/download_file/id/161/filename/Violent_and_antisocial_behaviours_among_young_adolescents_in_Australian_communities_-_An_analysis_of_risk_and_protective_factors.pdf
- Anderson, C. A., & Bushman, B. J. (2002). Human Aggression. *Annual Review of Psychology*, 53(1), 27–51. <https://doi.org/10.1146/annurev.psych.53.100901.135231>
- Anderson, C. A., & Bushman, B. J. (2002). Human Aggression. *Annual Review of Psychology*, 53(1), 27–51. <https://doi.org/10.1146/annurev.psych.53.100901.135231>
- Anjanappa, S., Govindan, R., & Munivenkatappa, M. (2020). Prevalence and expression of anger in school going adolescents. *Archives of Psychiatric Nursing*, 34(1), 35–40. <https://doi.org/10.1016/j.apnu.2019.12.002>
- Bailey, C. A., & Ostrov, J. M. (2007). Differentiating Forms and Functions of Aggression in Emerging Adults: Associations with Hostile Attribution Biases and Normative Beliefs. *Journal of Youth and Adolescence*, 37(6), 713–722. <https://doi.org/10.1007/s10964-007-9211-5>
- Baron, R. A., & Richardson, D. R. (1994). *Human aggression*. Springer Science & Business Media.
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, 106(1), 59–73. <https://doi.org/10.1037/0033-2909.106.1.59>
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, 63(3), 452–459. <https://doi.org/10.1037/0022-3514.63.3.452>
- Carter, C. S., & Krus, M. K. (2012). Dynamic cognitive control and frontal-cingulate interactions In Posner MI (Ed.), *Cognitive neuroscience of attention* (pp. 88–98). New York, NY: Guilford Press.
- Cervone, D., & Shoda, Y. (1999). Social-cognitive theories and the coherence of personality. In D. Cervone & Y. Shoda (Eds.), *The coherence of personality: Social-cognitive bases of consistency, variability, and organization* (pp. 3–33). New York: Guilford Press
- Chambers, R. A., Taylor, J. R., & Potenza, M. N. (2003). Developmental Neurocircuitry of Motivation in Adolescence: A Critical Period of Addiction Vulnerability. *American Journal of Psychiatry*, 160(6), 1041–1052. <https://doi.org/10.1176/appi.ajp.160.6.1041>
- Collins, W. A., & Steinberg, L. (2007). Adolescent Development in Interpersonal Context. *Handbook of Child Psychology*. <https://doi.org/10.1002/9780470147658.chpsy0316>
- Collins, W. A., & Steinberg, L. (2007). Adolescent Development in Interpersonal Context. *Handbook of Child Psychology*. <https://doi.org/10.1002/9780470147658.chpsy0316>
- Crick, N. R., & Grotpeter, J. K. (1995). Relational Aggression, Gender, and Social-Psychological Adjustment. *Child Development*, 66(3), 710. <https://doi.org/10.2307/1131945>
- Denny, K. G. (2014). *Cognitive mechanisms of anger regulation: The role of executive function* (Doctoral dissertation, University of Miami). Retrieved February 24, 2023, from <https://scholarship.miami.edu/esploro/outputs/doctoral/Cognitive-Mechanisms-of-Anger-Regulation-The-Role-of-Executive-Function/991031447109102976>
- Denson, T. F., DeWall, C. N., & Finkel, E. J. (2012). Self-Control and Aggression. *Current Directions in Psychological Science*, 21(1), 20–25. <https://doi.org/10.1177/0963721411429451>
- Denson, T. F., DeWall, C. N., & Finkel, E. J. (2012). Self-Control and Aggression. *Current Directions in Psychological Science*, 21(1), 20–25. <https://doi.org/10.1177/0963721411429451>

Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation

- Denson, T. F., Pedersen, W. C., Friese, M., Hahm, A., & Roberts, L. (2011). Understanding Impulsive Aggression: Angry Rumination and Reduced Self-Control Capacity Are Mechanisms Underlying the Provocation-Aggression Relationship. *Personality and Social Psychology Bulletin*, 37(6), 850–862. <https://doi.org/10.1177/0146167211401420>
- DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental Social Psychology*, 43(1), 62–76. <https://doi.org/10.1016/j.jesp.2005.12.005>
- Diamond, A. (2013). Executive Functions. *Annual Review of Psychology*, 64(1), 135–168. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-Related Self-Regulation and Its Relation to Children's Maladjustment. *Annual Review of Clinical Psychology*, 6(1), 495–525. <https://doi.org/10.1146/annurev.clinpsy.121208.131208>
- Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., Valiente, C., Losoya, S. H., Guthrie, I. K., & Thompson, M. (2004). The Relations of Effortful Control and Impulsivity to Children's Resiliency and Adjustment. *Child Development*, 75(1), 25–46. <https://doi.org/10.1111/j.1467-8624.2004.00652.x>
- Eisenberg, N., Valiente, C., Spinrad, T. L., Liew, J., Zhou, Q., Losoya, S. H., Reiser, M., & Cumberland, A. (2009). Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occurring behavior problems. *Developmental psychology*, 45(4), 988–1008. <https://doi.org/10.1037/a0016213>
- Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality*, 41(4), 868–888. <https://doi.org/10.1016/j.jrp.2006.11.002>
- Fanning, J. R., Keedy, S., Berman, M. E., Lee, R., & Coccaro, E. F. (2017). Neural Correlates of Aggressive Behavior in Real Time: a Review of fMRI Studies of Laboratory Reactive Aggression. *Current Behavioral Neuroscience Reports*, 4(2), 138–150. <https://doi.org/10.1007/s40473-017-0115-8>
- Feshbach, S. (1964). The function of aggression and the regulation of aggressive drive. *Psychological Review*, 71(4), 257–272. <https://doi.org/10.1037/h0043041>
- Gabrys, R. L., Tabri, N., Anisman, H., & Matheson, K. (2018). Cognitive Control and Flexibility in the Context of Stress and Depressive Symptoms: The Cognitive Control and Flexibility Questionnaire. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.02219>
- Goldsmith, H. H., Buss, K. A., & Lemery, K. S. (1997). Toddler and childhood temperament: Expanded content, stronger genetic evidence, new evidence for the importance of environment. *Developmental Psychology*, 33(6), 891–905. <https://doi.org/10.1037/0012-1649.33.6.891>
- Green, R., Geen, R. G., & Donnerstein, E. I. (1998). *Human Aggression: Theories, Research, and Implications for Social Policy*. Elsevier Gezondheidszorg.
- Gupta, S., Ramadass, S., & Nongkynrih, B. (2017). Adolescent health in urban India. *Journal of Family Medicine and Primary Care*, 6(3), 468. <https://doi.org/10.4103/2249-4863.222047>
- Henry, D., Guerra, N., Huesmann, R., Tolan, P., VanAcker, R., & Eron, L. (2000). Normative Influences on Aggression in Urban Elementary School Classrooms. *American Journal of Community Psychology*, 28(1), 59–81. <https://doi.org/10.1023/a:1005142429725>
- Huesmann, L. R., & Guerra, N. G. (1997). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality and Social Psychology*, 72(2), 408–419. <https://doi.org/10.1037/0022-3514.72.2.408>
- Huesmann, L. R., & Guerra, N. G. (1997b). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality and Social Psychology*, 72(2), 408–419. <https://doi.org/10.1037/0022-3514.72.2.408>

Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation

- Huesmann, L. R., & Guerra, N. G. (1997b). Normative Beliefs About Aggression Scale. *PsycTESTS Dataset*. <https://doi.org/10.1037/t01135-000>
- Keating, D. P. (2004). Cognitive and Brain Development. *Handbook of Adolescent Psychology*, 45–84. <https://doi.org/10.1002/9780471726746.ch3>
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593. <https://doi.org/10.1001/archpsyc.62.6.593>
- Kirkpatrick, L. A. (2015). *A Simple Guide to IBM SPSS Statistics - version 23.0* (14th ed.). Cengage Learning.
- Krahé, B., & Busching, R. (2014). Interplay of normative beliefs and behavior in developmental patterns of physical and relational aggression in adolescence: a four-wave longitudinal study. *Frontiers in Psychology*, 5, 1146. <https://doi.org/10.3389/fpsyg.2014.01146>
- Kumar, G., Verma, R., Yadav, R., Chayal, V., Kalhan, M., Bhalla, K., Dhaka, R., Agrawal, G., Sachdeva, A., Satija, J., Pankaj, & Sagar, V. (2021). Association of psychosocial factors with aggression among school going rural adolescents in Haryana. *Journal of Family Medicine and Primary Care*, 10(10), 3720. https://doi.org/10.4103/jfmpc.jfmpc_447_21
- Kumari, S. (2018). A Cross-Sectional Study of Aggression among School Adolescents in Karnataka, India. *Indian Journal of Youth and Adolescent Health*, 04(04), 4–9. <https://doi.org/10.24321/2349.2880.201728>
- Li, J. B., Nie, Y. G., Boardley, I. D., Dou, K., & Situ, Q. M. (2015). When do normative beliefs about aggression predict aggressive behavior? An application of I3 theory. *Aggressive behavior*, 41(6), 544–555. <https://doi.org/10.1002/ab.21594>
- Lim, S. H., & Ang, R. P. (2009). Relationship between boys' normative beliefs about aggression and their physical, verbal, and indirect aggressive behaviors. *Adolescence*, 44(175), 635–650.
- Mahajan, S. K., Arora, A. K., Gupta, P., & Kapoor, S. S. (2010). Adolescent Violence: an Emerging Challenge. *Journal of Punjab Academy of Forensic Medicine and Toxicology*, 10(2), 97–100. <https://www.indianjournals.com/ijor.aspx?target=ijor:jpfamat&volume=10&issue=2&article=009>
- Malhi, P., Bharti, B., & Sidhu, M. (2014). Aggression in Schools: Psychosocial Outcomes of Bullying Among Indian Adolescents. *The Indian Journal of Pediatrics*, 81(11), 1171–1176. <https://doi.org/10.1007/s12098-014-1378-7>
- Marlatt, G. A., & Donovan, D. M. (2005). Relapse prevention: Maintenance strategies in the treatment of addictive behaviors, 2nd ed. *Guilford Press EBooks*. <http://ci.nii.ac.jp/ncid/BB05106269>
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102(2), 246–268. <https://doi.org/10.1037/0033-295x.102.2.246>
- Mowrer, O. H., & Sears, R. (1939). *Frustration and Aggression*. New Haven, CT: Yale University Press.
- Muarifah, A., Mashar, R., Hashim, I. H. M., Rofiah, N. H., & Oktaviani, F. (2022). Aggression in adolescents: the role of mother-child attachment and self-esteem. *Behavioral Sciences*, 12(5), 147. <https://doi.org/10.3390/bs12050147>
- Munni, R., & Malhi, P. (2006). Adolescent violence exposure, gender issues and impact. *Indian Pediatrics*, 43(7), 607–612.
- Nelson, D. A., Springer, M. M., Nelson, L. J., & Bean, N. H. (2008). Normative Beliefs Regarding Aggression in Emerging Adulthood. *Social Development*, 17(3), 638–660. <https://doi.org/10.1111/j.1467-9507.2007.00442.x>
- Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-

Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation

- taking, and inhibition for developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 58(4), 361–383. <https://doi.org/10.1111/jcpp.12675>
- Olson, S. L., Lopez-Duran, N., Lunkenheimer, E. S., Chang, H., & Sameroff, A. J. (2011). Individual differences in the development of early peer aggression: Integrating contributions of self-regulation, theory of mind, and parenting. *Development and Psychopathology*, 23(1), 253–266. <https://doi.org/10.1017/s0954579410000775>
- Pessoa, L. (2009). How do emotion and motivation direct executive control? *Trends in Cognitive Sciences*, 13(4), 160–166. <https://doi.org/10.1016/j.tics.2009.01.006>
- Petersen, A. C. (1988). Adolescent Development. *Annual Review of Psychology*, 39(1), 583–607. <https://doi.org/10.1146/annurev.ps.39.020188.003055>
- Pokhrel, P., Herzog, T. A., Sun, P., Rohrbach, L. A., & Sussman, S. (2013). Acculturation, social self-control, and substance use among Hispanic adolescents. *Psychology of Addictive Behaviors*, 27(3), 674–686. <https://doi.org/10.1037/a0032836>
- Roos, Salmivalli, & Hodges. (2015). Emotion Regulation and Negative Emotionality Moderate the Effects of Moral (Dis)Engagement on Aggression. *Merrill-Palmer Quarterly*, 61(1), 30. <https://doi.org/10.13110/merrpalmquar1982.61.1.0030>
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (pp. 99–166). John Wiley & Sons, Inc.
- Rothbart, M. K., & Rueda, M. R. (2005). The Development of Effortful Control. *Developing Individuality in the Human Brain: A Tribute to Michael I. Posner.*, 167–188. <https://doi.org/10.1037/11108-009>
- Rothbart, M. K., Sheese, B. E., Rueda, M. R., & Posner, M. I. (2011). Developing Mechanisms of Self-Regulation in Early Life. *Emotion Review*, 3(2), 207–213. <https://doi.org/10.1177/1754073910387943>
- Sagar, R. (2011). Child and adolescent mental health: Need for a public health approach. *J Ment Health Hum Behav*, 16, 1-4.
- Sharma, M. K., & Marimuthu, P. (2014). Prevalence and Psychosocial Factors of Aggression Among Youth. *Indian Journal of Psychological Medicine*, 36(1), 48–53. <https://doi.org/10.4103/0253-7176.127249>
- Sharma, R., Grover, V., & Chaturvedi, S. (2008). Risk behaviors related to inter-personal violence among school and college-going adolescents in south Delhi. *Indian Journal of Community Medicine*, 33(2), 85. <https://doi.org/10.4103/0970-0218.40874>
- Sidhu, T. K., Kaur, P., Sangha, N. K., & Bansal, A. S. (2019). Aggression among adolescents—A cross-sectional study. *Adesh University Journal of Medical Sciences & Research*, 1(1), 21-26.
- Sinha, R. (2008). Modeling stress and drug craving in the laboratory: implications for addiction treatment development. *Addiction Biology*, 14(1), 84–98. <https://doi.org/10.1111/j.1369-1600.2008.00134.x>
- Spear, L. (2013). The teenage brain: Adolescents and alcohol. *Current Directions in Psychological Science*, 22(2), 152–157. <https://doi.org/10.1177/0963721412472192>
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of personality*, 72(2), 271–324. <https://doi.org/10.1111/j.0022-3506.2004.00263.x>
- Wang, M. (2019). Harsh parenting and adolescent aggression: Adolescents' effortful control as the mediator and parental warmth as the moderator. *Child Abuse & Neglect*, 94, 104021. <https://doi.org/10.1016/j.chiabu.2019.05.014>
- Werner, N. E., & Nixon, C. L. (2005). Normative Beliefs and Relational Aggression: An Investigation of the Cognitive Bases of Adolescent Aggressive Behavior. *Journal of Youth and Adolescence*, 34(3), 229–243. <https://doi.org/10.1007/s10964-005-4306-3>

Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation

- Wilkowski, B. M., & Robinson, M. D. (2007). The Cognitive Basis of Trait Anger and Reactive Aggression: An Integrative Analysis. *Personality and Social Psychology Review*, 12(1), 3–21. <https://doi.org/10.1177/1088868307309874>
- Wilkowski, B. M., & Robinson, M. D. (2008). Guarding against hostile thoughts: Trait anger and the recruitment of cognitive control. *Emotion*, 8(4), 578–583. <https://doi.org/10.1037/1528-3542.8.4.578>
- Wilkowski, B. M., & Robinson, M. D. (2010). The Anatomy of Anger: An Integrative Cognitive Model of Trait Anger and Reactive Aggression. *Journal of Personality*, 78(1), 9–38. <https://doi.org/10.1111/j.1467-6494.2009.00607.x>
- Wilkowski, B. M., Crowe, S. E., & Ferguson, E. L. (2014). Learning to keep your cool: Reducing aggression through the experimental modification of cognitive control. *Cognition and Emotion*, 29(2), 251–265. <https://doi.org/10.1080/02699931.2014.911146>
- Young, A. S., Youngstrom, E. A., Findling, R. L., Van Eck, K., Kaplin, D., Youngstrom, J. K., Calabrese, J., Stepanova, E., & The LAMS Consortium. (2019). Developing and Validating a Definition of Impulsive/Reactive Aggression in Youth. *Journal of Clinical Child & Adolescent Psychology*, 49(6), 787–803. <https://doi.org/10.1080/15374416.2019.1622121>
- Zelazo, P. D., & Carlson, S. M. (2012). Hot and Cool Executive Function in Childhood and Adolescence: Development and Plasticity. *Child Development Perspectives*, n/a-n/a. <https://doi.org/10.1111/j.1750-8606.2012.00246.x>
- Zelli, A., Dodge, K. A., Lochman, J. E., & Laird, R. D. (1999). The distinction between beliefs legitimizing aggression and deviant processing of social cues: Testing measurement validity and the hypothesis that biased processing mediates the effects of beliefs on aggression. *Journal of Personality and Social Psychology*, 77(1), 150–166. <https://doi.org/10.1037/0022-3514.77.1.150>
- Zeman, J., Cassano, M., Perry-Parrish, C., & Stegall, S. (2006). Emotion regulation in children and adolescents. *Journal of Developmental & Behavioral Pediatrics*, 27(2), 155-168. <https://doi.org/10.1097/00004703-200604000-00014>

Acknowledgement

The authors appreciate all those who participated in the study and helped to facilitate the research process. The authors also express gratitude towards school authorities who consented for the research to be conducted on school students.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Majumdar, I. G. & Srivastava, M. (2023). Cognitive Predictors of Aggression among School-Going Adolescents: A Preliminary Investigation. *International Journal of Indian Psychology*, 11(1), 1980-1994. DIP:18.01.196.20231101, DOI:10.25215/1101.196