

EXAMINING THE ASSOCIATION BETWEEN CALLOUS-UNEMOTIONAL
TRAITS, BULLYING AND VICTIMIZATION
IN PRESCHOOLERS

by

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ABSTRACT

Peer victimization and bullying are a widespread problem among children, which can lead to mental, behavioral and physical adjustment problems. Due to these excessive costs, much attention has been directed at identifying and examining risk factors for engaging in bullying behaviors. Previous research has examined callous-unemotional (CU) traits as a risk factor for bullying and victimization.

The present study examined the impact of CU traits in putting preschoolers at risk for bullying and victimization as well as how social-neuro-cognitive variables may moderate this relation. CU traits were a significant predictor for both bullying and victimization. Furthermore, cognitive inhibition and verbal intelligence moderated the relation between CU traits and bullying. However, no moderation effects were found for victimization. Other frequently studied predictors, such as age or income, did not discriminate within the sample. These findings suggest that in a preschool sample, CU traits not only serve as risk factors for bullying and being victimized, but are also associated with normative social cognitive functioning.

DEDICATION

This thesis is dedicated to my parents and grandparents, who have been a tremendous source of inspiration and mean more to me than I could ever express in words.

LIST OF ABBREVIATIONS AND SYMBOLS

<i>M</i>	Mean: the sum of a set of measurements divided by the number of measurements in the set
<i>N</i>	Sample size of group
<i>p</i>	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
<i>r</i>	Pearson product-moment correlation
<i>SD</i>	Standard Deviation: value of variation from the mean
<i>t</i>	Computed value of <i>t</i> test
<	Less than
=	Equal to

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1. INTRODUCTION

Examining the Association Between Callous-Unemotional Traits, Bullying and Victimization in Preschoolers

Bullying and Victimization

Bullying and victimization are growing public health issues because of the staggeringly high costs – both to bullies and victims – associated with them (Arseneault et al., 2010). Children who bully others (i.e., bullying), representing approximately 10% of school-aged children, are at an increased risk for aggressive and delinquent behaviors, school failure and drop out (Coie & Dodge, 1998; Nansel et al., 2001). Later in life, children who bully others are at a greater risk for criminal offending and involvement with the justice system (Nansel et al., 2004). Roughly 11% of school-aged children are victimized, and they often experience a range of internalizing symptoms including depression, anxiety, low self-esteem, self-harm behavior and suicidal ideation (Kim, Leventhal, Koh, Hubbard & Boyce, 2006; Nansel et al., 2004; Olweus, 1993). Due to the excessive costs associated with both bullying and victimization (e.g., mental health care services, involvement with the justice system), much attention has been directed at identifying and examining risk factors for engaging in bullying behaviors (Barker et al., 2008).

Callous and Unemotional Traits

Recent research has examined callous-unemotional (CU) traits, which are increasingly being considered as a primary risk factor for engaging in bullying behaviors (Fanti, Frick, & Georgiou, 2009; Viding, Simmonds, Petrides, & Frederickson, 2009). CU traits include a lack of empathy and guilt, including shallow emotions and lack of remorse for antisocial behaviors

(Frick & Marsee, 2006; Viding et al., 2009). Recent research found that CU adolescents engage in high levels of bullying behavior, but did not assess the extent to which these CU youth might also be victimized (Viding et al., 2009). A study that did take victimization into account (Fanti et al., 2009) suggested that middle and high school aged children with CU traits *and* aggression were the most highly victimized group, whereas middle and high school age children with *only* CU traits were not victimized. These findings are interesting as they suggest that: 1) CU traits alone may act as a risk factor for engaging in bullying behaviors and 2) the combination of CU traits and aggression may serve as a risk factor for victimization.

Potential heterogeneity with CU youth may explain this “dual risk” in that certain children with CU traits *and* low levels of aggression are at risk for engaging in bullying behaviors whereas others with CU traits *and* high levels of aggression are at risk for victimization. When examining neurocognitive variables, data suggests that children with only CU traits are thought to demonstrate normative levels of intellectual functioning and development (Loney, Frick, Ellis, & McCoy, 1998; Salekin, Neumann, Leistico, & Zalot, 2004). However, other children with CU traits (e.g., combined with aggression) may not. When examining social variables, such as social cognition and problem solving, CU children low in aggression may have normative levels of social cognition compared to CU children high in aggression who may have deficits in social cognition (Waschbusch et al., 2007). This is noteworthy because neurocognitive and social impairments are thought to be: 1) positively associated with the heightened use of physical aggression to solve interpersonal conflict, 2) negatively associated with CU traits, and 3) robust predictors of both bullying and victimization, even as early as the preschool years (Barker et al., 2008; Snyder et al., 2003).

