Animal cruelty and bullying: Behavioral markers of delinquency risk or causal antecedents of delinquent behavior?

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A B S T R A C T

Objective: The purpose of this study was to determine whether animal cruelty and bullying, in addition to serving as behavioral markers of delinquency risk, may also serve as causal antecedents of future delinquent behavior. It was hypothesized that these two behaviors would predict an increase in future offending via a rise in proactive criminal thinking, as measured by moral disengagement, one of its facets, but not via a rise in reactive criminal thinking or cognitive impulsivity.
Methods: All 1170 male members of the Pathways to Desistance study (mean age = 16.05 years) served as participants in this study. The first three waves of data from the Pathways study were used to perform a causal mediation path analysis.
Results: The results of this study supported the main research hypothesis. Specifically, the indirect effects of animal cruelty and bullying on future delinquency were mediated by moral disengagement but not cognitive impulsivity. Furthermore, the difference between moral disengagement and cognitive impulsivity mediation of the animal cruelty–delinquency relationship achieved statistical significance.
Conclusions: Findings from this study suggest that animal cruelty and bullying not only serve as early behavioral markers of delinquency risk but also play a potentially important role in delinquency growth and persistence.

1. Introduction

It is a well-known fact that most offenses never lead to an arrest because most offenses go undetected (Gramlich, 2017). Serious offenses frequently go undetected because a victim or witness fails to report the offense to the police. Less serious offenses often go undetected because people are uncertain whether or not they constitute a reportable criminal act. This is particularly true of delinquent and para-criminal activities committed by children and adolescents. These early markers of behavioral deviance, however, may serve an important function in identifying children at risk for more serious future delinquent and criminal involvement. Analyzing data from the Pittsburgh Youth Survey, Stouthamer-Loeber and Loeber (2002) discerned that by age 10, 21% of the boys who eventually became persistent serious early adult offenders had engaged in early disruptive behavior consistent with a diagnosis of conduct disorder, attention deficit disorder, or oppositional defiant disorder. By age 12, the proportion of future serious young adult offenders with a history of early behavioral problems had risen to 47%, and by age 14, 84% of the youth who eventually became serious young adult offenders had satisfied one or more of these three disruptive early diagnoses.

From a practical standpoint, a diagnosis may be less useful than a discrete behavior in assessing delinquency risk. Diagnoses require the services of a trained and qualified mental health professional, without which the results may not be trustworthy. Discrete behaviors, on the other hand, can be obtained through an interview or by observing the individual and often do not require the services of a trained mental health professional. Moreover, diagnoses typically consider a range or series of inter-related behaviors, only a portion of which need to be present to receive the diagnosis in question. A diagnosis of conduct disorder, for instance, requires the presence of at least three out of 15 symptoms within the past 12 months (APA, 2013). It is conceivable that two individuals could obtain the same diagnosis, conduct disorder, based on an entirely different set of behaviors. Hence, someone who started skipping school at age 11 or 12, ran away from home and stayed out overnight at least twice, and lied to obtain goods or services, would receive the same diagnosis as someone who used a weapon to cause physical harm to others, broke into someone's house or car, and forced someone into sexual activity. It is hard to conceive of these two individuals as being at comparable risk for future serious delinquency.

1.1. A theoretical model

Although the current study addresses a practical issue—specifically,

whether animal cruelty and bullying serve as causal antecedents and markers of delinquent behavior—it was driven by a theoretical perspective. The theory behind the study is Walters' (2017b) criminal lifestyle theory. According to criminal lifestyle theory, criminal behavior is a function of two overlapping streams of influence. One stream has its origins in a fearless temperament, which is believed to give rise to a callous/unemotional behavioral style and proactive (planned, calculated) criminal thinking. The other stream has its roots in a disinhibited temperament, which is thought to give rise to low self-control or behavioral impulsivity and reactive (impulsive, irresponsible) criminal thinking. Research reviewed by Walters (2017b) indicates that these two streams represent distinct pathways of influence despite moderate correlations between them in terms of their temperaments (fearlessness vs. disinhibition), behavioral styles (callous/unemotional vs. low self-control), and thinking patterns (proactive vs. reactive). Other behaviors may work their way into these streams as markers and causal antecedents of key aspects of either stream. Two such behaviors, animal cruelty and bullying, were examined in the current study to determine whether they might serve as causal antecedents to one of these streams (i.e., the fearlessness-proactive stream).

1.2. Animal cruelty and bullying

Animal cruelty is an early behavior that may serve as a behavioral marker of future delinquency risk. Being cruel to animals, in fact, is one of the 15 symptom patterns used to diagnose conduct disorder in DSM-5 (APA, 2013). Moreover, animal cruelty is frequently found in the retrospective accounts of adult offenders, with several of these studies showing that violent adult offenders report higher levels of animal cruelty than non-violent adult offenders (Ascione, 2001; Kellert & Felthous, 1985; Merz-Perez, Heide, & Silverman, 2001; Santtila & Haapasalo, 1997; Tingle, Barnard, Robbins, Newman, & Hutchinson, 1986; Vaughn et al., 2009). Concurrent analyses likewise denote the presence of a significant positive correlation between violent delinquency and animal cruelty in adolescents (Longobardi & Badenes-Ribera, in press; Salter et al., 2003). Although less common than retrospective or concurrent studies, at least one prospective investigation has documented a significant predictive effect for animal cruelty on future delinquent and criminal outcomes (Walters & Noon, 2015). Contrary to the specificity postulate of the violence graduation hypothesis, which holds that animal cruelty leads specifically to violent offending, animal cruelty was equally capable of predicting aggressive and non-aggressive (income) offending in a study by Walters (2014).

