



## RESEARCH ARTICLE

# Investigating honesty-humility and impulsivity as predictors of aggression in children and youth

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**Funding information**Canadian Institutes of Health Research,  
Grant/Award Number: PJT-148939**Abstract**

Among adult and adolescent populations, the personality trait of honesty-humility (HH) has been linked to aggression. For example, adults low in HH have been found to exhibit higher levels of workplace delinquency and revenge motivation, and adolescent low in HH are more likely to bully others. However, there is a paucity of research examining this relationship in children and youth, and how these relationships develop over time. The current study addressed these gaps in the literature by assessing whether HH and impulsivity are independently associated with aggression in children Grades 3 through 8 ( $N = 1201$ ). Using data from the two waves of a longitudinal project, autoregressive crossed-lagged path analysis was used to examine the bidirectional relationships between HH, impulsivity, and aggression over a 1-year period. Results revealed significant bidirectional relationships between HH and aggression, such that lower scores of HH at Time 1 were associated with higher scores of aggression at Time 2 and vice versa. Similarly, higher scores of impulsivity at Time 1 were associated with higher scores of aggression at Time 2 and vice versa. In addition, these relationships were strongest in boys and at higher ages. Consistent with research in other populations, these results indicate that low HH and high impulsivity are linked to aggression in children and youth. Further, our results demonstrate that HH and impulsivity bidirectionally impact aggression as one age, suggesting a need for early intervention.

**KEYWORDS**

aggression, children, honesty-humility, impulsivity, youth

## 1 | INTRODUCTION

Aggressive behavior, such as physically or verbally assaulting someone, is problematic across the lifespan. The time between childhood and adolescence; however, is of critical importance for curtailing such behaviors, as this developmental window is often accompanied by increased participation in aggression (e.g., bullying; Olweus, 2013). Importantly, if aggressive behaviors become prevalent during this stage of development, they can escalate and persist. For instance, when patterns of physical aggression begin at a young age in boys, there is a greater likelihood for them to develop into more violent and delinquent behavior during adolescence,

compared to boys who do not engage in such aggression (Broidy et al., 2003). Additionally, the social and emotional adjustment of these youth is affected by participation in aggression toward others, as these individuals often alienate themselves from their peers, develop hostile world views, and are unable to adequately self-regulate (Lundh, Daukantaitė, & Wångby-Lundh, 2014; McDougall & Vaillancourt, 2015; Raine et al., 2006). Thus, given the seemingly cyclical nature of aggressive behavior and maladaptive development, it is of critical importance for researchers to take a longitudinal approach in identifying what factors within individuals predict engagement in aggression early in the lifespan when the personality is the most susceptible to change (Ashton, 2017).

## 1.1 | Honesty-humility (HH)

An individual's personality can manifest itself in a seemingly infinite amount of ways; however, there are central dimensions of personality that vary across individuals. Indeed, many researchers have attempted to quantify personality into three, five, or six central dimensions by examining various languages and the ways in which individuals are described using adjectives. In particular, seminal work by McCrae and Costa (1987) examined the English language and summarized personality into five dimensions, commonly known as the Big 5 Model of personality. In recent years; however, updated models of personality have been developed by exploring other languages beyond English; these models have delineated the sixth factor of personality, known as HH (Lee & Ashton, 2004).

The HH factor reflects the general tendency to be humble and honest across different contexts (Lee & Ashton, 2004). Individuals high in HH do not manipulate others for personal benefit, they follow rules, are not motivated by monetary gain, and are unentitled (Lee & Ashton, 2004). Conversely, individuals who are low in HH use flattery to get what they want, break the rules, are materialistic and are extremely entitled.

From a theoretical standpoint, low HH may relate to aggression in two ways. First, given that individuals low in HH report feeling entitled and have lower levels of modesty than individuals high in HH, they often expect preferential treatment (e.g., Lee, Ashton, Ogunfowora, Bourdage, & Shin, 2010). Accordingly, these individuals have a greater tendency to feel slighted by minor mishaps (e.g., someone forgetting their name, someone showing up late to a meeting or appointment with them) or have a lower threshold for provocation, which may, in turn, promote greater reactive aggression (see Sell, Tooby, & Cosmides, 2009). Indeed, low HH has been associated more strongly with directed, rather than displaced, aggression after hypothetical disputes (Lee & Ashton, 2012), such that individuals endorsing lower levels of HH are more likely to focus their aggression toward the source of their frustration/anger, instead of toward an unrelated target (e.g., punching a wall). Second, since individuals low in HH tend to be motivated by material gain and personal benefits, yet they do not value fairness or equity, they are more prone to using aggression when they are not able to obtain their personal goals by other means (e.g., Zettler & Hilbig, 2010). For example, in contrast to a child who is higher in HH, a child who is low in HH may bully his/her peer to enhance his/her social status because he/she is motivated to become popular and is less concerned about who he/she may step on to achieve this aim (Farrell, Della Cioppa, Volk, & Book, 2014). In fact, low HH has been strongly associated with self-reports of both reactive and proactive aggression (Book, Visser, Volk, Holden, & D'Agata, 2019). Accordingly, low HH has been identified as a primary predictor of aggressive behavior in adult and adolescent populations (Ashton & Lee, 2008).