Callous-unemotional traits have cognitive and social correlates, which may help explain the inverse relation between victimization and CU traits in children with low levels of aggression. For example, certain CU youth are described as good at conning and manipulating others; this skill suggests a degree of cognitive sophistication related to advanced executive functions. Executive functions involve skills such as planning, cognitive flexibility, abstract thinking, rule acquisition, and inhibition (Liebermann, Giesbrecht, & Muller, 2007). Research has found executive functions to be inversely related to both aggression and antisocial behavior (Ellis, Weiss, & Lochman, 2009). However, there is a dearth of studies that have explicitly examined the relation between executive functions and CU traits.

Social Cognition as Predictive of CU Traits

An explanation for this inverse relation between CU traits and victimization is that CU children low in aggression may have normative levels of social cognition (Waschbusch et al., 2007). Normative social development is typically inversely related to aggression; children who use aggressive interpersonal strategies often fall back upon those strategies because they have not developed alternative social competencies (Frick, Cornell, Barry, Bodin, & Dane, 2003; Waschbusch et al., 2007). However, there is a dearth of studies that have directly investigated the relation between CU traits and social cognition, especially using a preschool population. Waschbusch et al. (2007) reports that only three studies have examined social cognition in relation to aggression and CU traits, all focusing on late childhood and adolescence. One study reported that youth with CU traits and aggression demonstrated deficits in social understanding in comparison to youth without CU traits (Frick et al., 2003). This is consistent with the notion that children with high levels of conduct problems tend to have social problem solving skill deficits (Frick et al., 2003). Furthermore, frequency of aggressive behaviors was associated with

poor social problem solving even when CU traits were low. However, youth with high levels of CU traits but low levels of aggression did not demonstrate similar deviant social problem behaviors (Waschbusch et al., 2007). Together, these results seem to indicate that CU traits might be differentially related to social cognition, depending on the level of aggressiveness of the youth. It appears that CU traits combined with aggressive behaviors would be associated with social development deficits (i.e., social cognition).

Neurocognitive Variables as Predictive of CU Traits

Research reports a positive correlation between CU traits and verbal intelligence (Loney et al., 1998; Salekin et al., 2004), which may help explain the inverse relation between CU traits and victimization. However, others have found a negative correlation (Fontaine, Barker, Salekin, & Viding, 2008). Fontaine et al. (2008) suggested that the negative relation between CU traits and verbal intelligence could be further explained by taking various conduct problems (e.g., aggression, antisocial behavior) into consideration. Research that has taken some of these conduct problems into consideration reports that many aggressive children show deficits in verbal intelligence (Lynam, 1998). However, the very idea that CU children can “con” and “manipulate” their peers suggests a necessity for verbal abilities. With studies on elementary and middle school children producing mixed results on the relation between CU traits and deficits in intellectual functioning, exploring this relation early on in the developmental timeframe could have etiological value. Exploring this relation in preschoolers, being so early on in the developmental trajectory, could offer some insight towards identifying which variables come on-line first (e.g., the onset of executive functions precedes that of CU traits). Furthermore, doing so could help to establish the directionality of the relation between CU traits and levels of social cognition. Given that these variables (e.g., CU traits, executive functions and social cognition)

begin to come on-line and develop during the preschool years (Dadds, Fraser, Frost, & Hawes, 2005; Diamond & Taylor, 1996; Dodge, Pettit, McClaskey, & Brown, 1986; Hawes & Dadds, 2005; Ladd, Herald, & Kochel, 2006; Wright et al., 2003), establishing directionality of these relations and identifying causal mechanisms could be obtained by assessing this age group.

Taking a different neurocognitive variable into consideration, prior studies have found that children's cognitive inhibition skills are inversely related to their aggressive behaviors (Coolidge, DenBoer, & Segal, 2004; Ellis et al., 2009). Cognitive inhibition helps children suppress immediate, and possibly aberrant thoughts and replace them with more social and acceptable ones. For example, children with hostile attribution bias are taught to use cognitive inhibition to suppress their hostile thoughts and replace them with more accurate explanations of a peer's behavior. Thus, better cognitive inhibition skills help children reduce aggression (Coolidge, DenBoer, & Segal, 2004; Ellis et al., 2009). Given the inverse relation between aggression and cognitive inhibition, it may be that non-aggressive children with CU traits would show greater inhibition and levels of cognitive sophistication than aggressive children with CU traits (e.g., Fanti et al., 2009).

Current Investigation

Although prior research has successfully examined the relation between CU traits and engaging in bullying behavior, this relation has only been studied with older children. The use of such samples (i.e., elementary school children and adolescents) may contribute to the lack of consistency across studies identifying the risk factors of CU traits and engaging in bullying behavior (Fontaine et al., 2009; Loney et al., 1998). By the time these children enter school and are further along the developmental trajectory, individual differences in CU traits may contribute to the lack of consistency in identifying risk factors. The present study addresses this gap in the

literature by investigating the impact of CU traits on bullying behaviors in preschoolers.