Bullying is a second behavioral pattern that could potentially serve as an early marker of delinquency risk. Like animal cruelty, bullying is one of the 15 symptom patterns used to diagnose conduct disorder in DSM-5 (APA, 2013). Using cross-sectional data and retrospective accounts from a nationally representative sample of adults, Vaughn et al. (2010) discovered that antisocial and delinquent behavior was three to five times higher in respondents reporting a prior history of bullying. A meta-analysis of 28 longitudinal studies on bullying and later offending by Ttofi, Farrington, Lösel, and Loeber (2011) revealed that bullying successfully predicted delinquency one to 11 years later, even after controlling for major childhood risk factors. In a study not included in the Ttofi et al. (2011) meta-analysis, Bender and Lösel (2011) determined that bullying at age 15 predicted a wide range of antisocial outcomes at age 25. The predicted behaviors included self-reported delinquency, violence, aggression, drug use, impulsivity, and psychopathy. Most of these relationships remained significant even when family risk factors and internalizing/externalizing problems were controlled. Most recently, Walters and Espelage (in press) ascertained that bullying in early adolescence (mean age = 13 years) predicted delinquency one year later, controlling for age, sex, race, social support, bullying victimization, pro-bullying attitudes, parental knowledge, impulsivity, and peer delinquency.

1.3. Markers or causal antecedents

The fact that animal cruelty and bullying display extensive overlap along several different dimensions (Boat et al., 2011; Schwartz, Fremouw, Schenk, & Ragatz, 2012; Vaughn et al., 2011) suggests that these two behavioral patterns share common points of origin and correlation. Low empathy, for instance, has been observed in youth who engage in animal cruelty (Dadds, Whiting, & Hawes, 2006) as well as in youth who bully (van Noorden, Haselager, Cillessen, & Bukowski, 2015), and callous-unemotional traits have been observed in both patterns (Fanti, Frick, & Georgiou, 2009; Vaughn et al., 2011; Walters, 2014). In his criminal lifestyle theory of delinquency development, Walters (2012, 2017b) highlights two temperament dimensions that can be assessed with items from the Psychopathy Checklist (Hare, 2003) family of measures. One dimension, fearlessness, is defined by weak autonomic response to punishment cues and reduced gray matter volumes in the amygdalae, whereas the other dimension, disinhibition, is characterized by weak effortful control and reduced gray matter volumes in the hippocampus (Walters, 2015; Walters & Kiehl, 2015). Using data from a large sample of sex offenders, Walters (2017a) determined that early animal cruelty correlated significantly better with fearlessness than with disinhibition. On the basis of these results, he concluded that animal cruelty is an effective marker of fearlessness. Bullying has also been found to correlate with fearlessness (Panayioutou, Fanti, & Lazarou, 2015).

In addition to their potential role as passive markers of fearlessness, animal cruelty and bullying may also play an active role in the delinquency development process; namely, as causal antecedents to future delinquent behavior. One way to evaluate and establish the plausibility of this argument would be to test theoretically congruous mechanisms of effect against theoretically incongruous mechanisms of effect. To the extent that proactive criminal thinking but not reactive criminal thinking mediates various relationships between correlates and consequences of fearlessness and future delinquency (Walters, 2012), if proactive but not reactive criminal thinking were to mediate these connections then this would provide justification for treating animal cruelty and bullying as more than simply passive markers of future delinquency risk. Previous research has shown that callous-unemotional traits may mediate the animal cruelty–delinquency relationship (Walters, 2014) but the mediating effect of the related construct of proactive criminal thinking on this relationship remains unknown. And if animal cruelty and bullying do play a more active and fundamental role in the development of a delinquent lifestyle, then these two early behavioral experiences could also serve as salient targets for intervention and change.

1.4. Present study

The purpose of this study was to determine whether animal cruelty and bullying can be considered causal antecedents of future delinquency, with an assist from proactive criminal thinking in the role of mediator. In testing this research question, proactive criminal thinking-mediated pathways were compared to reactive criminal thinking-mediated pathways in which reactive criminal thinking served as a link between animal cruelty/bullying and delinquency. Statistical controls were implemented to rule out demographic (age, race) and family background (parental SES, family structure) differences as alternative explanations for the results; also, age at time of first official court petition was included as a predictor in order to control for the effects of official labeling (Lieberman, Kirk, & Kim, 2014). Animal cruelty and bullying were expected to predict delinquency via proactive criminal thinking, as measured by one of its facets, moral disengagement, but not via reactive criminal thinking or cognitive impulsivity (Hypothesis 1). It was further reasoned that the indirect effect of each target or proactive criminal thinking-mediated pathway would be significantly stronger than the indirect effect of the corresponding control or reactive

criminal thinking-mediation pathway (Hypothesis 2).

