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Neighborhood crime as a predictor of individual differences in emotional processing and regulation

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Abstract

Emerging research suggests that early exposure to environmental adversity has important implications for the development of brain regions associated with emotion regulation, yet little is known about how such adversity translates into observable differences in children's emotion-related behavior. The present study examines the relationship between geocoded neighborhood crime and urban pre-adolescents' emotional attention, appraisal, and response. Results indicate that living in a high-crime neighborhood is associated with greater selective attention toward negatively valenced emotional stimuli on a dot probe task, less biased appraisal of fear on a facial identification task, and lower rates of teacher-reported internalizing behaviors in the classroom. These findings suggest that children facing particularly high levels of environmental threat may develop different regulatory processes (e.g. greater use of emotional suppression) than their peers from low-crime neighborhoods in order to manage the unique stressors and social demands of their communities.

Introduction

Children's sense of safety and security in their everyday environments plays a critical role in their successful development. Neighborhood violence and crime, in particular, have been linked with a host of negative outcomes for children, including mental health problems, academic failure, and delinquent behavior (Bowen & Bowen, 1999; Leventhal & Brooks-Gunn, 2000; Odgers, Moffitt, Tach, Sampson, Taylor *et al.*, 2009; Pettit, Bates, Dodge & Meece, 1999). Recent neuroimaging work suggests that disruptions in brain regions responsible for emotional regulation may underlie many of the negative outcomes experienced by chronically stress-exposed children (Evans & Kim, 2013; Kim, Evans, Angstadt, Ho, Sripada *et al.*, 2013). At the same time, relatively little is known about whether these adversity-related differences in neural activity translate into observable differences in emotion-related behaviors.

The primary aim of this study is to test the relationships between neighborhood crime and observable individual differences in three core aspects of children's emotional processing and regulation. In particular, we examine the links between objective police reports of crime in pre-adolescent children's residential communities and their deployment of selective attention toward emotionally negative stimuli, their bias in appraising negative emotions in others, and their day-to-day internalizing and externalizing behaviors. In doing so, we build a model of the ways that crime – a key environmental stressor with a number of psychological and social implications for children – might impact the early development of emotional processing and regulation.

Emotion regulation: conceptual overview and empirical operationalization

Thompson (1994, pp. 27–28) defines emotion regulation as the 'extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions ... to accomplish one's goals'. Building on this definition, Gross and Thompson (2007) propose a model of emotion regulation (see Figure 1) in which an individual has the opportunity to exert control over his or her emotions during one or more of four stages:

1. Engagement in an emotionally arousing *situation* (either internal or external to the individual);
2. Deployment of *attention* toward the source of emotional arousal;
3. *Appraisal* (identification/labeling) of the valence, value, and familiarity of the emotion; and
4. Implementation of a behavioral, cognitive, and/or physiological *response* to the emotion.

This study builds on this framework to operationalize emotion regulation in three ways. First, we consider children's selective attention toward and disengagement from negative emotional stimuli using a computerized dot probe task (*attention*). Attention serves as a critical, early step in emotion processing and regulation by orienting children toward important environmental cues, with persistent attention toward and difficulty disengaging from negative images being potentially problematic for children's long-term mental health (LoBue & DeLoache, 2008; Pollak & Tolley-Schell, 2003; Posner & Rothbart, 1998). Second, we consider children's identification of emotion using an emotion recognition task (*appraisal*). Research has shown that children who are abused or neglected tend to show different patterns of emotion identification from their non-abused/neglected peers (Pollak, Cicchetti, Hornung & Reed, 2000). Because children's ability to accurately identify and subsequently reappraise negative emotions (e.g. anger, sadness, fear) to reduce their negative impact is considered to be an adaptive regulatory strategy (John & Gross, 2004), we focus on pre-adolescents' tendencies to show bias in their appraisal of anger, sadness, and fear in others. Third, we consider children's internalizing and externalizing behaviors (as reported by teachers) as representations of children's expressed emotionality (*response*; Eisenberg, Cumberland, Spinrad, Fabes, Shepard *et al.*, 2001). Although past research has shown environmental stressors to predict increased expression of internalizing and externalizing behaviors (Kim, Conger, Elder & Lorenz, 2003; McFarlane, Groff, O'Brien & Watson, 2003), we also consider ways in which crime may lead to behavioral suppression of

emotion, which is associated with increased cognitive interference and amplification (rather than reduction) of feelings of psychological distress (Gross & John, 2003; Richards & Gross, 2000). Collectively, this approach allows us to supplement existing research on outward expression versus suppression of emotion (i.e. response) with snapshots of ‘internal’ emotion-related regulatory processes (i.e. attention and appraisal) that may be particularly important to capture within the critical period of pre-adolescence, when social factors may constrain the types of emotions youth are willing to share with the outside world (Zeman, Cassano, Perry-Parris & Stegall, 2006; Zeman & Garber, 1996).

