

**LONGITUDINAL RELATIONSHIP BETWEEN  
EMOTION REGULATION AND AGGRESSIVE BEHAVIOR:  
THE MODERATING EFFECT OF CAREGIVING**

by

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ABSTRACT

Aggressive behavior (or violence) among juvenile offenders is a major social problem in the United States. Emotion Regulation (ER) is a critical developmental task that cuts across adolescence. However, there is paucity of research directly linking deficits in ER to aggressive behavior among juvenile offenders. Furthermore, researchers have failed to examine how the effect of ER on aggressive behavior is influenced by the adolescents' immediate environment, particularly by caregiving.

Acknowledging this gap in the current literature this study represents the first attempt to examine caregiving as a moderator in the relationship between ER and self-report of aggressive offending behavior among ethnically diverse juvenile offenders. Specifically, this study examined two caregiving dimensions (caregiver-adolescent affective relationships and monitoring) that affect development of ER and aggressive behavior from two theoretical perspectives: ecological-transactional model and attachment theory. Applying an ecological-transactional perspective, aggressive behavior was conceptualized as a byproduct of the mutual interaction between adolescent ontogenic development (ER) and the microsystem (caregiving). Attachment theory was integrated with the ecological-transactional model so as to delineate the underlying psychological mechanism regarding the dynamic interactions between ER and caregiving.

The present study used a longitudinal design analyzing the Pathways to Desistance study ( $n=892$ ; 84% males; 21% White). The findings of the study suggest that changes in ER may cause—and do not merely predict—decline in juvenile offenders' aggressive behavior. The interaction effect was small in magnitude; however, monitoring operated as a significant moderator in the relationship between changes in ER and changes in aggressive behavior. The results imply that the increased ability to regulate emotion is a strong protective factor against aggressive behavior. Furthermore, effective caregiver's monitoring may promote positive development of cognitive ER. These relationships may operate synergetically, and may significantly contribute to decreases in aggressive behavior among juvenile offenders. The findings of this study hold strong implications for social work practitioners to treat juvenile offenders and their families. In an effort to reduce and prevent the perpetration of aggressive and violent behavior, social work practitioners in juvenile justice settings need to strengthen intervention efforts to improve ER skills and the quality of caregiving.

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## **PREFACE**

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## CHAPTER I

### BACKGROUND AND SIGNIFICANCE

#### **Definition and Epidemiology of Aggressive Behavior among Juvenile Offenders**

Aggressive behavior (or violence) among juvenile offenders is a major social problem in the United States, with one million juveniles being arrested in 2014 (Office of Juvenile Justice and Delinquency Prevention, 2015). A juvenile offender is a minor, usually defined as being between the ages of 10 and 18, who violates criminal laws, juvenile offending accounts for 12% of all arrests, and many juvenile offenders become adult offenders (Sickmund & Puzzanchera, 2014).

The present study specifically focuses on any forms of aggressive or violent behavior (i.e., self-report of aggressive offending) among juvenile offenders. Juvenile violence produces substantial financial costs to both society and the particular individuals involved. The full costs of juvenile violence are difficult to quantify (David-Ferdon, & Simon, 2014). In 2010, cost of youth violence was estimated as total of \$17.5 billion in combined medical and lost productivity costs due to homicide and nonfatal assault injuries (Centers for Disease Control and Prevention, 2010). However, the combined total of \$17.5 billion is an underestimate of the true toll of youth violence as it does not reflect other financial losses and required expenditures to address youth violence such as costs to maintain the criminal justice system, which includes costs of arrest, prosecution, incarceration, reentry, and rehabilitation of offenders (David-Ferdon, & Simon, 2014).