2. Method

2.1. Participants

The sample for this study consisted of all 1170 male members of the Pathways to Desistance study (Mulvey, 2012). The 184 female members of the Pathways study were not included in the current investigation because of the small number of females in the overall sample and fact that girls were significantly more likely to be facing simple drug charges than boys. The Pathways sample consists of youth from Maricopa County (Phoenix), Arizona and Philadelphia, Pennsylvania who were adjudicated delinquent or convicted of a felony between 2000 and 2002. Baseline interviews took place several months after youth agreed to participate in the study. Follow-up interviews were held every six months for the first three years of the Pathways study and then every twelve months for the final four years of the study. These follow-up interviews were conducted either in person or over the telephone and all data collection was complete by March 2010. Participants ranged in age from 14 to 19 years ($M = 16.05$, $SD = 1.16$) at baseline and the racial/ethnic breakdown of the sample was 19.2% White, 42.1% Black, 34.0% Hispanic, and 4.6% other.

2.2. Measures

2.2.1. Independent variables

The two independent variables, animal cruelty and bullying, were each assessed with a single dichotomous item. At baseline (Wave 1), as part of the Psychopathy Checklist assessment, participants were asked if they had "ever physically hurt animals on purpose." Also during Wave 1, within the context of the education evaluation, participants were asked if they "ever bully anyone." Affirmative answers to either question were scored 1 and negative answers received a score of 0. A partial reliability/validity check was conducted on the bullying item by correlating it with a related or more general question from the Psychopathy Checklist assessment (i.e., "do you bully or threaten others often"). These two items were found to correlate 0.61.

2.2.2. Mediating variables

Moral disengagement and cognitive impulsivity served as mediating variables in this study. Moral disengagement (MD) was assessed with Bandura, Barbarnelli, Caprara, and Pastorelli's (1996) 32-item moral disengagement scale. These 32 items assess eight mechanisms of moral disengagement (moral justification, euphemistic language, advantageous comparison, displacement of responsibility, diffusion of responsibility, distorting consequences, attribution of blame, and dehumanization) designed to normalize, rationalize, and justify actions that violate the rights of others. Each item on the moral disengagement inventory was rated on a three point scale (1 = disagree, 3 = agree) and an average score per item was calculated. The scale achieved good internal consistency in the first two waves of the Pathways study ($α = 0.91$; Mulvey, 2012) and was found to load heavily onto a proactive criminal thinking latent factor (0.723, with PICTS P fixed at 1.000) as reported by Walters and Yurvati (2017).

Cognitive impulsivity (CI) was assessed with the 8-item Impulse Control (IC) scale of the 84-item Weinberger Adjustment Inventory (WAI: Weinberger & Schwartz, 1990). Each WAI item is rated on a five-point scale (1 = false, 5 = true) and an average score per item computed. Because higher scores on the WAI-IC indicate better impulse control, the items were reverse coded so that higher scores represented lower levels of impulse control or higher levels of cognitive impulsivity. Sample items from the WAI-IC (e.g., "I say the first thing that comes into my mind without thinking enough about it;" "I become 'wild and crazy' and do things other people might not like;" "I'm the kind of person who will try anything once, even if it's not that safe") indicate

the scale's appropriateness as a measure of cognitive impulsivity. In addition, the reverse code WAI-IC loaded well onto a reactive criminal thinking latent factor in the Walters and Yurvati (2017) study (0.664, with PICTS R fixed at 1.000). The WAI-IC achieved adequate internal consistency in the first two waves of the Pathways study ($α = 0.76$; Mulvey, 2012).

2.2.3. Dependent variable

The dependent variable for this study was delinquency at Wave 3 of the Pathways study. This variable was assessed with the total offending variety score from Huizinga, Esbensen, and Weihar's (1991) Self-Reported Offending (SRO) scale. The SRO total offending variety score computes the ratio of all crime types endorsed over a period of time (6 months in the current study) to the total number of possible crime types. In the version of the SRO used in the Pathways study there were 22 different crimes (destroyed/damaged property, set fire, broke in to steal, shoplifted, bought/received/sold stolen property, used check/credit card illegally, stole car or motorcycle, sold marijuana, sold other drugs, carjacked someone, drove drunk or high, paid by someone for sex, forced someone to have sex, killed someone, shot someone, shot at someone, took by force with a weapon, took by force without a weapon, beat someone up, participated in a fight, beat someone up as part of a gang, carried a gun). Variety scores have been found to possess psychometric and statistical properties that make them superior to dichotomies and frequency counts in assessing offending behavior (Sweeten, 2012).