Contextual predictors of emotion regulation

Recent evidence suggests that early adversity may have important consequences for connectivity and activation of brain regions responsible for emotional processing and regulation. In particular, Kim *et al.* (2013) found that adults’ exposure to chronic stressors in childhood and adolescence was predictive of reduced neural activity in two parts of the brain responsible for higher-order regulation (the ventrolateral and dorsolateral prefrontal cortices), as well as reduced ability to suppress activity in a part of the brain that is central to emotional reactions (the amygdala). Although this research suggests that early exposure to environmental stress can have lasting impacts on the *structure* of the brain regions underlying emotional processing and regulation, less is known about whether such adversity may translate into *observable differences* in emotion regulation processes, particularly for children and adolescents. Literature on parenting suggests that parents’ conflict with one another and expression of negative emotion have direct impacts on children’s emotional reactivity and regulation (Davies, Sturge-Apple, Cicchetti, Manning & Zale, 2009; Raver, Blair, Garrett-Peters & Family Life Project Key Investigators, 2014; Zeman *et al.*, 2006), yet less is known about the ways that contexts outside of the family shape these outcomes.

As children transition from childhood to adolescence, their risk of exposure to neighborhood stressors increases. Approximately six out of every ten US children experience at least one direct or witnessed crime in their communities each year, with higher rates of exposure in low-income, high-crime neighborhoods (Finkelhor, Turner, Ormrod & Hamby, 2009). Crime is thought to have substantive implications for shaping the broader socioemotional environments in which children acquire emotional skills, for example by impacting social ties in the community, neighborhood order, and caregivers’ parenting practices (Sampson, Morenoff & Gannon-Rowley, 2002). As a result, living in high-crime environments has major implications for later mental health and behavioral problems (Gorman-Smith & Tolan, 1998; Kliewer, Cunningham, Diehl, Parrish, Walker *et al.*, 2004; Margolin & Gordis, 2000), yet the ways in which crime may directly influence pre-adolescents’ emotion regulation remain relatively unknown.

In the present study, we estimate the role of neighborhood crime in predicting pre-adolescents’ emotional regulatory processes and behaviors as a first empirical step in addressing this critical gap in knowledge. In particular, we hypothesize that controlling for other individual-, family-, and neighborhood-level risks, children living in high-crime environments will show early evidence of maladaptive regulatory patterns in response to negative emotions, including vigilance and difficulty with attentional disengagement

(*attention*), biased appraisal of emotion in others (*appraisal*), and either increased expressiveness of internalizing and externalizing behaviors or increased behavioral suppression (*response*). Given that past research has suggested the possibility of gender- and race-based differences in emotional processes and regulation (McCoy & Raver, 2011; Raver, 2004), we also conduct a set of exploratory analyses to understand whether these relationships may be stronger for boys versus girls or for black versus Hispanic children, as well as whether they may differ based on type of crime (e.g. violent, property, or non-index).

Method

Sample and procedures

Data were collected as a follow-up to the Chicago School Readiness Project, a socioemotional intervention trial conducted across two cohorts of Chicago Head Start sites in 2004 and 2005 (see Raver, Jones, Li-Grining, Metzger, Champion *et al.*, 2008, for study details). The present sample included 361 fourth and fifth graders who retained primary residential addresses in Chicago and were able to be contacted six years after the original intervention. Children were primarily black (71%) and from low-income households (mean income-to-needs ratio = 0.83). Children resided in 188 US census tracts, with an average of 1.92 sample children per tract (range = 0–13). Neighborhoods showed high overall crime rates (mean *n* crimes per year = 632), and high but variable rates of poverty (mean percent of families living in poverty = 30.03%; range = 2.60–84.80%).

Measures

Neighborhood crime—Neighborhood crime included the total number of crimes reported by the Chicago Police Department within each child’s residential census tract during the 12 months preceding assessment. The census tract was chosen over alternative georepresentations of neighborhood (e.g. block groups, zip codes) because of its prevalence in past seminal work in the neighborhood literature, its correspondence with natural boundaries that demarcate neighborhoods (e.g. highways, train tracks), and its similarity with residents’ perceptions of the size of their lived neighborhood (Coulton, Korbin, Chan & Su, 2001; Sampson *et al.*, 2002). Crime data (including the precise latitude and longitude where the crime took place) were downloaded from the publicly available Chicago Crime Portal, geocoded using ArcGIS software (ESRI, 2011) and included violent crimes (e.g. homicide, aggravated assault; 10% of all crimes), property crimes (e.g. burglary, motor vehicle theft; 29% of all crimes), and other, non-index crimes (e.g. simple assault, drug-related crimes; 61% of all crimes). Although less directly threatening than violent crimes, property and non-index offenses were included in these analyses due to their potential to exert influence on children’s emotion regulation through their unmeasured impacts on the community and its residents (e.g. shaping community norms, caregivers’ monitoring practices). Sensitivity analyses were conducted by sub-type of crime to determine whether results differed for violent, property, and non-index crimes.