Furthermore, this study investigated how key social-neuro-cognitive variables may moderate this relation.

The present study will address this gap in the literature by focusing on individuals earlier on in the developmental trajectory. This will hopefully lead to a better understanding of the directionality of the relation between CU traits and bullying. It was predicted that: 1) CU traits would predict both bullying and victimization 2) CU children high in cognitive inhibition, social cognition and verbal IQ would be at an increased risk for engaging in bullying behavior and 3) children low in cognitive inhibition, social cognition and verbal IQ would be at an increased risk for being victimized.

There are two primary research questions this study is designed to address: What is the impact of CU traits in putting preschoolers at risk for engaging in bullying behaviors and how might social- and neuro-cognitive variables moderate this relation? If these key variables are meaningful risk factors, this will hopefully lead to the development of interventions that better target identified risk factors and increase school readiness in the realms of cognitive and social development.

2. METHODOLOGY

Participants

The data that will be used for the present study was collected as part of a larger investigation, the School Readiness Project. The larger study has multiple components, which includes assessing social-behavioral readiness (social competence, behavioral inhibition, prosocial behavior, aggressive behavior) and cognitive readiness (cognitive inhibition, executive function skills, theory of mind, appropriate fantasy). There are two broad aims to this study. The first is to examine parent and child risk factors for early onset (i.e., preschool) peer relational problems, through the use of existing measures utilized with children showing mild-to-severe developmental impairments in sociability and communication. The second aim is to examine children's cognitive development, specifically in the realm of conceptual development.

Data were collected through parent and teacher rated reports, along with engaging in various tasks with the children. Aside from demographic variables, only data from teacher reports and the various tasks with the children will be used in the present study.

The sample consisted of 103 parent-child dyads ($n = 103$) recruited from local preschools in the Southern United States, with the children aged 4-5 years ($M = 59.32$ months, $SD = 6.43$ months). 47% were boys and 53% were girls. Seventy-two percent of the children were identified by their mother as Caucasian, 22% as African American, 1% as Hispanic, and 5% not reporting. Twenty-three percent of mothers reported an annual income under \$15,000, with 17% reporting an income between \$15,000 and \$29,000, 28% between \$30,000 and \$49,000, and 32%

reported an annual income greater than \$50,000. Boys and girls significantly differed on age with boys being older than girls. Primary caregiver income did not differ between boys and girls.

Table 1

Sample Characteristics

Characteristics	<i>M</i>	<i>SD</i>	<i>t</i>
Age (in months)			
Whole sample	59.32	6.43	-2.53*
Males	60.75	6.59	
Females	57.61	5.92	
Income			
Whole sample	8.41	5.71	-.527
Males	8.70	5.35	
Females	8.00	6.25	

Notes: *N* = 103

**p* < .05

Procedure

The Internal Review Board at the University of Alabama approved all procedures for the larger study. Teacher and parent consent and child assent were obtained before primary data collection began. Data for the present study were collected from the teacher of the children. Measures were collected in a questionnaire format and filled out at the teachers' convenience. The various tasks that the children engaged in included the Peabody Picture Vocabulary Test, 4th Edition (PPVT-IV; Dunn & Dunn, 2006) and an Inhibitory Control Conflict Task titled the "Animal-Stroop Task" (Wright et al., 2003). Research assistants took the child into a separate room of the preschool where the Peabody Picture Vocabulary Test and several behavior and cognitive inhibition tasks (Gist task and Animal Stroop task) were administered. The vocabulary test took about 20 minutes, with the inhibition tasks taking a total of another 20 minutes. As preschoolers are notorious for their short attentions span (e.g., Wynn & Chiang, 1998), tasks were broken up to ensure willingness to participate and to avoid any fatigue. Various games

typically found in the child's classroom were used to keep the child active and engaged after each 20-minute block. Sessions were videotaped, given parental consent and child assent, to record responses of the inhibition tasks and aid in coding. Strategies to encourage teacher participation included a small monetary compensation that frequently went towards purchasing classroom materials.

Measures

Demographic information. Primary caregivers completed a demographic questionnaire, which collected information regarding the child's family. Parents were asked to identify their present age, the child's ethnicity, and the relationship to the child. Caregivers then rated their gross individual income over the past year using a 20-point scale from 0 (earns no income/not working) to 19 (earns \$100,000 or more). Additionally, caregivers were asked to give their highest educational level, marital status, and various occupation questions (e.g., what kind of work do you do, what are your most important activities or duties at that job, what kind of business or industry is this?).