In adults, HH is negatively correlated with various forms of aggressive behaviors, such as self-reported delinquency (Dunlop, Morrison, Koenig, & Silcox, 2012) and workplace theft (Lee, Ashton,

& de Vries, 2005). In addition, lower levels of HH are associated with higher levels of revenge motivation (Lee & Ashton, 2012) and a willingness to exploit and deceive romantic partners (Holden, Zeigler-Hill, Pham, & Shackelford, 2014). Other research has investigated this personality factor in adolescent populations, demonstrating that low levels of HH are a strong predictor of bullying behaviors, even more so than other personality factors, such as low agreeableness (i.e., a higher likelihood to hold grudges, be stubborn, and respond angrily; Book, Volk, & Hosker, 2012; Farrell et al., 2014). Further, research has demonstrated that adolescents low in HH are less likely to endorse prosocial behavior and instead advocate for antisocial behavior to achieve desired outcomes (Allgaier, Zettler, Wagner, Püttmann, & Trautwein, 2015). Together, the research from adult and adolescent populations demonstrates that low HH is an important motivator for a variety of aggressive behaviors and may be broad in its predictive ability. Nevertheless, there remains a paucity of research examining how HH develops over time and what types of aggressive behavior are associated with low HH in younger age groups.

## 1.2 | Impulsivity

Research examining low HH and aggressive behavior is lacking at younger ages and across time, but there is a substantial body of research that has examined impulsivity and aggressive behavior, over time in children and youth (Romer, 2010). Impulsivity is broadly defined as the ability to monitor, control, and restrict one's actions. Accordingly, impulsivity is a defining feature and crucial to the diagnosis of many psychopathologies. In particular, the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition contains a section dedicated to impulse-control disorders (e.g., conduct disorder, intermittent explosive disorder, pyromania, and kleptomania; American Psychiatric Association [APA], 2013), and impulsivity is embedded within the diagnostic criteria for other mental disorders, such as borderline personality disorder, antisocial personality disorder, and attention-deficit/hyperactivity disorder (APA, 2013).

Impulsivity's association with aggressive behavior is not limited to clinical populations, as impulsivity has been identified as a predictor of aggressive behavior in nonclinical samples as well. Importantly, when individuals demonstrate an inability to control their impulses at a young age, they are more likely to experience maladjustment problems compared to those who can. For example, evidence from longitudinal research has demonstrated that children with higher levels of impulsivity are at greater risk for substance dependence, financial difficulties, and engagement in criminal behavior later in life than children with lower levels of impulsivity (reviewed in Moffitt, Poulton, & Caspi, 2013). Further, longitudinal research examining adolescents over brief periods of time has found that those who are more impulsive also tend to be more aggressive toward others and display more antisocial behaviors compared to those who are less impulsive (e.g., Luengo, Carrillo-de-la-Peña, Otero, & Romero, 1994; Ostrov & Godleski, 2009). Together, the

importance of impulsivity in psychopathology, and findings from longitudinal research demonstrate that it is predictive of aggression and maladaptive development over time and that the association between impulsivity and these negative outcomes begins early on in the lifespan.