Emotion regulation—Children’s *attention* toward emotional stimuli was represented using a dot probe task administered on laptops. Each trial began with a fixation cross for 500 ms. Next, a pair of pictures – one emotionally neutral (e.g. book), and the other either

emotionally neutral, positive (e.g. smiling baby), or negative (e.g. threatening dog, weapon) – appeared side-by-side for 250 ms, followed immediately by a ‘dot’ on either the left or the right side of the screen. Using the keyboard, children indicated as quickly as possible the position of the dot. If the child did not respond within 5000 ms, the next trial – beginning with a blank screen for 2000 ms – began automatically. The order of the 72 trials was constant across participants. Images were selected from the International Affective Picture System (IAPS; Lang, Bradley & Cuthbert, 1999) based on their relevance to urban, ethnic minority, elementary school-aged children, their emotional ‘intensity’, and their visual complexity. Images that were deemed by study staff to be culturally/contextually inappropriate, emotionally disturbing, and/or non-identifiable on a laptop screen were removed after an initial pilot period. Negative facilitation scores included children’s average response times (in milliseconds) to emotionally congruent, negative displays (i.e. those where the dot appeared on the same side as the negative stimulus). Negative disengagement scores were calculated based on children’s average response times to emotionally incongruent, negative displays (i.e. those where the dot appeared on the opposite side as the negative stimulus). Children’s facilitation and disengagement scores were subtracted from their average response time on neutral/ neutral trials to account for individual differences in basic processing speed. Only trials where children correctly identified the position of the dot were included in the calculation of facilitation and disengagement. Higher, more positive scores on the facilitation index indicate children’s greater attention toward negative images (relative to neutral images) and higher, more positive scores on the disengagement index indicate children’s faster ability to disengage from negative images (relative to neutral images).

Children’s *appraisal* was captured using the Florida Affective Battery (Bowers, Blonder & Heilman, 1991), which measures children’s perceptions of potentially ambiguous facial emotions. Children were presented with a set of pictures on a laptop screen of the same person showing five different facial expressions: fear, sadness, anger, happiness, and ‘neutral’ emotion. Children were asked to point to the face showing a particular emotion (e.g. ‘Point to the sad face’) across five practice items and 20 test items. Children’s biased appraisal scores were calculated using the total number of times children pointed to a particular ‘negative’ emotion (sadness, fear, anger) minus the number of times they correctly pointed to that particular negative emotion. For example, children’s sadness appraisal score represented the number of times they pointed to a sad face on trials assessing happiness, fear, anger, and/or neutral emotion. Scores were calculated separately for all three negative emotions.

Children’s emotional *response* was assessed by teachers using the Teacher Report Form (TRF; Achenbach, 1991) internalizing and externalizing subscales. Previous research has found internalizing and externalizing symptoms to be representative of children’s behavioral manifestation of internal emotional states, emotionality, and emotion regulatory strategies (e.g. Eisenberg *et al.*, 2001; Garnefski, Kraaij & van Etten, 2005). All items were rated by teachers on a 0–2 scale and averaged to yield internalizing (33 items) and externalizing (32 items) aggregate scores.

Neighborhood, family, and child covariates—Child and family covariates collected from primary caregivers included the year in which children were originally recruited to the study (2004 vs. 2005; to account for potential differences in crime over time), child gender, child age, child race, maternal education, family income-to-needs ratio (the ratio of family income relative to the federal income standard, normed for family size), maternal unemployment, maternal marital status, and family mobility (number of times moved in the previous year). Children also reported on a set of seven ‘yes/no’ items on their experiences with witnessing domestic violence, being abused by adults, and being physically hurt by other children, which were averaged to create a composite score of interpersonal violence.

Neighborhood covariates from the 2010 American Community Survey included the percent of: individuals in the child’s census tract who were black; families who were below the federal poverty line; families headed by single mothers; families headed by individuals with less than a high school education; and families headed by individuals who were unemployed. Across all individual- and neighborhood-level covariates, collinearity with neighborhood crime was minimal (all r s < .50, variance inflation factor = 1.39).