Bullying and Victimization. The child's teacher assessed bullying and victimization with the Bully and Victim Problems scale (BVP; Alsaker & Valkanover, 2008). The BVP contains 8 items measuring two facets of bullying and victimization: physical (e.g. "How often did it happen during the last 3 months that he/she bullied other children physically such as hitting, kicking, pinching, or biting?") and verbal (e.g., "How often did it happen during the last 3 months that he/she was victimized verbally such as being laughed at, called names, or teased?"). Items are rated on a 5-point Likert scale from '1' (Never) to '5' (Several times a week). Past studies have found this measure to yield an adequate reliability of .85 (Perren & Alsaker, 2009).

Social Cognition. The child's teacher completed the social Responsiveness Scale (SRS; Constantino, 2002), which is a 65-item rating scale that measures the severity of autism spectrum symptoms as they occur in natural social settings. The SRS provides a clear picture of a child's social impairments, assessing social awareness, social information processing, capacity for reciprocal social communication, social anxiety/avoidance, and autistic preoccupations and traits. Items are rated on a 4-point Likert scale from '1' ('Not true') to '4' ('Almost always true'). For the purpose of this study, the social cognition subscale was used. Consisting of 12 items, teachers are asked to identify the response that best describes their student by asking such questions as 'doesn't recognize when others are trying to take advantage of him or her' and 'recognizes when something is unfair'. The social cognition subscale assesses the child's capability to understand social cues and exemplifies the cognitive-interpretive aspect of interchangeable social behavior. Past studies have found an internal consistency rating of .88 (Constantino et al., 2003).

CU traits. The child's teacher assessed callous-unemotional (CU) traits in the children using the CU Traits Factor Scale (Hawes & Dadds; 2007). CU Traits Factor Scale is a 9-item rating scale that measures callous-unemotional traits, prosocial behavior, and conduct problems. Items are rated on a 3-point Likert scale from '0' ('Not true') to 2 ('Certainly true'). The scores of all 9-items are summed then averaged to derive an overall score, and higher overall scores indicate higher levels of CU traits. Items are derived from two subscales: the CU sub-scale from the Antisocial process screening device (APSD; Frick & Hare, 2002) and the Prosocial behavior sub-scale and Conduct Problems sub-scale from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). The CU Traits Factor has been demonstrated to be a valid and reliable instrument (Hawes & Dadds; 2007) with a Cronbach's alpha of .79 being reported.

Cognitive Inhibition. Children's level of cognitive inhibition was measured using an inhibitory control conflict task. Titled the "Animal-Stroop" task (Wright et al., 2003); children are presented with drawings of animals (a duck, sheep, pig, and cow) that sometimes have mismatched faces and bodies (e.g., a duck face on a cow body), which is the stroop condition. Congruent faces and bodies is the control condition. Children are asked to name the animal based on the body, not the face. The first condition is a primer task that asks the child to merely identify common objects (e.g., ship, balloon). The first and third conditions are congruent, with the second and fourth condition being incongruent, or vice versa. Participants were randomly assigned to one of two orders. Reaction time along with whether or not the child correctly answered is recorded. Level of cognitive inhibition is measured as a percentage that is derived from using the formula [(average rt from stroop conditions – average rt from matching condition) X 100%]. A higher percentage represents higher average reaction times, which represents lower levels of cognitive inhibition. Prior findings have found a reliability coefficient of .93 using The Animal-Stroop task (Wright et al., 2003).

Peabody Picture Vocabulary Test. Children's verbal ability was assessed using the Peabody Picture Vocabulary Test, 4th Edition (PPVT-IV; Dunn & Dunn, 2006). The PPVT-IV scale is a norm-referenced, wide-range instrument for measuring the receptive vocabulary of children and adults. Each test contains training items and 228 test items, each consisting of 4 full-color pictures as response options on a page. For each item, the researcher says a word, and the child responds by pointing to the picture that best illustrates that word's meaning. Recent research findings have established a .72 reliability coefficient (Ryan, Glass, Sullivan, Gibson, & Bartels, 2009).

Analytic Strategy

Scores from teacher-based questionnaire along with the children's tasks were used to create all variables. Linear regression was used to generate models that would explain the greatest amount of variance for all the predictors. In line with previous findings, it was hypothesized that teacher ratings of CU traits and bullying would be significantly related with one another. Additionally, it was hypothesized that lower ratings of the independent variables (teacher ratings and children's tasks) would significantly predicted higher levels of bullying and higher levels of victimization (i.e., lower levels of social cognition would predict higher levels of bullying). It was also hypothesized that an interaction effect would exist, where the relation between bullying and the other independent variables would become stronger in the presence of increasing levels of CU traits. This hypothesis was based off previous findings that bullying and conduct problems increase in the presence of CU traits (Viding et al., 2009). All analysis controlled for the child's gender and mother's report of annual income.