2.2.4. Control variables

Five demographic/background measures served as control variables in this study. These included age (in years), ethnicity (1 = white, 2 = nonwhite), parental socioeconomic status, family structure, and age at time of first official court petition. Parental socioeconomic status (SES) was a composite measure that assessed parental education and occupation and produced a score that could range from 11 to 77. Family structure was assessed on a 4-point scale: 1 = both biological parents living in the home, 2 = adoptive parents or step parent living in the home, 3 = one-parent family, 4 = no adults living in the home. Age at time of first official court petition was included in the analyses in order to control for the official labeling effect of prior adjudication. If there was no prior court petition then age at time of current official court petition was employed.

It is commonly recommended that researchers control for prior levels of a predicted variable whenever performing a mediation analysis (Cole & Maxwell, 2003). Because there were three predicted variables in this study (Wave 2 MD, Wave 2 CI, Wave 3 delinquency), and neither the independent nor mediator variables had been randomly assigned, there were three precursor measures that had to be worked into the design. Specifically, Wave 1 MD served as a precursor measure (predictor variable) in the equation predicting Wave 2 MD, Wave 1 CI was included as a precursor measure (predictor variable) in the equation predicting Wave 2 CI, and Wave 1 delinquency was included as a precursor measure (predictor variable) in the equation predicting Wave 3 delinquency.

In conducting a supplemental analysis using callous-unemotional traits as a control variable, Factor 1 of the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003) served as a proxy for callous-unemotional traits. The use of Factor 1 as a proxy for fearlessness and callous-unemotional traits received preliminary support in a study by Walters and Kiehl (2015) where MRI results were correlated with PCL:YV scores in a group of severely delinquent youth. Although the original scale proposed by Walters and Kiehl (2015) included only 6 out of the 8 PCL Factor 1 items, the individual PCL items were unavailable in the public Pathways database. Even so, the 6- and 8-item versions of the PCL:YV fearlessness/callous-unemotional traits measure have been found to correlate highly (i.e., $r = 0.96$: Walters & Kiehl, 2015). The PCL:YV was administered at baseline (Wave 1) in the

Table 1
Descriptive statistics and correlations for the 13 independent, dependent, mediator, and control variables.

Variable	n	M	SD	Range	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	1170	16.05	1.16	14–19	0.06	−0.06	0.03	0.38†	0.04	0.04	0.00	0.02	−0.02	−0.05	0.01	−0.03
2. Race	1170	1.81	–	1–2		0.22†	0.08	−0.03	0.05	−0.07	0.03	0.08	−0.14†	−0.13†	−0.07	−0.04
3. Parental SES	1164	51.66	12.37	11–77			−0.12†	−0.05	0.01	−0.01	0.07	0.07	0.04	0.04	0.01	0.01
4. Family Structure	1170	2.38	0.79	1–4				−0.05	0.00	0.02	−0.04	−0.03	−0.08	−0.06	−0.01	0.00
5. Prior Court Petition	1170	14.86	1.66	9.1–18.4					0.00	−0.06	−0.04	0.03	−0.00	−0.01	−0.06	−0.06
6. Animal Cruelty	1170	0.15	–	0–1						0.17†	0.19†	0.18†	0.15†	0.13†	0.13†	0.14†
7. Bullying	1170	0.22	–	0–1							0.20†	0.16†	0.22†	0.17†	0.21†	0.13†
8. MD-1	1167	1.63	0.35	1–3								0.59†	0.36†	0.30†	0.30†	0.23†
9. MD-2	1090	1.59	0.36	1–3									0.27†	0.32†	0.25†	0.27†
10. CI-1	1167	3.04	0.94	1–5										0.58†	0.32†	0.22†
11. CI-2	1090	2.95	0.92	1–5											0.25†	0.18†
12. Delinquency-1	1167	0.16	0.16	0–0.91												0.36†
13. Delinquency-3	1086	0.08	0.12	0–0.82												

Note. Age = age in years; Race = White (1) vs. Nonwhite (2); Parental SES = parental index of social position; Family structure = family structure (1 = both biological parents, 2 = adoptive parents or step parent, 3 = one parent, 4 = no adults in the home); Prior Court Petition = age at time of first official court petition; Animal Cruelty = ever engaged in animal cruelty; Bullying = ever bullied someone; MD-1 = moral disengagement at Wave 1; MD-2 = moral disengagement at Wave 2; CI-1 = cognitive impulsivity at Wave 1; CI-2 = cognitive impulsivity at Wave 2; Delinquency-1 = delinquency variety score at Wave 1; Delinquency-3 = delinquency variety score at Wave 3; n = number of non-missing cases; M = mean, SD = standard deviation; Range = range of scores in current sample.
† $p < .00064$ (Bonferroni-corrected alpha: 0.05/78 correlations).

Pathways study.

2.3. Research design

The current investigation employed a three-wave (with six months between waves) longitudinal fixed panel design with two independent variables, two mediator variables, and a single dependent variable. These five variables were organized into two target pathways (Animal Cruelty → MD → Delinquency; Bullying → MD → Delinquency) and two control pathways (Animal Cruelty → CI → Delinquency; Bullying → CI → Delinquency). Using the comparison pathways approach (Walters, 2018), it was predicted that the two target pathways would be significant, the two control pathways would be non-significant, the Animal Cruelty → MD → Delinquency pathway would be significantly stronger than the Animal Cruelty → CI → Delinquency pathway, and the Bullying → MD → Delinquency pathway would be significantly stronger than the Bullying → CI → Delinquency pathway. The control and precursor measures were all assessed at Wave 1, concurrent with the independent variables. This secondary data analysis was approved by the Kutztown University Institutional Review Board.