When courts determine whether an adolescent should be tried as an adult, the youth's level of maturity, including emotional development is an important indicator among other factors (Ewing, 1990; Lyons, Adams, & Dahan, 2012). There is now a burgeoning literature supporting the association between deficits in emotional development and aggressive and risk-taking behaviors. Research suggests that deficiencies in regulating emotions and

emotionally-driven behaviors are core characteristics of risky or problem behavior during adolescence (Cooper, Wood, Orcutt, & Albino, 2003; Kerr, & Schneider, 2008; Walcott & Landau, 2004). Specifically, anger is a significantly related emotion with juvenile aggressive and violent behavior (Agnew, 2001; Plattner et al., 2007). Evidence indicates that juvenile delinquents have less capability for anger regulation than non-delinquents, and anger control training is a common component of treatment for many juvenile offenders (Goldstein et al., 2012). However, there is lack of research directly linking deficits in Emotion Regulation (ER) to aggressive behavior among adolescent offenders. Furthermore, researchers have failed to examine whether the effect of ER on aggressive behavior is mediated or moderated by other relational factors. More research is needed to explore the personal and relational risk factors related to ER in juvenile offenders.

Among the relational factors to adolescent ER, the caregiving environment would be the most salient factor in distinguishing delinquents from nondelinquents (Hoeve et al., 2009). In general, caregivers of delinquents are more likely than caregivers of nondelinquents to express rejecting attitudes as well as exhibit a lack of warmth and affection and less effective discipline style in stopping deviant and aggressive behaviors (Barnow, Lucht, & Freyberger, 2005; Dishion, Nelson, & Kavanagh, 2003; Hoeve et al., 2009; Laird, Criss, Pettit, Dodge, & Bates, 2008). Evidence also indicates that antisocial children and adolescents who have difficulty in controlling their anger were raised in families that were emotionally disengaged and/or show unskillful caregiving practices (Dishion & Patterson, 2006; Moriarty, Stough, Tidmarsh, Eger, & Dennison, 2001; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003).

Traditionally, caregiver involvement has been a focus of the juvenile justice system. Early juvenile court judges and reformers emphasized the role of inadequate parenting in delinquency (Vincent, 1977). Thus, focusing on caregiving (or parenting) of justice-involved

youth is not new; however, juvenile justice professionals have recently highlighted the importance and significant challenge of increasing positive caregiver involvement. According to a recent survey of juvenile justice probation and correctional leaders (Center for Juvenile Justice Reform, 2008), caregiver involvement was identified as not only one of the most important issues, but also the most operationally challenging issue faced within the juvenile system. It is argued that the methods to establish definition and measurement of caregiver involvement are under-developed (Burke, Mulvey, Schubert, & Garbin, 2014).

Many scholars emphasize that juvenile violence is an extremely complex, multifaceted problem whose solution can only be achieved through our society's better understanding of the root causes of behavior and the environmental factors that facilitate its development into criminal violence (Reiss, Miczek, & Roth, 1994). Loeber & Farrington (2000) suggest that juvenile violence could best be understood from a developmental perspective, as it is likely to wax and wane with age as many other forms of child problem behavior. The phenomenon of "age-crime curve" refers to a frequently observed increase in aggressive and antisocial behavior in early-to mid-adolescence, followed by a decrease in these behavior in late adolescence and early adulthood (Farrington, 1986; Piquero, 2008; Piquero et al., 2001). Studies have focused on the transition to adulthood as a key developmental stage in the study of violence among juvenile offenders (Kosterman, Graham, Hawkins, Catalano, & Herrenkohl, 2001; Roisman, Aguilar & Egeland, 2004).

A number of factors in this transitional phase could contribute to a reduction in aggressive behavior among juvenile offenders; maturational changes in moral reasoning, future orientation, impulse control, or susceptibility to peer influence may make them less prone to antisocial, risky, and aggressive behavior and more prone to socially desirable and safer activities (Gardner, 1993; Keating, 1990; Steinberg & Cauffman, 1996). Additionally, the transition into adult roles of work and family, such as beginning a career and marriage,

were identified as positive turning points for previously aggressive and antisocial youth to have the opportunity to engage in prosocial behaviors (Cernkovich & Giordano, 2001; Laub, Nagin, & Sampson, 1998; Sampson & Laub, 1992). Furthermore, this desistance process from aggressive behavior may involve interactions among dynamic changes in offenders' psychological states, developmental capacities, and social contexts (Mulvey et al., 2004).