3. RESULTS

Relationship Between Variables

Pearson correlations showed significant inter-correlation between variables. For girls: bullying was positively correlated with victimization, $r=.80, p<.01$, and CU traits, $r=.65, p<.01$; victimization was positively correlated with CU traits, $r=.75, p<.01$; CU traits was positively correlated with social cognition, $r=.53, p<.01$; and cognitive inhibition was positively correlated with PPVT standard scores, $r=.48, p<.01$.

For boys: income was negatively correlated with bullying, $r=-.30, p<.05$; bullying was positively correlated with victimization ($r=.67, p<.01$), CU traits ($r=.65, p<.01$), and social cognition ($r=.58, p<.01$). Victimization was positively correlated with CU traits ($r=.36, p<.01$), social cognition ($r=.70, p<.01$), and negatively correlated with PPVT standard scores ($r=-.39, p<.05$). CU traits were positively correlated with social cognition ($r=.44, p<.01$).

Table 2

Correlations Among Study Variables

Variable	1	2	3	4	5	6	7
1. Income	-	.08	.06	.18	-.07	.19	.30
2. Bullying	-.30*	-	.80**	.65**	.18	-.11	-.03
3. Victimization	-.12	.67**	-	.75**	.26	-.15	.18
4. CU traits	-.29	.65**	.36**	-	.53**	-.03	.26
5. Social Cognition	-.17	.58**	.70**	.44**	-	.03	.29
6. Cognitive Inhibition	.03	-.04	.12	.01	-.07	-	.48**
7. PPVT standard score	.16	-.08	-.39*	-.02	-.20	-.06	-

Note: PPVT – Peabody Picture Vocabulary Test standard score. Correlations for males are below the diagonal; correlations for females are above the diagonal.

** $p<.01$ * $p<.05$

Moderated Regression models

Moderated regression analyses were conducted to investigate the association between bullying, victimization, CU traits, and other variables. All analysis controlled for parental income and gender. The first regression analysis modeled victimization as the dependent variable, with CU traits as the main predictor and social cognition as the moderator, i.e., the degree to which the relation between CU and victimization might vary at different levels of social cognitive abilities (see Table 3). CU traits and social cognition were significant predictors for victimization. The interaction failed to reach significance.

Table 3

Regression Analysis of CU traits, Social Cognition, Gender, Income and CU x SC on Victimization

Variable		<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1	Gender	-.19	.17	-.10	.26
	Income	.01	.01	.05	.58
Step 2	Gender	-.16	.13	-.08	.37
	Income	.01	.03	.04	.58
	CU traits	.93	.21	.45	<.001
	Social Cognition	.75	.21	.35	.001
Step 3	CU X Social Cognition	.03	.08	.11	.25

In a second model, we examined the degree to which social cognition moderated the relation between CU and bullying (see Table 4). CU traits, social cognition and gender (girls being lower than boys) were significant predictors of bullying. The interaction failed to reach significance.

Table 4

Regression Analysis of CU traits, Social Cognition, and CU x SC on Bullying

Variable		<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1	Gender	-.40	.19	-.19	.04
	Income	-.01	.02	-.03	.72
Step 2	Gender	-.14	.10	-.05	.33
	Income	.02	.03	.05	.54
	CU traits	1.57	.24	.63	<.001
	Social Cognition	.40	.05	.49	.02
Step 3	CU X Social Cognition	.13	.22	.21	.36

The third modeled PPVT scores as the moderator of the relation between CU and victimization. None of the main effects or interaction term was significant predictors of victimization, although CU traits was trending ($p=.06$).

Table 5

Regression Analyses of CU traits, PPVT standard score, Gender, Income, and CU x PPVT_ss on Victimization

Variable		<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1	Gender	.01	.12	.15	.88
	Income	-.13	.14	-.86	.39
Step 2	Gender	.03	.09	.11	.79
	Income	-.17	.19	-.88	.35
	CU traits	.44	.23	.37	.06
	PPVT_ss	.17	.39	.24	.66
Step 3	CU X PPVT_ss	-.20	.46	-.44	.66

The fourth modeled PPVT as the moderator of the relations between CU and bullying. CU traits ($p<.001$) and PPVT standard scores ($p<.001$) were significant predictors of bullying. The interaction term 'PPVT standard scores' X 'CU traits' reached significance ($p < .001$). The

interpretation of the interaction effect is as follows: the relation between bullying and CU traits becomes progressively stronger as PPVT standard scores increase (see Figure 1). Hence, CU children with high PPVT scores are more likely to bully his/her peers.