2.4. Data analytic plan

A path analysis of data from the first three waves of the Pathways study was performed using a maximum likelihood (ML) estimator. Calculations were computed with the structural equation program MPlus 8.1 (Muthén & Muthén, 1998–2017). The total, direct, and indirect effects were tested using bias-corrected bootstrapped confidence intervals constructed from 5000 bootstrap replications (with replacement). Research indicates that bootstrapping is superior to normal theory approaches like the Sobel (1982) test in accounting for non-normality in both the indirect effect and dependent variable (Hayes, 2013; MacKinnon, Kisbu-Sakarya, & Gottschall, 2013; Pituch & Stapleton, 2008). A bootstrapped effect is considered significant when the bootstrapped 95% confidence interval does not include zero. Comparisons between target (predicted to be significant) and control (predicted to be non-significant) pathways were made using Preacher and Hayes' (2008) contrast test.

The sequential ignorability assumption holds that a third variable or covariate confounder does not explain the mediating effect in situations where the independent and/or mediating variables are not randomly assigned (Imai, Keele, & Tingley, 2010). This was evaluated in the current study using the "failsafe ef" sensitivity test (Kenny, 2013). The "failsafe ef" is calculated with the following formula:

$(r_{my.x}) \times (sd_{m.x}) \times (sd_{y.x}) \times (sd_m) \times (sd_y)$. The resulting coefficient indicates how well an unobserved covariate confounder would need to correlate with both the mediating and dependent variables—controlling for the independent and mediating variables in the case of the dependent variable—to completely eliminate the significant coefficient along the b path of the indirect effect. Because conditioning on the precursor to an outcome can potentially inflate path coefficients through endogenous selection bias or a collider effect (Elwert & Winship, 2014), a second sensitivity analysis was performed in which the precursor measures were removed from the analysis.

2.5. Missing data

Nearly nine-tenths of the sample had complete data on all 13 study variables (88.6%), another 4.4% were missing data on one variable, 3.4% were missing data on two variables, 3.5% were missing data on three variables, and 0.1% were missing data on five variables. Only three out of the 12 variables had > 1% missing data: Delinquency-3 (7.2%), MD-1 (6.8%), and CI-1 (6.8%). In this study missing data were handled with full information maximum likelihood (FIML), which estimates model parameters and standard errors from analyses performed on all non-missing data. FIML has been found to be robust to violations of its basic assumptions (Collins, Schafer, & Kam, 2001; Young & Johnson, 2013). Research demonstrates that FIML generates results that are significantly less biased and significantly more accurate than those produced by traditional missing data methods like simple imputation and listwise deletion (Allison, 2012; Peyre, Leplége, & Coste, 2011).

3. Results

3.1. Preliminary analyses

Descriptive statistics for the eight control/precursor variables, two independent variables, two mediator variables, and one dependent variable, along with the variable inter-correlations, are listed in Table 1. The two mediators (MD-2 and CI-2) showed no evidence of skew (−0.01–0.66), and while the dependent variable was moderately to highly skewed (2.52), the results of an analysis performed with a robust maximum likelihood estimator, did not differ appreciably from the results obtained with a standard ML estimator. There was no evidence of multicollinearity in any of the regression equations (Tolerance = 0.832–0.986; Variance Inflation Factor [VIF] = 1.015–1.202).

Table 2
Path Analysis of the Animal Cruelty–Delinquency and Bullying–Delinquency Relationships with Mediation by Moral Disengagement and Cognitive Impulsivity.