Analysis

Analyses were conducted in Mplus (Version 7.11; Muthén & Muthén, 1998–2012) and included seven outcome variables: negative (1) facilitation and (2) disengagement on the dot probe (*attention*); biased identification of (3) fearful, (4) angry, and (5) sad faces on the FAB (*appraisal*); and teachers’ reports of (6) internalizing and (7) externalizing symptoms in the classroom (*response*). Additional analyses included interaction terms between child gender and crime, and between child race and crime, to determine whether relationships differed for boys versus girls, and for black versus Hispanic children. Residual correlations between the seven outcomes were estimated and robust standard errors were used to account for the nesting of children in neighborhoods using the CLUSTER command.¹ Missing data (see Table 1) were addressed using full information maximum likelihood, which estimates a likelihood function for each child based on non-missing variables.

Results

Correlations between all primary study variables indicate primarily weak associations between the seven emotion regulation dimensions captured in the present study, with the exception of a moderately strong correlation between negative facilitation and negative disengagement, and between children’s internalizing and externalizing symptoms (see Table 2). Results of regression models indicate that neighborhood crime (as represented in units of 1000) was significantly predictive of higher negative facilitation, $b = 1.50$ ($SE = 0.77$), $p < .05$, less over-appraisal of fear in faces, $b = -0.29$ ($SE = 0.15$), $p < .05$, and lower ratings of children’s internalizing symptoms in the classroom, $b = -0.042$ ($SE = 0.021$), $p < .05$ (see Table 3). In units of effect size, a one standard deviation increase in neighborhood crime was associated with an average of 5.56 milliseconds (0.12 SD) faster response time to negative emotional stimuli, an average of 0.11 fewer biased appraisals of fear in others’ faces (0.08

¹A multi-level modeling strategy was considered but deemed unnecessary due to low numbers of children in each neighborhood, as well as generally small intra-class correlations (mean ICC across seven outcomes = 0.05).

SD), and a 0.01 point (0.10 *SD*) reduction in teachers' recognition of internalizing symptoms. No significant associations were seen between neighborhood crime and children's disengagement from negative stimuli, appraisal of anger or sadness, or reported externalizing behaviors in the classroom. Figure 2 displays a summary of the standardized differences in each emotion regulation outcome associated with a one standard deviation increase in annual neighborhood crime, which is the equivalent of an increase of approximately one crime per day. No evidence for moderation by either race/ethnicity or gender was found. Sensitivity analyses revealed that results were relatively consistent when examining violent and non-index crimes separately, but did not appear to hold true for property crimes alone. (For full results, contact first author.)

Discussion

The primary aim of the present study was to explore the ways in which neighborhood crime over the past year relates to individual differences in low-income, pre-adolescent children's emotional processing and regulation. Results suggest that children from especially high-crime environments were significantly faster to deploy their attention toward emotionally negative images (but not necessarily to disengage from these stimuli), less likely to misattribute fear in others' faces, and less likely to be reported by their teachers as showing behaviors related to withdrawal, anxiety, or sadness in the classroom. Across our analyses, we saw no evidence for meaningful differences across gender, race, or type of crime, with the exception of property crimes, which did not appear to relate to any emotion regulation outcome. Although the lack of moderation may be attributed to our small sample size (and limited statistical power), it also may be reflective of the relatively young age of our sample. Past research has shown, for example, increases in both gender differences and the general complexity of emotion regulation processes as children enter their teenage years, suggesting that in the pre-adolescent period, these processes may still be somewhat stable across groups (Garnefski & Kraaij, 2006; Zeman *et al.*, 2006).

Together, these findings suggest that living in a high-crime neighborhood is not only predictive of children's everyday emotionality and behavior, but also of the ways that they 'subconsciously' attend to and process emotional stimuli in their day-to-day lives. In particular, this study suggests that children surrounded by high levels of community crime demonstrate a more 'vigilant' profile of attention deployment, where they are faster to attend to negative images than children from lower-crime environments, but no slower to disengage. These results are consistent with past work showing that children with a history of abuse tend to exhibit higher orientation toward distressing stimuli than those who were not abused (Kimonis, Frick, Munoz & Aucoin, 2008; Pollak & Tolley-Schell, 2003). They are also in line with research suggesting that abused children tend to deploy greater cognitive resources to disengage attention from negative stimuli, but do not necessarily show evidence of longer response time to do so (Pollak & Tolley-Schell, 2003). Although these attention deployment and disengagement processes occur quickly enough that children are likely not conscious of the nature of the stimuli to which they are attending, research suggests that they may have implications for their long-term functioning. 'Vigilant' responses following threat exposure are thought to be evolutionarily adaptive in that they help children to more quickly identify future sources of environmental danger. At the same

time, such vigilance may be costly to children's long-term HPA axis functioning, emotion regulation, and mental health. Increased orientation toward negative environmental cues may place children's stress response systems on overdrive, prevent them from processing other important social information, and increase the frequency with which they must regulate negative emotion. Indeed, profiles of persistent attention toward negative stimuli have been directly linked with increased risk for hostile attribution bias and mental health problems such as major depression (Dodge & Crick, 1990; Joormann, Talbot & Gotlib, 2007).