Nevertheless, recent research has begun to account for other personal characteristics when examining the relationship between impulsivity and aggressive behavior, as impulsivity covaries with other personal characteristics that are associated with aggression (e.g., psychopathic traits, see Hare, 2003; Hosker, 2017). Further, as behavioral models are advanced, research has examined if impulsivity's predictive validity is limited to specific forms of aggressive behavior and affected by the context in which an individual develops. For instance, when examining the relationships between impulsivity, parenting practices, and aggression over time, Hentges, Shaw, and Wang (2018) found that high impulsivity at age 2 had a direct effect on greater substance use at age 22, but not aggression. Impulsivity, however, moderated the relationship between neglectful parenting at age 2 and greater aggression at age 12, 15, and 22, such that these relationships existed only in children who were high on impulsivity at a young age. Similar research from Rhee et al. (2018) examined impulsivity in toddlers and externalizing problems in childhood and adolescence. In this study, impulsivity was not associated with a parent or self-reported aggressive behavior but was negatively associated with teacher-report. This finding, however, was no longer significant when accounting for "a disregard for others" (i.e., a separate individual characteristic; Rhee et al., 2018), which may be conceptually similar to HH. In other words, impulsivity may be related to low HH, as both factors share strong associations with other personality traits and individual tendencies. For example, both high impulsivity and low HH are positively associated with narcissism, psychopathy, and selfishness (Hilbig & Zettler, 2009; Hodson et al., 2018; Jones & Paulhus, 2011; Malesza & Ostaszewski, 2016), and low HH is associated with both sensation-seeking and risk-taking behaviors (De Vries, de Vries, & Feij, 2009). Taken together, recent findings suggest that, over time, impulsivity's predictive validity may be limited to particular forms of aggressive behaviors or diminished when accounting for other aspects of an individual's personality. Thus, the primary objective of the current paper is to determine if impulsivity and low HH independently predict aggressive behavior in children and youth over time.

### 1.3 | The current study

We investigated which individuating factor, HH or impulsivity, was the better predictor of aggressive behavior in a large sample of nonclinical youth over a 1-year period, and their bidirectional relationships over time. Notably, impulsivity was selected as a predictor of aggression given its predominance in the developmental literature (Romer, 2010). Moreover, due to its association with related personality constructs, such as psychopathy (Hodson et al., 2018), the current study attempted to control for impulsivity when examining HH's effect on aggression over time. The current study

had two hypotheses: (1) HH and aggression would share a bidirectional relationship over time, such that lower scores of HH at Time 1 would be associated with higher scores of aggression at Time 2 and higher scores of aggression at Time 2 would be associated with lower scores of HH at Time 1; (2) impulsivity and aggression would share a bidirectional relationship over time, such that higher scores of impulsivity at Time 1 would be associated with higher scores of aggression at Time 2 and higher scores of aggression at Time 2 would be associated with higher scores of impulsivity at Time 1. Additionally, we examined the bidirectional relationship between HH and impulsivity over time, but given the lack of research on this topic, we made no specific hypotheses regarding these associations. Sex, age, and socioeconomic status (SES) were also examined as covariates, as each has been found to be associated with variation in aggressive responding over time (Archer, 2004; Dodge, Pettit, & Bates, 1994; Huesmann, Eron, Lefkowitz, & Walder, 1984).

## 2 | METHOD

### 2.1 | Participants

The current longitudinal sample included 1,201 children and adolescents (49.4% female) who were enrolled in 15 elementary and two high schools in a mid-sized city in southern Ontario, Canada. Participants were part of a larger longitudinal study examining the relationship between wellbeing and youth health-risk behaviors. All participants were in Grades 3 through 8 in Year 1 ( $M_{\text{age}} = 10.74$  years; standard deviation [SD] = 20.64 months; range = 7–14 years), and in Grades 4 through 9 in Year 2 of the study. Retention from Year 1 to Year 2 was 89.1%. Consistent with the broader population from which the sample was drawn (Statistics Canada, 2016), 83.6% of the children and adolescents were White, 2.7% were Hispanic, 2.2% were Asian, 1.9% were Black, 1.8% were Indigenous, 6.8% were Mixed, and 1% preferred not to answer (information was obtained by parent report). Data on socioeconomic status indicated mean levels of education for mothers and fathers falling between "some college university" and "associate degree/diploma". Further, 67.9% of the respondents reported living with both birth parents, 10.1% reported shared parenting arrangements, 9.5% lived with one birth parent and a stepparent, 11.5% lived with one birth parent (mother or father only), and the remainder with other guardians (e.g., other relatives, foster parents, etc.).

### 2.2 | Procedure

The study was approved by the Brock University Research Ethics board and a local School Board. Active informed consent was obtained from the participants' parents and actively informed assent was obtained from the participants. The questionnaires were administered to students in their classroom by trained research staff. Participants who were unable to complete the survey on their own were provided with assistance from the research staff. Students were informed that their responses were completely confidential. In

both Year 1 and Year 2, survey data collection occurred over 4 months (January–April). Each year, the survey was split into two parts due to its length and administered approximately 1 month apart. This separation resulted in aggression items being measured in Part 1, and HH and Impulsivity items measured in Part 2. Participants received small gifts as compensation (e.g., pencils).