Yet, there is paucity of empirical evidence on desistance of aggressive behavior among juvenile offenders during this transitional period, and predictors of the desistance have not been well-established. (Mulvey et al., 2004). Furthermore, juvenile offenders are less frequently studied than other high-risk populations (Williams & Steinberg, 2011). Prior research has not sufficiently attended to adolescents in the juvenile justice system—an important group for the development of criminological theory and juvenile justice policy—but has instead studied adolescents sampled from schools or communities (Laub & Sampson 2001; Loeber & Stouthamer-Loeber, 1998; Mulvey et al., 2010). As a result, there is limited knowledge of the specific developmental contexts and behavioral characteristics that distinguish among youth whose offending is serious (Mulvey et al., 2010). Therefore, the present study seeks to examine self-report of aggressive offending patterns of adolescents who are in the juvenile justice system—especially serious adolescent offenders—focusing on predictors of which adolescents are able to desist from aggressive behavior across this developmental transition into adulthood.

### **Relevance to Social Work**

The prevalence of youth violence mandates that social workers must develop adequate knowledge and skills to respond to vulnerable youth and their families, in order to ultimately create a society that is intolerant of aggression and violence. Social work's commitment to social justice through the National Association of Social Workers (NASW) Code of Ethics mandates that social workers advocate for and intervene on behalf of

vulnerable individuals and groups as well as strive to provide these populations with access to needed information, services, and resources (NASW, 2008).

There is growing need to incorporate emotion concepts into prevention and intervention programs for juvenile offenders within clinical, school, and family settings for social work practice. The role of ER in psychological treatments for juvenile offenders has not been explicitly stated as being a central treatment goal despite its significant impact on aggressive behavior. The key aspect when developing an emotion component in a psychological treatment plan for juvenile violence is the incorporation of caregiver involvement. This acknowledgment of caregiver involvement has quintessential importance to the profession of social work, which emphasizes the link and transaction between individual and social context. It is clear that caregivers exert a strong socializing influence on their children's emotional behavior. Thus, within the clinical setting, caregivers can be taught to encourage their children's emotional development by providing a supportive social structure in which children can learn and practice ER skills (Zeman, Cassano, Perry-Parrish, & Stegall, 2006).

In addition, youth involved in the juvenile justice system often have experienced victimization: two-thirds of youth in juvenile justice samples have been seriously victimized (Abram et al., 2004; Ford et al., 2000). Justice-involved youth are also likely to be affected by multiple types of trauma, or polyvictimization, before entering the juvenile justice system (Abram et al., 2004). Victimization refers to "being threatened or harmed intentionally (e.g., sexual, physical, or emotional abuse) by a caregiver or other trusted person, witnessing caregivers or significant others being intentionally harmed (e.g., domestic violence), or neglect, separation from, or abandonment by trusted adults or youths" (Ford, Chapman, Mack, & Pearson, 2006, p.14). There is an increased risk of victims becoming perpetrators of violence themselves later in life. Numerous studies have documented the association between

childhood victimization and aggressive behavior (Herrenkohl, Huang, Tajima, & Whitney, 2003; Hoeve et al., 2015; Salzinger, Rosario, & Feldman, 2007; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Widom, Schuck, & White, 2006; Wilson, Stover, & Berkowitz, 2009). Childhood experiences of abuse and victimization are also associated with emotion regulation. Trauma caused by victimization leads to impairment in emotional regulation and, eventually, to aggressive behavior (D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012; Ford, 2002; Ford et al., 2006; Pollak, Vardi, Bechner, & Curtin, 2005).

Therefore, current practice and policy demand that social work researchers address the issues of juvenile violence by advancement of theories, methodology, and intervention approaches. Further research is needed to better understand juvenile offenders and their caregiving environment. It is important to understand the extent to which the adolescent violence is a product of psychological factors (such as ER) as well as whether and how strongly aspects of caregiving are associated with ER and the perpetration or desistance of aggression. This knowledge can be used to inform family-based interventions aimed at reducing and preventing the perpetration of aggressive behavior of juvenile offenders (Trentacosta, Hyde, Shaw, & Cheong, 2009). Promising approaches to youth violence intervention programs would be family-centered, designed to improve adolescence ER as well as quality of caregiving.