In addition, children from high-crime communities were less likely to show bias toward fear when identifying emotions in others' faces. Post-hoc analyses revealed no relationship between children's crime exposure and their ability to correctly point to fearful faces. Rather, crime was related to reductions in children's tendency to *mis*-appraise sadness, anger, happiness, or 'neutral' emotion as fear. This finding suggests a recalibration of the perceptual systems that crime-exposed children use to identify social cues (Pollak & Sinha, 2002) and is in keeping with other emotional discrimination work in this age group, including a recent study showing that youth at high risk for having a parent with depression were less likely than their peers to over-identify sadness in ambiguous faces (Lopez-Duran, Kuhlman, George & Kovacs, 2013). It may be that for youth living in high-crime areas, being able to distinguish when the people around them are experiencing fear (versus an emotion that may be less immediately affected by witnessing crime, such as sadness) may be an adaptive strategy for navigating unsafe neighborhoods, whereas reappraising others' negative emotions as being the result of fear rather than anger or sadness may be a more socially appropriate strategy for processing these emotions in less risky contexts.

Finally, this study finds that living in a high-crime community is negatively related to children's expression of internalizing behaviors such as sadness, anxiety or fear in the classroom. These patterns may reflect risk-exposed children's increasing use of suppression as a regulatory strategy, but not necessarily their decreased, internal experiences of distress. As noted previously, suppression involves masking or repressing negative emotional responses in order to avoid negative social consequences of their expression (Gullone, Hughes, King & Tonge, 2010). In this particularly high-risk sample, suppression of emotion-related behaviors – particularly those associated with fear, anxiety, or sadness – may be viewed as a way of avoiding future conflict or victimization. Chicago's crime rate is consistently higher than most other major cities in the United States; given their location in particularly high-crime neighborhoods (see Figure 3), children in this study may be better able to attend to high-risk stimuli, distinguish fear from other emotions, and suppress their own negative emotional responses as a means of coping with a dangerous environment in which threat is pervasive but expression of anxiety and other internalizing symptoms may be viewed as a weakness.

Although this 'adaptive calibration' of biological and behavioral response in the context of persistent threat may be useful in the short term for individuals living in high-risk neighborhoods, this does not necessarily imply that these children are immune to negative consequences over time (Del Giudice, Ellis & Shirtcliff, 2011). The patterns of vigilance toward threat, increased identification of fear, and suppression of negative emotions observed in this study may preclude crime-exposed children from developing the types of

progressively more complex, developmentally appropriate coping mechanisms that are needed to flexibly deal with emotional stimuli across contexts and time (e.g. reappraisal). Indeed, previous research has shown that children showing early vigilance, recognition of fear, and behavioral suppression who continue to be exposed to high-stress environments are at particular risk for either hyper- or non-responsivity of the HPA axis, social-cognitive biases, aggression, impulsivity, and memory problems later in life, suggesting such early emotional regulatory responses as a ‘developmental mechanism’ for later psychopathology (De Gelder, Snyder, Greve, Gerard & Hadjikhani, 2004; Gross & John, 2003; Pollak & Tolley-Schell, 2003; Shirtcliff, Vitacco, Graf, Gostisha, Merz *et al.*, 2009). Given the large body of research showing long-term behavioral, social, and academic problems for individuals living in high-crime environments (e.g. Gorman-Smith & Tolan, 1998; Leventhal & Brooks-Gunn, 2000; Margolin & Gordis, 2000), more research is needed to understand how and why these emerging patterns of emotion regulation may give way to maladaptive outcomes over time.