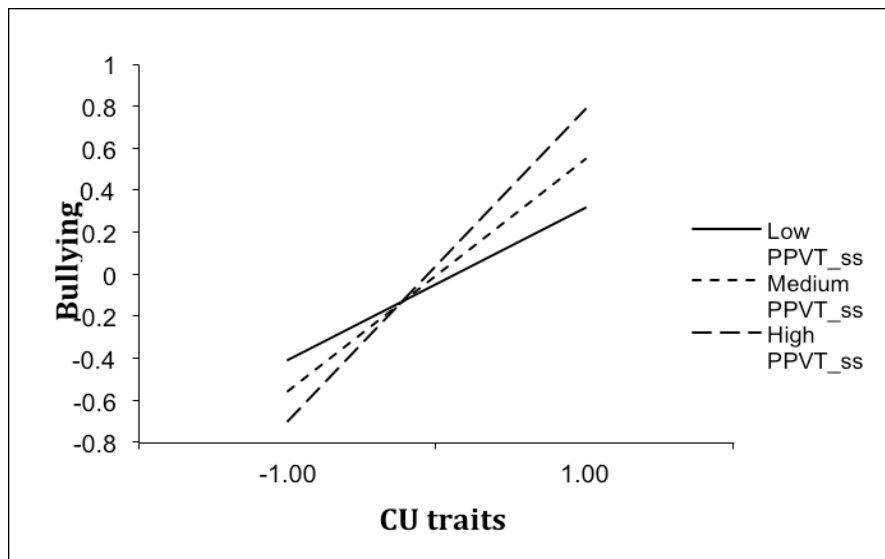
Table 6

Regression Analyses of CU traits, PPVT standard score, , and CU x PPVT_ss on Bullying

Variable		<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1	Gender	-.002	.003	-.001	.39
	Income	.001	.001	.002	.24
Step 2	Gender	-.002	.001	-.001	.47
	Income	.003	.002	-.007	.33
	CU traits	-.19	.002	-.22	<.001
Step 3	PPVT_ss	-.06	.001	-.01	<.001
	CU X PPVT_ss	-.09	.001	1.13	<.001

Figure 1

Interaction between CU traits and PPVT standard scores on bullying



The fifth modeled cognitive inhibition as the moderator of the relation between CU and victimization (see Table 6). In this model, CU traits were a significant predictor of victimization ($p < .001$) and the interaction term failed to reach significance.

Table 7

Regression Analyses of CU traits, Cognitive Inhibition, Gender, Income, and CU x Cognitive Inhibition on Victimization

Variable	<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1				
Gender	.04	.08	.52	.61
Income	.01	.09	.07	.09
Step 2				
Gender	.06	.10	.49	.57
Income	.03	.08	.09	.11
CU traits	.55	.09	.63	<.001
Cognitive Inhibition	-.01	.11	-.05	.96
Step 3				
CU X Cognitive Inhibition	.79	.77	.21	.31

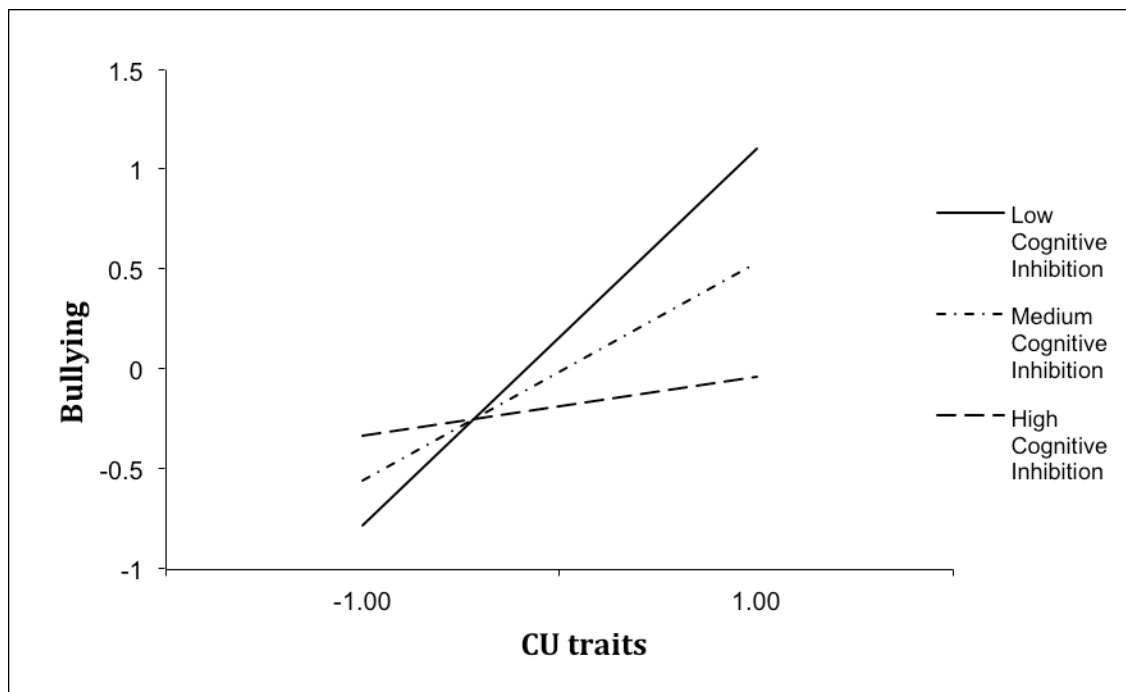
The final model assessed the degree to which cognitive inhibition moderated the relation between CU and bullying. (see Table 8). CU traits were a significant predictor of bullying ($p < .001$). The interaction term ‘cognitive inhibition’ X ‘CU traits’ reached significance ($p = .01$). The interpretation of the interaction effect is as follows: the relation between bullying and CU traits becomes progressively stronger as cognitive inhibition levels decrease (see figure 2).