## **Overview of the Study**

This study examines the combined effects of ER and caregiving on the developmental trajectory of aggressive behavior. The central goal of this study is to investigate caregiving as a moderator of the relationship between ER and aggressive behavior among juvenile offenders. Specifically, this study examines two caregiving dimensions (caregiver-adolescent affective relationships [i.e., caregivers' warmth and hostility] and monitoring) which affect development of ER and aggressive behavior from two theoretical perspectives: ecological-

transactional model and attachment theory. The present study uses a longitudinal design analyzing the Pathways to Desistance study (2000-2010) of serious adolescent offenders. Measures are obtained from five waves of data collected from 892 youth (84% were males; 21% were White; an average age of 16 years) and are examined by employing Poisson growth curve models.

The specific questions addressed are:

1. Does aggressive behavior decline over the 2-year study period?
2. Do changes in ER predict changes in aggressive behavior?
3. Does caregiving predict changes in aggressive behavior?
4. Does caregiving moderate the relationship between changes in ER and changes in aggressive behavior?



## CHAPTER II

### THEORETICAL FRAMEWORK AND CONCEPTUAL MODEL

#### **Introduction**

The theoretical framework presents two theories: Ecological-transactional model (Cicchetti & Lynch, 1993) and Attachment theory. The present study aims to account for the complexity of aggressive behavior (or violence) among adolescent offenders and increase explained variance through application of these two theoretical perspectives. Both ecological-transactional model and attachment theory have been substantiated by well-grounded theoretical propositions and empirical findings within developmental arena. Both theories advocate a transactional approach to conceptualizing the developmental process and emphasize “the importance of the lifespan and the developmental makeup of the caregiver providing care to the child” (Belsky, Rosenberger, & Crnic, 1995, p.154).

Within the current study, the ecological-transactional model is integrated with attachment theory so as to increase explanatory and predictive power of ecological-transactional model by delineating the underlying psychological mechanism regarding the dynamic interactions between caregiving and ER. These theories, in combination, may further our understanding of the etiology of juvenile violence.

#### **ER, Caregiving, and Aggressive Behavior: An Ecological-Transactional Perspective**

No single factor can be expected to bear the adequate explanation of the cause of aggressive behavior as affected by multiple levels of adolescents’ environments. Various systems—including individual, family, and community levels—and the complex interactions among the nested contextual levels contribute to and influence the developmental trajectories of aggressive behavior among juvenile offenders. The ecological systems theory (Bronfenbrenner, 1979) explains human development within the context of multiple levels of interconnected systems that are nested within each other. These levels of systems range from

the proximal microsystem (i.e., family) to more distal macrosystem (i.e., social structures to the larger culture) (Bronfenbrenner, 1979). This theory conceptualizes the interdependent interaction of systems as the main dynamic mechanism shaping the context in which the individual produces certain developmental outcomes (Bronfenbrenner, 1979).

Applying Bronfenbrenner's (1979) ecological systems theory, Belsky (1980) proposed the etiological model of child development. His model consists of four levels of analysis: the *macrosystem* (i.e., broader societal aspects including cultural beliefs and values that contribute to and influence child development), *exosystem* (i.e., aspects of the community that contribute to child development), *microsystem* (i.e., factors within the family that contribute to child development), and *ontogenic development* (i.e., factors within the individual [e.g., temperamental disposition, personal characteristics, etc.]). Belsky (1980) asserts that interactions exist between all levels of ecology contributing to child development, following the view of Bronfenbrenner's (1979) theory of human development.

Integrating the etiological model of Belsky (1980), the ecological-transactional model proposed by Cicchetti and Lynch (1993) added a transactional aspect to the etiological model. This model has remained the predominant etiological perspective in the developmental field, providing a useful framework to explain aggressive and antisocial behavior among adolescents. The ecological-transactional model specifically focuses on interactions to explain how processes at each level of ecology reciprocally influence on each other and shape the course of adolescent development (Cicchetti & Lynch, 1993).