Predictor	b (95% CI)	β	z	p
MD-2 (Outcome)				
Animal Cruelty	0.721(0.152, 1.370)	0.070	2.34	0.020
Bullying	0.478(0.034, 0.917)	0.055	2.15	0.032
Age	−0.005(−0.022, 0.012)	−0.017	−0.62	0.537
Race	0.058(0.014, 0.101)	0.064	2.63	0.009
Parental SES	0.000(−0.001, 0.002)	0.016	0.58	0.563
Family Structure	−0.002(−0.026, 0.022)	−0.003	−0.13	0.900
Prior Court Petition	0.012(0.000, 0.024)	0.055	1.98	0.048
MD-1	0.562(0.497, 0.620)	0.546	17.70	< 0.001
CI-2 (Outcome)				
Animal Cruelty	1.075(−0.121, 2.337)	0.041	1.70	0.088
Bullying	0.952(−0.159, 2.011)	0.043	1.72	0.085
Age	−0.026(−0.070, 0.016)	−0.033	−1.18	0.239
Race	−0.135(−0.256, −0.017)	−0.058	−2.20	0.027
Parental SES	0.002(−0.002, 0.006)	0.028	1.10	0.272
Family Structure	−0.008(−0.067, 0.049)	−0.007	−0.29	0.773
Prior Court Petition	0.004(−0.029, 0.036)	0.007	0.23	0.819
CI-1	0.526(0.476, 0.574)	0.541	20.97	< 0.001
Delinquency-3 (Outcome)				
MD-2	0.060(0.036, 0.083)	0.179	5.03	< 0.001
CI-2	0.003(−0.006, 0.012)	0.025	0.75	0.454
Age	−0.003(−0.009, 0.003)	−0.030	−1.02	0.306
Race	−0.011(−0.029, 0.007)	−0.035	−1.16	0.245
Parental SES	0.000(−0.001, 0.001)	0.001	0.02	0.983
Family Structure	0.001(−0.008, 0.010)	0.010	0.33	0.739
Prior Court Petition	−0.003(−0.007, 0.001)	−0.040	−1.32	0.186
Animal Cruelty	0.217(0.005, 0.434)	0.063	1.98	0.048
Bullying	0.063(−0.125, 0.258)	0.022	0.66	0.512
Delinquency-1	0.225(0.159, 0.297)	0.290	6.33	< 0.001
AC with Bullying	0.000(0.000, 0.000)	0.174	4.96	< 0.001
MD-2 with CI-2	0.037(0.024, 0.052)	0.170	5.19	< 0.001

Note. MD-2 (Outcome) = regression equation with moral disengagement at Wave 2 as the outcome measure; CI-2 (Outcome) = regression equation with cognitive impulsivity at Wave 2 as the outcome measure; Delinquency-3 (Outcome) = regression equation with participant delinquency variety score at Wave 3 as the outcome measure; Age = age in years; Race = White (1) vs. Nonwhite (2); Parental SES = parental index of social position; Family structure = family structure (1 = both biological parents, 2 = adoptive parents or step parent, 3 = one parent, 4 = no adults in the home); Prior Court Petition = age at time of first official court petition; Animal Cruelty = ever engaged in animal cruelty; Bullying = ever bullied someone; MD-1 = moral disengagement at Wave 1; MD-2 = moral disengagement at Wave 2; CI-1 = cognitive impulsivity at Wave 1; CI-2 = cognitive impulsivity at Wave 2; Delinquency-1 = delinquency variety score at Wave 1; AC with Bullying = covariance between animal cruelty and bullying at Wave 1; MD-2 with CI-2 = covariance between moral disengagement and cognitive impulsivity at Wave 2; b(95% CI) = unstandardized coefficient and the lower and upper limits of the 95% confidence interval for the unstandardized coefficient (in parentheses); β = standardized coefficient; z = Wald Z test; p = significance level of the Wald Z test; N = 1170.

3.2. Main analysis

The results of a three-regression path analysis are summarized in Table 2. The *a* (from the independent variable to the mediator) and *b* (from the mediator to the dependent variable) path coefficients for the two target and two control pathways can also be found in Fig. 1. Consistent with the first hypothesis, the *a* and *b* paths of both target pathways (see Table 2 and Fig. 1) and their total indirect effects (see Table 3) were significant, whereas the *a* and *b* paths of both control pathways and their total indirect effects were non-significant. In partial support of the second hypothesis, the difference between the target and control animal cruelty-initiated pathways was significant (see Table 3) but the difference between the target and control bullying-initiated

pathways was not.

3.3. Sensitivity analyses

The "fail-safe ef" coefficient calculated for the significant indirect effect running from animal cruelty or bullying to moral disengagement to delinquency was 0.27. This means that an unobserved covariate confounder would need to correlate 0.27 with the mediator (MD-2) and 0.27 with the dependent variable (Delinquency-3), controlling for the independent variable (animal cruelty or bullying) and MD-2 in the case of the dependent variable, to lower the significant *b* path of both target pathways to zero. This suggests that both indirect effects were moderately to highly robust to the effects of omitted variable bias.

Sensitivity testing was also used to rule out a collider effect, commonly referred to as endogenous selection bias, as an alternate explanation of the current results. When the precursor measures were removed from the three regression equations, path coefficients rose rather than dropped. This finding is inconsistent with a collider effect. In fact, after the precursor measures were removed from the analysis, all four pathways (target and control) were significant and the two target pathways were significantly stronger than the two control pathways. These results should only be used to rule out endogenous selection bias, however, because they lack temporal direction.

3.4. Supplemental analysis

A supplemental analysis was performed in which callous-unemotional traits, assessed with Factor 1 of the PCL:YV, were included as an additional control variable. Adding this proxy estimate of callous-unemotional traits did not alter the significance and non-significance of the various pathways. The AC-1 → MD-2 → Delinquency-3 (95% CI = 0.0013, 0.0096) and Bully-1 → MD-2 → Delinquency-3 (95% CI = 0.0004, 0.0062) target pathways remained significant, the AC-1 → CI-2 → Delinquency-3 (95% CI = −0.0004, 0.0021) and Bully-1 → CI-2 → Delinquency-3 (95% CI = −0.0004, 0.0020) control pathways remained non-significant, and the AC-1 → MD-2 → Delinquency-3 pathway was still significantly stronger than the AC-1 → CI-2 → Delinquency-3 pathway (95% CI = 0.0007, 0.0095).