Table 8
Regression Analyses of CU traits, Cognitive Inhibition, Gender, Income, and CU x Cognitive Inhibition on Bullying

Variable		<i>b</i>	<i>SE b</i>	Beta	<i>p</i>
Step 1	Gender	-.13	.16	-.08	.43
	Income	.003	.01	.02	.84
Step 2	Gender	-.14	.13	-.10	.41
	Income	.003	.02	.02	.88
	CU traits	.45	.08	.52	<.001
Step 3	Cognitive Inhibition	-.05	.08	-.07	.48
	CU X Cognitive Inhibition	-.22	.08	-.28	.01

Figure 2

Interaction between CU traits and Cognitive Inhibition on bullying



4. DISCUSSION

The goals of the present study were to examine the extent to which CU traits might put preschool children at risk for bullying and victimization, as well as how key social- and neurocognitive variables might moderate this relation. Additionally, this study extended current knowledge on the relation between bullying, victimization and CU traits by assessing these behaviors at preschool. As hypothesized, CU traits predicted bullying behavior as well as being victimized. Furthermore, results indicated that the relation between CU traits and bullying was moderated by both cognitive inhibition and verbal ability. However, no moderation effects were found for victimization.

It was hypothesized that CU traits would put children at risk for both bullying behaviors and victimization. Data from this study with preschoolers supported the predication and corroborates previous findings that have used older participants (Viding et al., 2009). CU traits serving as a risk factor for engaging in bullying behavior has been well established (Fanti et al., 2009; Viding et al., 2009). Recent research has examined the potential importance of subtyping children with CU traits to those with low and high levels of aggression (Frick & Marsee, 2006; Viding et al., 2009). The current study provides support for examining potential heterogeneity with CU children and identifying risk factors for the differing profiles. That is, identifying factors that would put a child at risk for developing CU traits and high levels of aggression. Likewise, identifying factors that would put a child at risk for developing CU traits and low levels of aggression.

One of the more robust risk associations with aggressive behavior is low verbal IQ. Prior findings have linked delinquency and antisocial behavior with verbal deficits in children (Loney, Frick, Ellis, & McCoy, 1998). Although verbal deficits were found in children with conduct problems only, children with conduct problems and CU traits did not demonstrate any verbal deficits. Of interest, Fontaine et al. (2008) reported that CU traits were related to normative abilities in an epidemiological sample of males and females in late childhood. We supported and extended these results, in that CU children high in verbal ability would be at risk for engaging in bullying behaviors. This is an interesting finding as our measure of bullying included forms such as physical (e.g., hits, kicks, punches, bites), verbal (e.g., laughs at, call names) and social (e.g., excludes other children).

Against our expectations, data suggested that CU traits and low levels of cognitive inhibition predicted bullying behaviors. This is an interesting finding as it suggests such children possess normative verbal ability but are also cognitively uninhibited. Prior studies have found children's cognitive inhibition skills inversely related to their aggressive behaviors (Coolidge & DenBoer, 2004; Ellis et al., 2009). Being less cognitively inhibited may explain why these CU children are engaging in aggressive, more physical forms of bullying.

Gender differences in bullying, social cognition and verbal abilities were found in this sample. For males, a positive relation between bullying and social cognition existed. This relation did not reach significance with females. Although males have been found to engage in higher rates of bullying than females (Archer, 2004; Viding et al., 2009), this relation was expected to be negative, as previous findings have found social development to be inversely related to aggressive behaviors (Waschbusch et al., 2007). At the same time, victimization and verbal abilities were negatively related for males only. Aggression, which is a robust predictor of

victimization (Barker et al., 2008), has been demonstrated to be negatively related with normative intellectual functioning (Lynam, 1998). That is, children who are victimized engage in physically aggressive behavior. It is this physically aggressive behavior that serves as a risk factor for deficits in intellectual functioning. Furthermore, previous research has found that females possess higher levels of verbal ability than males (Calvin, Fernandez, Smith, Fischer, & Diary, 2010). This may explain why young males that are increasingly victimized demonstrate lower verbal ability.