The level of ecology most proximal to the adolescent (i.e., ontogenic level) is expected to have greatest and direct impact on their development relative to the more distally located macro-systems. Thus, ultimately, it is the adolescent's own ontogenic processes, as manifested by the particular developmental pathway, which eventually lead the adolescent to adaptive or maladaptive resolution of stage-salient developmental tasks (Cicchetti &

Valentino, 2006). However, challenges or supports from the family, community, and society contribute to adolescent ontogenic processes, and the adolescents also play active roles in their development as they react to the environmental influences and engage in the resolution of stage-salient developmental issues (Cicchetti & Valentino, 2006).

The ecological-transactional model specifically focuses on the reciprocal interactions of the adolescents' immediate environment, the caregiver and the adolescent, which together contribute to the outcome of their development. This study examines two fundamental caregiving dimensions: caregiver-adolescent affective relationships (i.e., caregivers' warmth and hostility) and monitoring. These caregiving dimensions have been highlighted as major risk factors to the development of aggressive and antisocial behavior (Agnew, 2001, 2008). In accordance with this ecological-transactional point of view, aggressive behavior is conceptualized in the current study as a byproduct of the mutual transaction between adolescent ontogenic development (ER) and the microsystem (caregiving). Therefore, the central goal of this study is to examine caregiving as a moderating contextual risk (or protective) factor in the relationship between ER and aggressive behavior among juvenile offenders.

There has been increasing recognition among developmentalists that the long-term impact of any particular risk factor often depends on the levels of other risk factors (Lewis, 2000). For example, Dishion and Patterson (2006) emphasized the roles of parent-child interaction and management dynamics in establishing developmental trajectories toward antisocial behavior. Connell and Goodman (2002) highlighted that parenting behaviors accounted for only a small proportion of the variance within externalizing behavior. Acknowledging these findings is crucial to delineate a more complete model to understand developmental pathways leading to aggressive behavior among adolescent offenders.

Significant advances have been made in the studies of ER and caregiving behavior in relation to externalizing behavior. However, research in each area has often been pursued without clear linkages to other areas despite the associations among ER, caregiving, and aggressive behavior. Thus, this study attempts to bridge these areas by constructing a model to test the combined effects of ER and caregiving on the developmental trajectory of self-report of aggressive offending behavior.

### **Psychological ontogenic development: ER**

**Definition of ER.** An ecological-transactional perspective regards the acquisition of ER as a major developmental task that cuts across adolescence (Cicchetti & Valentino, 2006). This perspective views that inadequate resolution of this stage-salient task may contribute to psychological maladjustment and externalizing behavior (Cicchetti, Ganiban, & Barnett, 1991; Cole, Michel, & Teti, 1994). From a developmental perspective, ER consists of “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (Thompson, 1994, pp. 27-28). According to this definition, emotion is regulated not only by inherent and acquired strategies of emotion self-management (i.e., intrinsic influences) but also by external means (i.e., extrinsic influences) (Thompson, 1994).

Research has tended to obscure the heterogeneity of the complexity of ER development and their links to significant social relationships as well as the challenges of identifying the origins and correlates of these regulatory processes (Thompson, 1994). Specifically, an external factor—caregiving—plays a significant role in teaching and socializing one’s emotional expression and regulation in the service of accomplishing their goals (Guttmann-Steinmetz & Crowell, 2006). It is through their primary caregivers’ socialization practices that children learn which expressive alternatives of emotions will be effective and adaptive in attaining immediate goals as well as the more general goals of

conforming to social and cultural expectations (Thompson, 1994). Therefore, individual differences in regulation may arise from caregivers' influence such as social learning experiences as well as attachment relationships that differentially foster emotion labeling, adherence to emotion display rules, modeling of strategies for managing emotion, and problem solving (Synder et al., 2003).

There are two core features of this conception of ER. First, there is possibility that people may regulate either negative or positive emotions, either by decreasing or increasing them, and that these ER episodes are nearly always social in nature (Gross & Thompson, 2007). Second, emotion serves adaptation by organizing and coordinating cognitive, neural, and physiological processes in service of goal-directed behavior. Thus, it is assumed that no emotion is intrinsically good or bad, and ER is not inherently adaptive or maladaptive (Ekman & Davidson, 1994; Gratz & Roemer, 2004; Gross, 2002).