4. Discussion

The current study examined the possibility that animal cruelty and bullying are more than just markers of a fearless temperament or correlates of future delinquency. Instead, they may play a pivotal role in creating a delinquent lifestyle. One way this could occur is by stimulating proactive criminal thinking—measured in the current study with one of its facets, moral disengagement. Moral disengagement, in turn, could encourage a rise in general delinquent behavior. For this to be something more than a simple marker for risk, it was necessary for the results to be congruent with a theoretically prescribed pathway and incongruent with a theoretically non-prescribed pathway. Consistent with the first research hypothesis, the effect ran through proactive criminal thinking but not through reactive criminal thinking, even though the two mediators were nearly identical in stability over time. This is what one would expect if animal cruelty and bullying achieved their effect through a theoretically informed network of factors related to low empathy, callous unemotional traits, and other aspects of fearlessness. The second hypothesis, which held that the difference between the proactive- and reactive-mediated pathways would be statistically significant, only found support with respect to animal cruelty. Sensitivity testing revealed that the significant indirect effects from animal cruelty to proactive criminal thinking to delinquency and from bullying to proactive criminal thinking to delinquency were moderately to highly robust to the effects of unobserved covariate confounders and probably not the result of a collider effect.
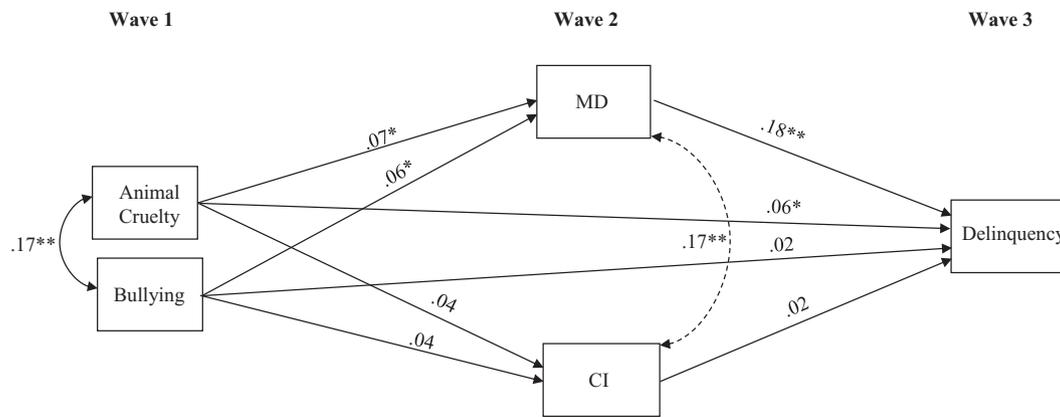
Wave 1   **Wave 2**   **Wave 3**

Fig. 1. Maximum Likelihood path analysis of the mediating effects of moral disengagement and cognitive impulsivity on the animal cruelty-delinquency and bullying-delinquency relationships. Note. Standardized beta coefficients are reported; Animal Cruelty = animal cruelty at Wave 1; Bullying = bullying at Wave 1; MD = moral disengagement at Wave 2; CI = cognitive impulsivity at Wave 2; Delinquency = participant delinquency at Wave 3; curved solid double-arrowed line = exogenous covariance between animal cruelty and bullying at Wave 1; curved dashed double-arrowed line = residual (endogenous) covariance between moral disengagement and cognitive impulsivity at Wave 2; control and precursor variables are not shown; $N = 1170$. *$p < .05$, **$p < .001$.

Table 3
Total, Direct, and Indirect Effects for Pathways Running from Animal Cruelty and Bullying at Wave 1 to Delinquency at Wave 3.

	BCBCI (95% CI)		
	Estimate	Lower	Upper
Animal Cruelty → Delinquency			
Total Effect	**0.0264**	**0.0053**	**0.0482**
Direct Effect	**0.0217**	**0.0005**	**0.0434**
Indirect Effect	**0.0047**	**0.0013**	**0.0096**
Specific Indirect Effects			
AC-1 → MD-2 → Delinquency-3	**0.0044**	**0.0012**	**0.0094**
AC-1 → CI-2 → Delinquency-3	0.0004	−0.0004	0.0021
Preacher-Hayes Contrast Test	**0.0040**	**0.0006**	**0.0093**
Bullying → Delinquency			
Total Effect	0.0095	−0.0093	0.0292
Direct Effect	0.0063	−0.0125	0.0258
Indirect Effect	**0.0032**	**0.0004**	**0.0066**
Specific Indirect Effects			
Bully-1 → MD-2 → Delinquency-3	**0.0029**	**0.0004**	**0.0063**
Bully-1 → CI-2 → Delinquency-3	0.0003	−0.0004	0.0020
Preacher-Hayes Contrast Test	0.0026	−0.0001	0.0063

Note. Significant paths, estimates, and 95% confidence intervals are bolded; AC-1 = animal cruelty at Wave 1; Bully-1 = bullying at Wave 1; MD-2 = moral disengagement at Wave 2; CI-2 = cognitive impulsivity at Wave 2; Delinquency-3 = delinquency variety score at Wave 3; BCBCI(95% CI) = bias-corrected bootstrapped estimate and 95% confidence interval; Estimate = unstandardized point estimate; Lower = lower boundary of the 95% confidence interval; Upper = upper boundary of the 95% confidence interval; $N = 1170$.