Limitations and future directions

Although this work provides an important step toward understanding the ways in which neighborhood crime can impact children’s development of emotion regulation, it has several important limitations. First, as noted above, the present sample is non-representative of children in the United States. Additional research is needed to identify the degree to which these findings are unique to this particularly disadvantaged context. Second, although this study attempts to control for a number of potential confounding characteristics at both the family and neighborhood levels, it is likely that unmeasured factors also influence children’s emotion regulation and co-vary with community crime. Longitudinal and/or experimental approaches are needed to determine the causality of these relationships, as well as how different regulatory processes may mediate the associations between environmental stressors and child outcomes across developmental periods. Third, results of sensitivity analyses suggest that violent and non-index crimes such as drug offenses may be more salient for children’s emotion processing and regulation than property-related crimes, yet without additional data on children’s experiences with and communities’ reactions to these crimes, the reasons for these different associations remain unknown. Although research suggests that witnessing or hearing about a crime may be as costly for children’s mental health as direct victimization (Fowler, Tompsett, Braciszewski, Jaccques-Tiura & Baltes, 2009), future research combining police data and self-reports is needed to better understand the ‘visibility’ of various types of crime for children, and to distinguish between the impacts of direct forms of crime exposure versus indirect forms (e.g. increased parental monitoring or emotionality in response to a nearby crime). Similarly, future research should consider merging multiple approaches – including neuroimaging, qualitative research on social norms around emotion, and multi-method measurement of emotion regulation – to generate better generate a holistic understanding of the bioecological development of individual differences in regulatory processes.

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Research highlights

We test links between neighborhood crime and observed emotion regulation.

- Crime is associated with greater selective attention toward negative stimuli.
- Crime is also related to lower appraisal of fear and less internalizing behavior.
- Children may develop context-specific coping strategies to manage emotional stress.

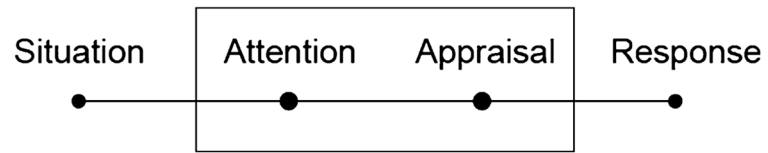


Figure 1.
Model of emotion regulation, taken from Gross and Thompson, 2007.

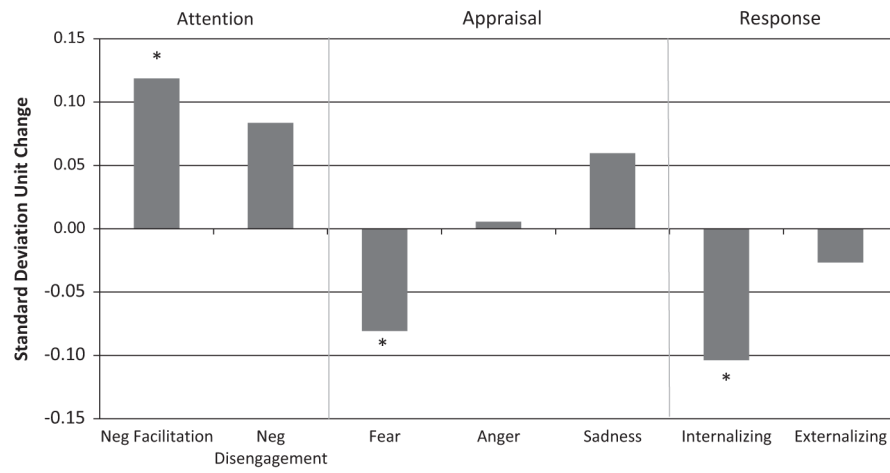


Figure 2. Visual representation of the average difference in emotion regulation (in standardized units) based on an increase in community crime of 1 SD, or approximately one crime per day. *Note:* * $p < .05$.

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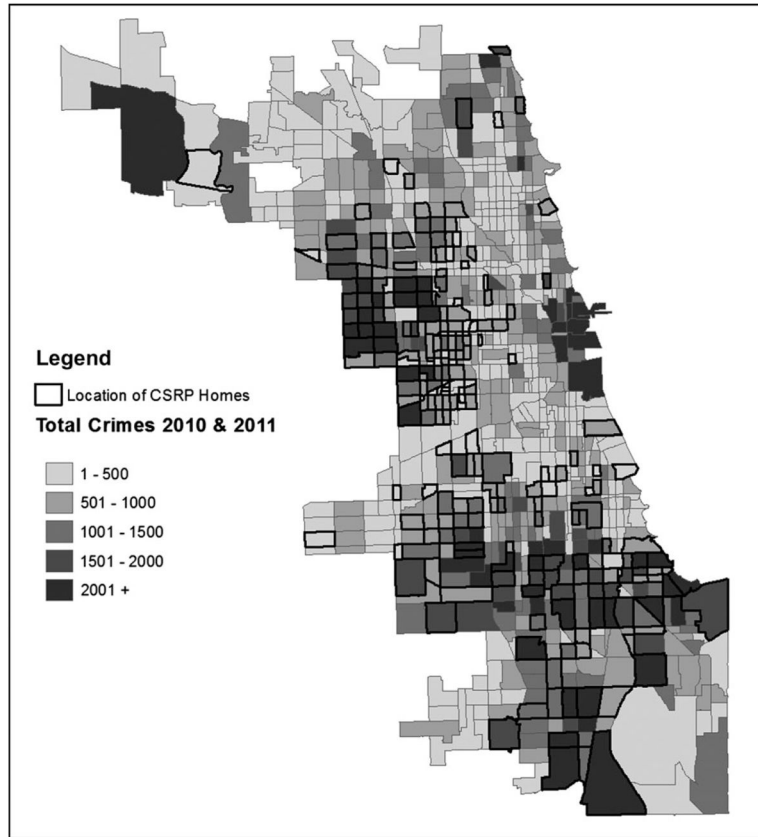