As with any behavior, adaptive ER enables individuals to function successfully in their environment (Bridges, Denham, & Ganiban, 2004). If an individual utilizes ER adaptively when they encounter a difficult emotion experience, they could then be able to contain the emotional experience sufficiently by monitoring or altering their own level of arousal, thereby continuing to engage in goal-directed behaviors while allowing their emotional experience to run its course (Gratz & Roemer, 2004; Robertson, Daffern, & Bucks, 2012; Shields & Cicchetti, 1998; Whelton, 2004).

Given these propositions, an individual who uses maladaptive ER when faced with a difficult emotion experience is neither able to contain the emotional experience sufficiently to engage in goal-directed behaviors nor able to allow the emotional experience to run its course. These two styles of maladaptive ER are termed under-regulation and over-regulation, respectively (Robertson et al., 2012). The relationship between emotional under-regulation and development of externalizing behavioral problems is empirically established (Calkins &

Fox, 2002; Crundwell, 2005; Dearing et al., 2002; Eisenberg et al., 2000; Rapport, Friedman, Tzelepis, & Van Voorhis, 2002; Robertson et al., 2012; Sullivan, Helms, Kliwer, & Goodman, 2010; Walcott & Landau, 2004) and is the focus of this study.

Relatively little is known about the relationship between emotional dynamics and externalizing problems among adolescents compared to children. However, a smaller body of ER research regarding adolescents at risk for aggressive and antisocial behaviors reported that highly aggressive youth demonstrated high levels of emotional arousal and were also highly reactive to the distress of others with few or less adaptive ER strategies (de Castro, Merk, Koops, Veerman, & Bosch, 2005; Lochman & Dodge, 1994; Shields & Cicchetti, 1998).

***Under-regulation of anger.*** The present study specifically highlights and examines a negative affect (i.e., anger) as a core emotional feature of aggressive behaviors among adolescent offenders. The rationale of examining a discrete emotion is based on the functionalist theory of emotion which conceives of emotion as contextually-bound and goal-directed. As such, discrete emotions serve specific purposes and contain unique and valuable information about one's relationship with the environment, thereby enabling one to respond adaptively to environmental changes (Izard, 1977; Lazarus & Smith, 1988). Current knowledge about ER is limited by the failure of considering divergent characteristics of discrete emotions (Zeman et al., 2006; Zimmermann & Iwanski, 2014). The underlying assumption of predominant research on ER suggests that individual differences in ER ability do not vary as a function of emotion, which may hinder our understanding of effective regulation (Rivers, Brackett, Katulak, & Salovey, 2007).

For example, Barrett and colleagues (2001) indicated that individuals who differentiate among discrete emotional states were better able to regulate negative emotions than those who made fewer distinctions. These findings suggest that discrete emotional states,

compared to global affective states such as pleasantness–unpleasantness, have more adaptive value in that they provide more accurate information about the person–environment relationship and enable one to identify the cause of the emotional state, which leads to more adaptive selection responses (Schwarz & Clore, 1996). Therefore, scholars have called for greater scientific attention to examining the regulation of discrete emotions, such as anger, especially among children and adolescents (e.g., Zeman et al., 2006).

Under-regulated anger is predictive of acting-out or aggressive behavior problems (Calkins & Fox, 2002; Dearing et al., 2002; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Kerr & Schneider, 2008). Aggressive behavior is frequently preceded by feelings of anger, more so than any other emotion (Novaco, 2007). Typically, under-regulated anger is considered facilitating overt behavioral problems—anger leads to verbal or physical aggression—rather than covert behavioral problems (Kendall, 2000). Under-regulation of anger is characterized by a failure to inhibit impulsive behaviors such as lack of anger control and extreme anger arousal. In under-regulation, the emotion and the behavior that occurs in response to that emotion is experienced as inseparable (e.g., anger and throwing things or hitting people), which interferes the individual’s ability to employ the ER strategies necessary to control his or her behavior (Gratz & Tull, 2010; Robertson et al., 2012). This maladaptive style of ER indicates failing to contain difficult emotional experiences sufficiently to continue to engage in goal-directed behaviors, as previously discussed. Regulation and culturally appropriate expression of anger are considered key developmental tasks (Lemerise & Harper, 2010). Individual differences in expression of anger are the consequence of a transaction between individual differences in temperamentally-based anger-proneness and socialization of anger within the caregiving context (Lemerise & Harper, 2010).