## 2.3 | Missing data analysis

Missing data occurred because some students did not complete all the questions in the surveys (average missing data were 3.25% at Year 1, and 3.39% at Year 2), and because some students did not complete each part of the survey in Year 1 and Year 2 (as mentioned in the procedure, the survey each year was split into two parts that were completed at different time periods; missing data were due to absenteeism but also occasionally to time conflicts or students declining to participate in one part of the survey). For the first part of the survey (containing the aggressive behavior questions), in Year 1 8.33% of students missed the survey, and in Year 2 11.16% missed the survey. For the second part of the survey (containing the HH and impulsivity measures), in Year 1 8.91% of students missed the survey, and in Year 2 11.91% missed the survey. Missing data for the second part of the survey in Year 1 (0.83%) and for both parts of the survey in Year 2 (6.83%) also occurred because some students moved from the school district and were not able to be contacted to complete the surveys online (6.91%), or because they dropped out of the study (0.75%). Missing data, however, were not related to the variables used in the current analyses ( $ps > .05$ ). Thus, missing data were estimated using the full information maximum likelihood (FIML) estimation method. FIML retains cases that are missing survey waves, thus avoiding the biased parameter estimates that can occur with pairwise or listwise deletion (Schafer & Graham, 2002).

## 2.4 | Measures

### 2.4.1 | Aggression

Participants completed a 7-item questionnaire that assesses perceptions about the frequency of aggressive behavior (Time 1  $\alpha = .80$ ; Time 2  $\alpha = .78$ ; Marini, Spear, & Bombay, 1999). In particular, items of this questionnaire ask participants how often they engaged in aggression toward others over the past school year (e.g., Since the beginning of

summer last year, how often have you pushed or shoved someone?). Questions are answered on a 5-point Likert scale (1 = never, 2 = a few times a year, 3 = a few times a month, 4 = a few times a week, 5 = everyday). Mean scores were used in data analyses. Higher scores on this questionnaire indicate more aggression.

### 2.4.2 | Honesty-humility

HH is one of six factors of the HEXACO Personality Inventory-Revised (HEXACO PI-R; Lee & Ashton, 2004). In the current study, a composite measure of HH was created using four questions from the HEXACO PI-R (Time 1  $\alpha = .62$ , Time 2  $\alpha = .70$ ). These questions were modified so that they would be developmentally appropriate for children as young as 8 years of age (see Table 1). Despite these modifications, the modified version retained similar psychometric properties to the original HH scale (see Lee & Ashton, 2004). Additionally, a parallel analysis gave eigenvalues of 1.1, 1.06, and 1.01. Analyses at both time points produced only one eigenvalue exceeding those obtained from the parallel analysis. Specifically, maximum likelihood estimation revealed a 1-factor solution at both Time 1 and Time 2. At Time 1, this 1-factor solution had an eigenvalue of 1.91, explaining 48% of the variance, and at Time 2, this 1-factor solution had an eigenvalue of 2.13, explaining 53% of the variance. Questions were answered on a 4-point Likert scale and reversed coded (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). The mean scores of these questions were used for data analysis. Higher scores indicated greater HH.

### 2.4.3 | Impulsivity

Participants completed a 4-item impulsivity questionnaire (Time 1  $\alpha = .81$ , Time 2  $\alpha = .81$ ). The items (e.g., I act on the spur of the moment) were taken from the Barret Impulsiveness Scale-10 (Patton, Stanford, & Barratt, 1995). Questions were answered on a 4-point Likert scale (1 = almost never, 2 = sometimes, 3 = often, 4 = almost always). The mean scores of these questions were used for each participant in data analyses. Higher scores indicated greater impulsivity.

### 2.4.4 | Covariates

Age, sex (0 = male, 1 = female), and parental education (an average of both parents' education level on a 6-point scale; 1 = did not finish

**TABLE 1** Original and adapted honesty-humility items

HH items from the 60 items HEXACO PI-R	Adapted questions
I wouldn't pretend to like someone just to get that person to do favors for me.	I would pretend to like someone just to get them to do favors for me.
I think that I am entitled to more respect than the average person is.	I think that I should get more respect than the average student.
I wouldn't want people to treat me as though I were superior to them.	I think I should get special treatment.
If I knew that I could never get caught, I would be willing to steal a million dollars.	If I knew that I would never get caught, I would be willing to steal something worth a lot of money.

Abbreviations: HH, honesty-humility; HEXACO PI-R, HEXACO personality inventory-revised.