4.1. Theoretical implications

Even though the current results suggest that animal cruelty and bullying may serve as causal antecedents to delinquency growth and persistence, it could still be argued that they were not the principal force behind the results, but simply markers of a fearless temperament. Hence, even though the effects persisted when a proxy measure of callous-unemotional traits was controlled, additional research is required to investigate whether animal cruelty and bullying directly shape proactive criminal thinking or simply represent the impact of fearlessness on proactive criminal thinking. This could be evaluated by inspecting mediators, moderators, and correlates of the animal cruelty/bullying–proactive criminal thinking relationship. In other words, what is it about animal cruelty and bullying that leads to proactive criminal thinking, or in this case, moral disengagement. Vaughn et al. (2011)

probed the child adversities that predicted subsequent animal cruelty and bullying in a large epidemiological sample and discovered that adversities like physical and psychological abuse preceded both patterns, even after controlling for a number of confounding factors. To the extent that these adverse situations are what link animal cruelty and bullying to proactive criminal thinking and delinquency, they should be evaluated as possible mediators, moderators, and correlates of the nomological network of variables that give rise to fearlessness, animal cruelty, bullying, proactive criminal thinking, and delinquency.

4.2. Practical implications

If animal cruelty and bullying do more than mark fearlessness, then they should also serve as targets for intervention. Although there is preliminary evidence that including animals in therapy with delinquent youth can improve empathy (Dawson, 2016), there are very few actual programs available for children who abuse animals. An exception would be the Anicare Child program (Shapiro, Randour, Krinsk, & Wolf, 2014), which uses an eclectic approach to teach children cognitive skills, empathy, and respect for animals. Although the intervention is theory-based, the program itself has yet to be formally evaluated. Fortunately, more has been accomplished in the development of early prevention programs for bullying behavior. Randomized control trails of the Finnish KiVa program indicate that this is an evidence-based, cost-effective intervention for bullying perpetrators, victims, and by-standers (Juvonen, Schacter, Sainio, & Salmivalli, 2016; Polanin, Espelage, & Pigott, 2012). Even if they are nothing more than markers of fearlessness, animal cruelty and bullying could still be helpful in conducting interventions with at-risk youth. The early markers could then be used to identify those at highest risk for future delinquency. These at-risk youth could then receive special assistance in addressing proactive criminal thinking, given the latter's role in linking fearlessness to future delinquency, not to mention its amenability to change (Maruna & Copes, 2005). In the event animal cruelty and bullying are more than markers, clinicians should still consider proactive criminal thinking a target for intervention given the critical linking function it serves.

4.3. Limitations

The external validity of the current results is brought into question by a sample composed entirely of male serious delinquent offenders. How confident can we be that these results generalize to female offenders and less serious delinquents? Furthermore, because every

participant had a prior criminal record, the delinquency outcome may be more appropriately labeled offending persistence or growth rather than delinquency per se. There were also several threats to the internal or causal validity of this study. One such threat is that the two independent variables were both measured dichotomously. The use of dichotomous independent variables, while not violating the assumption of normality with respect to outcome measures, still fails to provide a less than full accounting of prior animal cruelty and bullying behavior. A second threat to the internal validity of the current results is that neither the independent nor mediator variables were randomly assigned. Accordingly, prior levels of each variable had to be controlled in order to establish the causal direction of the variable relationships observed in this study. The use of precursor measures, it has been noted, can reduce the size of an effect in a mediation analysis (Walters, in press) and could potentially explain why the cognitive impulsivity-mediated pathways failed to achieve significance.

5. Conclusion

It would appear that animal cruelty and bullying, both of which can be considered passive markers of fearlessness (Panayioutou et al., 2015; Walters, 2017a), may also play a more active role in promoting offending persistence by virtue of their ability to stimulate proactive criminal thinking. In the current study, prior animal cruelty and bullying were found to predict an increase in moral disengagement, a facet of proactive criminal thinking, and moral disengagement, in turn, precipitated a rise in offending. There was no such effect, however, when cognitive impulsivity, a correlate of disinhibition, served as the mediator. These results open several doors of opportunity for future research. First, there is a need to expand the number of markers of both fearlessness and disinhibition. Thus far, only animal cruelty and bullying have been found to mark fearlessness and fire-setting is the lone validated marker of disinhibition (Walters, 2017a). Other potential markers of fearlessness (e.g., cruelty to people) and disinhibition (e.g., property damage and attention-deficit problems) need to be identified, studied, and validated. Second, additional research is required to determine why these markers differentially correlate with fearlessness or disinhibition and what this means in terms of their possible status as causal antecedents of delinquent behavior.

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