Some limitations of the current study should be mentioned. Seventy-two percent of children were Caucasian with the average parental income ranging from \$35,000-\$40,000. Further investigation of other SES and ethnic groups would increase the generalizability of these findings. The assessment of bullying and victimization has been previously used (Alsaker & Valkanover, 2000; Alsaker & Nagele, 2008) in parental and teacher reports and incorporates three essential forms of bullying and victimization (e.g., physical, social and verbal). However, the definitions used were compressed and not as specific as assessments frequently used in the bullying and victimization literature (Olweus, 1993). This is due, in part, to the age of the participants in the current study. Bullying and victimization assessments that use older participants typically include a formal definition of bullying and victimization. In addition, the different components that make up bullying and victimization (e.g., power differential, repeated occurrence) are brought to the informant's awareness. An additional limitation of the study derives from not finding that any of the social- and neurocognitive variables moderated the relation between CU traits and victimization. Future research should incorporate internalizing symptoms (e.g., anxiety or depression) as potential moderators between CU traits and victimization. Prior findings have found anxiety to be negatively correlated with CU traits

(Pardini, Lochman, & Powell, 2007; Kubak & Salekin, 2009). The Child Behavior Checklist (Achenbach, 1991; Achenbach & Rescorla, 2001) is a well validated measure for use in internalizing research. Furthermore, the CBCL has been established to assess ages from 4- to 18-year old-children. However, research using internalizing symptoms as a moderator in young CU children and bullying/victimization is sparse.

A further point to consider in relation to the data is the notion that the behaviors being investigated are not static in nature. That is, bullying and victimization do not occur independent of one another. It must be acknowledged that significant correlations exist between several of the independent variables. However, tests for multicollinearity indicated that moderate levels of multicollinearity were present (Mean $VIF = 6.21$ for bullying, victimization, verbal ability, CU traits and social cognition). Thus, the multicollinearity found within the data does not present significant concern with respect to the regression model coefficients becoming unstable and the standard errors becoming inflated.

This study highlighted the importance of viewing CU traits and neurocognitive variables not only as associated behaviors, but also as moderating the risk of children engaging in bullying behaviors. A strength of the current investigation is these findings were demonstrated early in children development (e.g., preschool). These findings have important implications for etiology and prevention purposes. One prior study of CU traits (Hawes & Dadds, 2007) in a clinically referred sample of male elementary school children indicated that CU traits remained stable over time. The very nature of CU traits, such as lack of guilt and remorse for antisocial behavior, makes effective interventions a challenge. However, common interventions for bullying can be categorized as either “educative” (Rigby, 2004) or “zero-tolerance” (Smith, Pepler, & Rigby, 2004). The educative approach attempts to increase a bully’s awareness of their actions and to

motivate change. The zero-tolerance policy is more punitive in approach and is administered within the school. Given the minimal impact of interventions with children high on CU traits (Blair et al., 2006; Hawes & Dadds, 2007), perhaps efforts would be more impactful if focused earlier in child development. One project in particular (Gilpin, Boxmeyer, Lochman, DeCaro, & Barker, in preparation) is aiming to improve school readiness. The study will be identifying social, cognitive and physiological predictors of school readiness in a preschool sample. Children will be receiving the PATHS preschool curriculum (Greenberg, Kusche, Cook, & Quamma, 1995). The aim of PATHS is to improve children's behavioral control (inhibition) and socio-emotional understanding.

Finally, cognitive inhibition and verbal intelligence, which were moderator variables, could be important targets for interventions. Given the known relation between cognitive inhibition, aggressive behaviors, CU traits and verbal intelligence, focus needs to be on developing a neurocognitive profile of young children. Based on this study, it is theorized that children high on aggression and CU traits may be the best targets for intervention. The development and evaluation of such interventions represents a vital focus for future research.

In conclusion, the current study examined the association between CU traits, bullying and victimization, as well as how social- and neurocognitive variables might moderate this relation. In particular, children high on CU traits and verbal ability are at an increased risk for engaging in verbal bullying behaviors. Also, children high on CU traits and low on cognitive inhibition are at an increased risk for engaging in a more bullying behavior, such as physical bullying. Examining whether internalizing symptoms moderate the relation between CU traits and victimization may help identify the underpinnings of this type of behavior.

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