**TABLE 2** Descriptive statistics

	Range	Time 1		Time 2	
		M	SD	M	SD
Honesty-humility	1–4	3.23	0.51	3.26	0.54
Aggression	1–5	1.26	0.36	1.22	0.32
Impulsivity	1–4	3.12	0.70	3.10	0.66
Covariates					
Age	8–14	10.74	1.73		
Sex	0–1	49.49% female			
Parental education	1–6	3.758	1.27		

Abbreviation: SD, standard deviation.

high school, to 6 = graduate degree;  $r = 0.45$ ) were assessed at Time 1 and included in analyses as covariates.

### 3 | RESULTS

#### 3.1 | Preliminary analyses

Descriptive statistics are presented in Table 2. Preliminary analyses were carried out with IBM's Statistical Package for the Social Sciences (SPSS; IBM, 2012). Outliers ( $\pm 3.29$  SD's from the mean) on each variable were Winsorised with rank-order stability maintained. Specifically, we adjusted scores for seven participants high on aggression at Time 1 and Time 7 participants high on aggression at Time 2, and for five participants low on HH at Time 1 and Time 9 participants low on HH at Time 2. These Winsorised variables were used for all path analyses. Normality checks for each variable revealed that kurtosis and skewness were within acceptable ranges. We examined the correlations between each predictor in our model to assess multicollinearity and all correlations between variables were acceptable  $< 0.50$  (see Table 3).

There were significant differences between males and females on aggression (Time 1 and Time 2), impulsivity (Time 1 and Time 2), and HH (Time 2) such that males were more aggressive, impulsive, and

lower in HH than females (all  $ps < .05$ ). Younger children were more aggressive (Time 1 and Time 2) and lower in impulsivity (Time 1 and Time 2) than older children (all  $ps < .025$ ). Lower parental education was associated with higher impulsivity at Time 1 and Time 2 (both  $ps < .05$ )

#### 3.2 | Primary analyses

We used an autoregressive cross-lagged path analysis in MPlus 8 to examine the associations among aggression, HH, impulsivity and our covariates (sex, age, and parental education) across Time 1 and Time 2 (see Figure 1). Overall model fit was determined using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) indicators (Hu & Bentler, 1999). The cut-off criteria recommended for a well-specified model are a CFI  $> 0.95$  and an RMSEA  $< 0.06$ , simultaneously (Hu & Bentler, 1999).

Across both time points, cross-lag paths, autoregressive paths, and concurrent associations among all variables within each wave were included, with the exception of the correlation between sex and parental education as it was not expected to be significant. Correlations were specified between the covariates and each variable at Time 1, and paths estimated between the covariates and each variable at Time 2. Any significant paths, therefore, would be accounting for covariates, previous scores on the outcome variables, correlations among variables within a wave, and the other predictors in the model.

We first examined whether age was a potential moderator of the relationship among our variables, given its bivariate associations with our primary variables of interest (see Table 3). Multigroup analyses used the same model as primary analyses except output was median-split between younger and older ages ( $> 11$  years of age ( $n = 554$ ), or  $\leq 11$  years of age ( $n = 647$ )). We ran the model once with all cross-lagged paths constrained ( $\chi^2 = 8.902$ ;  $df = 8$ ) and once unconstrained ( $\chi^2 = 1.493$ ;  $df = 2$ ). The difference score ( $\chi^2$  diff = 7.409) was not significant,  $p > .05$ , indicating that the pattern of findings between the two age groups was not significantly different from one another.

**TABLE 3** Bivariate correlations between all study variables

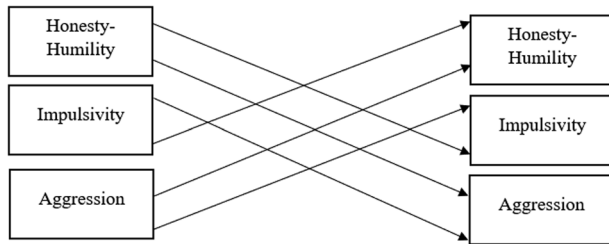
Variables	1	2	3	4	5	6	7	8	9
1. HH1	–								
2. HH2	0.406**	–							
3. Agg1	–0.312**	–0.260**	–						
4. Agg2	–0.244**	–0.323**	0.499**	–					
5. Imp1	–0.248**	–0.243**	0.380**	0.297**	–				
6. Imp2	–0.190**	–0.379**	0.270**	0.374**	0.470**	–			
7. Age	–0.096**	–0.131**	0.220**	0.206**	0.153**	0.166**	–		
8. Sex	0.120**	0.133**	–0.177**	–0.166**	–0.128**	–0.152**	0.076*	–	
9. EDU	–0.029	.003	–0.025	–0.044	–0.093*	–0.134**	0.021	–0.006	–

Note: Numbers 1 and 2 indicate Time 1 and Time 2, respectively.