Figure 3. Map of Chicago Census tracts with crime and study participant homes.

Table 1

Sample descriptive statistics

	N	Valid	Mean or %	SD	Min	Max
<i>Emotion regulation outcomes</i>						
Attention – Negative Facilitation	327		-22.68	46.87	-188.33	152.46
Attention – Negative Disengagement	329		-11.22	48.93	-188.40	156.33
Appraisal – Frightened	360		3.95	1.33	0.00	10.00
Appraisal – Angry	360		4.28	1.10	2.00	9.00
Appraisal – Sad	360		4.81	1.27	1.00	10.00
Response – Internalizing	327		0.13	0.15	0.00	0.97
Response – Externalizing	330		0.24	0.32	0.00	1.69
<i>Child/Family characteristics</i>						
2004 Cohort	361		52%			
Child Gender – Boy	361		46%			
Child Age (yrs)	361		9.88	0.72	8.00	12.00
Child Race – Black	361		71%			
Child Race – Hispanic	361		24%			
Maternal Education <HS	353		19%			
Income to Needs Ratio	354		0.83	0.81	0.00	3.75
Mother Married or Living w/ Partner	348		42%			
Mother Unemployed	361		32%			
Number of Times Moved (past year)	353		0.28	0.58	0	5
Child Interpersonal Violence Exposure	359		0.39	0.26	0	1
<i>Neighborhood characteristics</i>						
# Crimes	188		631.99	370.57	88	1931
% Black	188		62.20	40.98	0.50	98.90
% Hispanic	188		26.76	33.76	0.40	97.90
% Single Mother Households	188		16.12	7.00	2.10	38.70
% <HS Education	188		27.54	14.49	1.83	74.88
% Unemployed	188		16.42	8.29	0.00	41.20
% Poverty	188		30.04	13.28	2.60	84.80

Table 2

Correlations between emotion regulation outcomes and key study variables

	1	2	3	4	5	6	7
<i>Emotion Regulation Outcomes</i>							
1) Attention–Negative Facilitation	1.00						
2) Attention–Negative Disengagement	.44**	1.00					
3) Appraisal–Frightened	-.11**	-.08	1.00				
4) Appraisal–Angry	-.09 ⁺	-.05	.15**	1.00			
5) Appraisal–Sad	-.03	-.08	.10 ⁺	.24**	1.00		
6) Response–Internalizing	.08	.02	.03	-.00	.05	1.00	
7) Response–Externalizing	.11 ⁺	.00	.09 ⁺	.01	.14*	.38**	1.00
<i>Child and Family Characteristics</i>							
2004 Cohort	-.06	-.04	-.01	-.02	-.11*	-.11*	-.11 ⁺
Child Gender – Boy	.03	.01	.00	-.12*	-.04	-.04	.25**
Child Age	-.04	.05	-.13*	-.08	-.16**	-.09	-.09
Child Race – Black	.02	.07	.03	.03	.18**	.04	.23**
Child Race – Hispanic	.00	-.03	-.03	-.02	-.16**	-.02	-.22**
Maternal Educ <HS	-.04	.04	.03	.07	-.03	.01	-.01
Inc-to-Needs Ratio	-.09	-.01	-.10 ⁺	-.16**	-.14**	-.07	-.16**
Mother Unemployed	.01	-.12*	.06	.06	.15**	.06	.06
Mother Married	-.08	.04	.05	-.05	-.04	-.05	-.13*
Number of Times Moved (past year)	.08	-.03	.07	-.01	.15**	.05	.05
Child Interpersonal Violence Exposure	.04	.00	.10 ⁺	.02	.09 ⁺	.18**	.21**
<i>Neighborhood Characteristics</i>							
# Crimes	.08	.08	-.04	.02	.13*	-.08	.03
Race – % Black	.03	.05	.03	.01	.18**	.06	.18**
Race – % Hispanic	.02	-.03	-.00	.02	-.16**	-.05	-.18**
% Single Mother	-.03	.05	-.01	.07	.19**	.05	.11*

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	1	2	3	4	5	6	7
% <HS Education	-.02	-.01	.02	.07	-.07	-.07	.13*
% Unemployed	-.04	.02	.07	.06	.14**	.07	-.02
% Poverty	-.04	.03	.02	.06	.16**	.04	.08

Note

** $p < .01$

* $p < .05$

+ $p < .10$.

Table 3
Results of regressions showing relationships of neighborhood crime with emotion regulation outcomes

	Attention			Appraisal			Response	
	Negative Facilitation ^a	Negative Disengagement ^a	Fear	Anger	Sadness	Internalizing	Externalizing	
<i>Child/Family level</i>								
2004 Cohort	-0.90 (0.69)	-0.21 (0.72)	0.08 (0.15)	0.11 (0.14)	0.10 (0.16)	-0.036 ⁺ (0.020)	0.043 (0.049)	
Child Gender – Boy	0.17 (0.54)	0.22 (0.54)	-0.01 (0.10)	-0.26 ^{**} (0.11)	-0.13 (0.13)	-0.020 (0.018)	0.153 ^{**} (0.034)	
Child Age	-0.28 (0.35)	0.46 (0.39)	-0.18 [*] (0.08)	-0.12 (0.08)	-0.26 ^{**} (0.08)	-0.016 (0.012)	-0.040 [*] (0.018)	
Child Race – Black	-0.04 (1.37)	2.01 (1.29)	-0.05 (0.21)	0.07 (0.24)	0.19 (0.25)	-0.013 (0.022)	0.171 [*] (0.071)	
Child Race – Hispanic	0.45 (1.11)	0.90 (1.20)	-0.19 (0.26)	-0.19 (0.24)	-0.19 (0.21)	0.022 (0.017)	-0.046 (0.065)	
Maternal Education <HS	-0.71 (0.70)	0.92 (0.90)	0.01 (0.19)	0.15 (0.18)	-0.01 (0.15)	-0.003 (0.027)	0.045 (0.042)	
Income to Needs Ratio	-0.37 (0.34)	-0.30 (0.33)	-0.13 ⁺ (0.08)	-0.20 ^{**} (0.06)	-0.09 (0.07)	-0.004 (0.010)	-0.050 [*] (0.024)	
Mother Unemployed	-0.07 (0.58)	-1.64 ^{**} (0.58)	0.04 (0.14)	-0.03 (0.13)	0.28 ⁺ (0.17)	0.008 (0.021)	0.015 (0.042)	
Mother Married or Living w/ Partner	-0.79 (0.60)	0.86 (0.59)	0.14 (0.13)	-0.07 (0.12)	0.05 (0.15)	-0.012 (0.017)	0.007 (0.036)	
Number Times Moved (last year)	0.58 (0.40)	-0.36 (0.53)	0.15 (0.10)	-0.05 (0.09)	0.27 ^{**} (0.10)	0.02 (0.01)	0.03 (0.03)	
Child Interpersonal Violence Exposure	0.49 (0.89)	-0.12 (0.96)	0.38 ⁺ (0.22)	0.05 (0.22)	0.41 ⁺ (0.26)	0.10 ^{**} (0.04)	0.19 ^{**} (0.06)	
<i>Neighborhood level</i>								
# Crimes (in units of 1000)	1.50[*] (0.77)	1.10 (0.82)	-0.29[*] (0.15)	0.02 (0.15)	0.20 (0.16)	-0.042[*] (0.021)	-0.023 (0.040)	
Race – % Black	0.04 (0.03)	-0.00 (0.02)	0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	0.001 (0.001)	0.000 (0.001)	
Race – % Hispanic	0.06 ⁺ (0.03)	0.02 (0.03)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.001 (0.001)	0.000 (0.001)	
% Single Mother Households	-0.05 (0.06)	0.03 (0.06)	-0.03 (0.02)	0.01 (0.02)	0.01 (0.02)	-0.001 (0.002)	-0.002 (0.004)	
% <HS Education	-0.06 ⁺ (0.03)	-0.04 (0.03)	0.00 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.001 (0.001)	-0.001 (0.002)	
% Unemployed	-0.05 (0.04)	-0.01 (0.04)	0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.002 (0.001)	-0.005 (0.003)	
% Poverty	0.01 (0.03)	0.01 (0.03)	0.00 (0.01)	-0.00 (0.01)	0.01 ⁺ (0.01)	0.001 (0.001)	0.002 (0.002)	

Notes: Robust standard errors in parentheses

^{**} $p < .01$

^{*} $p < .05$

⁺ $p < .10$

Attention scores rescaled to represent units of 10 milliseconds.
Bold text highlights the primary study variable of interest: neighborhood crime.

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