Abbreviations: Agg, aggression; EDU, parental education; HH, honesty-humility; Imp, impulsivity.

\*Correlation is significant at the 0.01 level (2-tailed).

\*\*Correlation is significant at the  $< 0.001$  level (2-tailed).



**FIGURE 1** Visualization of significant main paths from the final model

Thus, all further reported results are from the model in which age was included as a covariate. Model fit was excellent ( $\chi^2 = 0.829$ ;  $p = .866$ ; RMSEA = 0.000; 90% confidence interval = [0.00, 0.041]; CFI = 1.000).

With regard to Hypothesis 1, the results of the path analyses indicated a significant bidirectional relationship between HH and aggression, such that lower levels of HH predicted higher levels of aggression over time, and higher levels of aggression predicted lower levels of HH over time (see Table 4). With regard to Hypothesis 2, the results of the path analyses indicated a bidirectional relationship between impulsivity and aggression, such that higher levels of impulsivity predicted higher levels of aggression over time, and higher levels of aggression predicted higher levels of impulsivity over time (see Table 4). Additionally, the results of the path analyses indicated a unidirectional association between HH and impulsivity over time, such that higher impulsivity was a significant predictor of lower HH, but lower HH was not a significant predictor of higher impulsivity over time, although this association approached significance ( $p = .055$ ; see Table 4).

In terms of covariates, sex at Time 1 was a significant predictor of aggression at Time 2, impulsivity at Time 2, and HH at Time 2, such that males were more likely to be aggressive, impulsive, and have lower levels of HH than females over time (see Table 4). Age at Time 1 was a significant predictor of aggression at Time 2, impulsivity at Time 2, and HH at Time 2, such that older youth were more aggressive, impulsive, and had lower levels of HH than younger youth over time (see Table 4). Parental education at Time 1 was a significant predictor of impulsivity at Time 2, such that lower levels of parental education predictor higher levels of impulsivity over time (see Table 4).

## 4 | DISCUSSION

The current study sought to address an important gap in the literature by investigating the interrelationships among HH, impulsivity, and aggression in a large sample of children and adolescents over a 1-year period. Consistent with hypotheses, bidirectional relationships were found between HH and aggression, as well as between impulsivity and aggression, indicating that these variables are associated with one another over time. Importantly, the bidirectional association between HH and aggression is in line with

**TABLE 4** Autoregressive cross-lagged model results

	B	$\beta$	95% CI	SE
HH1 → Agg2	-0.058	-0.071*	[-0.126, -0.016]	0.033
HH1 → Imp2	-0.080	-0.062	[-0.115, -0.009]	0.032
Imp1 → Agg2	0.054	0.088*	[0.032, 0.145]	0.034
Imp1 → HH2	-0.080	-0.107**	[-0.162, -0.051]	0.034
Agg1 → HH2	-0.144	-0.116**	[-0.174, -0.059]	0.035
Agg1 → Imp2	0.144	0.092**	[0.036, 0.149]	0.034
HH1 → HH2	0.343	0.337***	[0.286, 0.388]	0.031
Imp1 → Imp2	0.375	0.395***	[0.345, 0.446]	0.031
Agg1 → Agg2	0.414	0.415***	[0.363, 0.468]	0.032
Sex1 → Agg2	-0.077	-0.090*	[-0.137, -0.043]	0.029
Sex1 → Imp2	-0.127	-0.095**	[-0.142, -0.048]	0.029
Sex1 → HH2	0.072	0.068*	[0.019, 0.117]	0.030
Age1 → Agg2	0.030	0.119***	[0.070, 0.168]	0.030
Age1 → Imp2	0.034	0.088*	[0.038, 0.138]	0.030
Age1 → HH2	-0.022	-0.073*	[-0.139, -0.036]	0.031
SES → = Imp2	-0.030	= -0.087*	[-0.139, -0.036]	0.031

Note: Numbers 1 and 2 indicate Time 1 and Time 2, respectively.

Abbreviations: Agg, aggression; HH, honesty-humility; Imp, impulsivity; SES, socioeconomic status.

\*significant at a 0.05 level.

\*\*significant at the 0.01 level.

\*\*\*significant at the <0.001 level.

recent research showing that low HH is concurrently associated with bullying and antisocial behavior in adolescents (Allgaier et al., 2015; Book et al., 2012; Farrell et al., 2014) and extends this work to show that individual characteristics in children and youth are important longitudinal predictors of the types of aggressive behaviors typically displayed by these age groups. Traditionally, it has been suggested that personality characteristics inform behavior; however, the current findings demonstrate that aggressive behavior also contributes to higher levels of delinquent personality traits over time. Accordingly, this bidirectional relationship has important implications for intervention efforts aimed at reducing aggressive behavior, as it implies that both problem behaviors and problematic personality traits must be addressed to reduce recidivism and foster prosocial development. Indeed, low HH is thought to reflect strong entitlement, the desire for material gain, and the willingness to deceive (Lee & Ashton, 2004); however, current antibullying interventions tend to omit such factors (see Ttofi & Farrington, 2011). There is a need, therefore, for interventions that target personality characteristics, such as entitlement and deception, in children and youth.

The observed relationship between impulsivity and aggression supports a large body of research demonstrating that low impulsivity predicts aggressive behavior across the lifespan (e.g., Hentges et al., 2018; Moffitt et al., 2013). In particular, poor impulse control has been reliably associated with a number of problem behaviors, such as physical bullying (Farrell et al., 2014; Pontzer, 2010), across a range of age groups (Campbell, Spieker, Burchinal, & Poe, 2006). Nonetheless, some researchers have questioned whether impulsivity on its

own is sufficient to account for aggression (Hentges et al., 2018) and whether other variables, such as a callous disregard for others (Rhee et al., 2018), also are important. For example, it has been unclear whether impulsivity and HH are independent predictors of aggression in youth, as they have not been examined simultaneously in a single study. Importantly, the current study demonstrates that when HH—a delinquent personality factor—is accounted for, impulsivity continues to share a bidirectional relationship with aggression among children and youth. Thus, despite recent research suggesting impulsivity is not a sufficient predictor of aggression when controlling for selfish tendencies (e.g., Rhee et al., 2018), this finding provides evidence to the contrary in a large sample.

Interestingly, path analyses identified a relationship between HH and impulsivity. Specifically, impulsivity predicted HH, such that higher levels of impulsivity predicted lower levels of HH over time. Notably; however, this relationship was not found to be bidirectional in that HH did not predict impulsivity. In adult populations low HH is thought to be reflective of the “Dark Triad” of personality and shares variance with psychopathy (Hodson et al., 2018; Lee & Ashton, 2005). As impulsivity is a characteristic component of psychopathy and its behavioral factor (Hare, 2003; Hosker, 2017), the observed relationship between HH and impulsivity in the current study may be reflective of this association. Nevertheless, impulsivity is thought to be embedded in other factors of the HEXACO framework (i.e., low conscientiousness; Lee & Ashton, 2004). Thus, it may be that lower levels of conscientiousness in general lead to lower levels of HH. Additional longitudinal investigations are needed to model these relationships over time while controlling for broader personality dimensions to more precisely examine these associations.

Impulsivity was also found to be negatively associated with parental education, such that lower levels of parental education were associated with higher levels of impulsivity over time. Although this relationship was not predicted, it is consistent with Life History Theory, which posits that human behavior is motivated by outcomes that have the best chance of promoting the survival of one’s genes. (Kaplan & Gangestad, 2005). Thus, under this evolutionary framework, individuals from lower socioeconomic backgrounds (i.e., lower parental education) might be expected to be impulsive because of their increased concern over immediate resources, rather than distal consequences or outcomes. Furthermore, age was found to positively predict aggression and impulsivity and negatively predict HH. Previous research has indicated that aggressive behavior can increase with age; for example, bullying behaviors have been found to increase during middle school relative to primary school (Pellegrini & Long, 2002). The significant positive relationship observed between impulsivity and age; however, was unexpected. According to Steinberg et al. (2008), impulsivity linearly declines across the lifespan as frontal executive systems develop and promote greater emotion regulation. Nonetheless, others have argued that impulsivity exhibits a variable pattern throughout development, with individuals differing in their impulse control trajectories (e.g., Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002). Moreover, since impulsivity is a multifaceted construct (Evenden, 1999), these inconsistent findings

may reflect differences in the operationalization and assessment of impulsivity.

Notably, the relationship between age and lower levels of HH is consistent with research examining HH and bullying in adolescents (Book et al., 2012; Farrell et al., 2014; Farrell, Provenzano, Dane, Marini, & Volk, 2017); together, these findings may be interpreted as evidence that levels of HH may decrease with age as individuals learn through reinforcement and modeling that there can be personal benefits to dishonesty and selfishness. Alternatively, this decrease in HH as children’s age may be reflective of advancements in children’s moral development. In particular, Piaget (1932) states that children’s moral reasoning becomes less concrete, as they develop an understanding that morality can be subjective; thus, it may be that HH decreases with age as children become less impacted by authority and rules. Nonetheless, these findings highlight the need for early intervention before these relationships become more established and less malleable in adulthood.

#### 4.1 | Limitations

The current study is not without its limitations. First, we were not able to distinguish between proactive (i.e., aggression i.e., planned) and reactive (i.e., aggression in response to a provocation) forms of aggression; thus, it remains unclear whether low HH and higher levels of impulsivity are more greatly associated with either of these forms. Theoretically, there is a reason to suspect that low HH is more strongly associated with proactive, compared to reactive, aggression. As mentioned, individuals low in HH are entitled and motivated by the material gain (Lee & Ashton, 2004), seeking out the possessions they desire. Accordingly, these individuals would be expected to engage in more proactive forms of aggression to obtain wanted items or desired outcomes. Further research; however, is needed to validate this hypothesis. In addition, the measure of aggression employed in the current study required participants to reflect on past behavior and make judgments about the frequency of aggression over the past year; as such, this measure is not a direct measure of aggression and may be subject to self-report bias. Replication of these findings using observational or behavioral measures of aggression is, therefore, needed.

Second, the items used to assess HH in the current study were adapted for children based on the HEXACO questionnaire. It is plausible that there are additional components of low HH in children and youth which are not included in the current subscale. Nevertheless, this approach was taken to reduce verbal demands and closely mimic adult conceptions of the construct and provide a first step in examining HH among children and youth. Although the internal consistency of HH at Time 1 was low, this may be due to the adaptations made to the HH items; however, it has been shown that modest levels of internal-consistency reliability can still be associated with strong validity (McCrae, Kurtz, Yamagata, & Terracciano, 2011). Nonetheless, it should be acknowledged that the psychometric properties of the modified HH measure used in the current study have not been comprehensively examined and require further investigation.

A third limitation of the current investigation, whether the relationship between low HH and aggression might be moderated by other personality factors, was not examined. Asthon (2012) states that the most egregious personality profile should theoretically include a combination of low HH, low agreeableness, and high emotionality. Likewise, research examining adult populations has shown that low HH and low agreeableness are both predictive of revenge intentions after hypothetical transgressions (Lee & Asthon, 2012), while low emotionality is correlated with self-reported psychopathy scores (De Vries, Lee, & Ashton, 2008). Therefore, future research should examine HH and these other personality factors simultaneously to determine how the unique combinations of such traits may differentially predict problem behavior, especially among child populations. Similarly, HH is a multifaceted construct consisting of several subcomponents (i.e., fairness, sincerity, modesty, greed avoidance), which may differentially predict behavior. Although the aim of the current study was to examine HH holistically, future research is needed to identify which combinations of different HH facets (e.g., high modesty, low sincerity) predict specific forms of delinquent behavior. In addition, there are other factors of personality that are relevant predictors of aggression that were not examined in the current study (e.g., anger proneness).

Finally, while the effect sizes observed in the current study are small, these effect sizes are typical for longitudinal cross-lagged models given that the analyses account for many different factors (e.g., how stable each measure is over time and within-wave correlations between measures; Adachi & Willoughby, 2015). Taken together, therefore, the current study contributes to the emerging literature on HH and its associations with problematic behavior across the lifespan. Importantly, this research extends recent findings by demonstrating that aggression and low HH share a bidirectional relationship over time. The longitudinal methodology employed; however, suggests that these relationships may become more stable with time, having potential implications for early intervention strategies aimed at increasing HH and reducing impulsivity and aggression.

Although personality traits are often thought to lead to behavior, the current research demonstrates that behavior can also impact personality traits over time. It remains likely; however, that external factors moderate the observed behaviors among low HH, high impulsivity and aggressive behavior. Accordingly, research should examine which factors mitigate these observed relationships. For example, positive parental and peer relationships may alleviate dishonesty and feelings of entitlement by fostering a desire for prosocial interactions.

Taken together, this study provides a novel contribution to the aggression literature by demonstrating that HH and aggression share a bidirectional relationship with one another over time, among children and youth. Further, this research builds on previous work examining HH and aggression in older populations by showing that this relationship extends to younger age groups. In addition, the results of the current study suggest that impulsivity and aggression are related over time, even when controlling for the effects of related personality factors, such as HH.

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