***Developmental considerations of ER.*** Adolescence is a period of transition during which there are rapid and dramatic changes in physical, intellectual, emotional, and social

capabilities (Steinberg & Schwartz, 2000). The transition through adolescence evokes new experiences of emotional arousal under the influence of many physical, psychological, and social changes. The biological and social changes make adolescence a period of increased vulnerability, which in part explains the increases in externalizing behavior (Steinberg, 2008).

Research suggests that adolescents experience more frequent and intense emotions than younger or older individuals (Larson, Moneta, Richards, & Wilson, 2002; McLaughlin, Garrad, & Somerville, 2015; Weinstein, Mermelstein, Hankin, Hedeker, & Flay, 2007). maturational changes in many of the hormonal, neural, and cognitive systems that would affect ER occur throughout this period (Spear, 2000). These changes might be perceived as a challenge for some adolescents and various forms of psychopathology, including affective and behavioral disorders, are dramatically increased during this period, as well (Silk, Steinberg, & Morris, 2003).

From middle childhood into adolescence (i.e., 12-18 years), children's ability to regulate their emotions increases (Zeman et al., 2006). Children during this period begin to utilize more differentiated ER decisions, depending on motivation, emotion type, and social-contextual factors—an ability which continues to develop throughout the lifetime (Zeman & Garber, 1996). They begin to clearly recognize the interpersonal impact of emotional display and, as such, these recognitions begin to affect their motivations and decisions to regulate emotions and use certain ER strategies (Shipman, Zeman, & Stegall, 2001; Zeman et al., 2006). Nevertheless, “response suppression—the ability to control behavior according to instruction or rational understanding”—is difficult for adolescents and particularly so under strong influence of alternative forces such as impulse or emotions (Kupfer & Woodward, 2004, p.320). Behavioral control requires considerable effort and, while it can be accomplished, it is less likely to be accomplished consistently during adolescence (Kupfer & Woodward, 2004). Maintaining consistency with intended or planned choices, however,



gradually improves for most individuals as they reach later adolescence and make the transition into adulthood (Kupfer & Woodward, 2004).

### **Microsystem: Caregiving**

When considering what develops in the emotion domain, it is essential to recognize that emotional development is inextricably intertwined with development in other domains such as social, cognitive, and biological realms (Zeman et al., 2006). “ER is embedded in experiences and plans that are further embedded in their relation to contextual demands” (Cole, Michel, & Teti, 1994, p. 84). Emotional life is socially constructed in terms of gaining meaning from and providing meaning to social contexts and experiences (Zeman et al., 2006). The developmental changes in emotional life during adolescence evolve from an interaction between developing neural regulatory structure and social environment (Cole, Michel, & Teti, 1994; Davidson, Jackson, & Kalin, 2000).

Considering ecological proximity to the adolescent, primary caregiving has the most direct socializing influence on the adolescents’ ontogenic development: ER (Cicchetti & Lynch, 1993). However, little research has examined caregiving mechanisms of influence on ER and their integrative roles in aggressive behavior. Adolescence is considered a period of increased striving for autonomy (Steinberg, 1990), which suggests a likely diminishment of caregivers’ influence on children’s behavior (Bradley & Corwyn, 2013). Yet, evidence indicates the contrary (Kuczynski, Pitman, & Mitchell, 2009); that is, caregiving behavior is amenable to change as children grow older and is likely to be reformulated in response to the child’s changing needs and inclinations (Bradley & Corwyn, 2013; Kuczynski et al., 2009).

As children age, primary caregivers continue to assess if their behaviors meet the child or family goals and resist threats to the children’s sense of autonomy and remain an important resource for adolescents (Kuczynski et al. 2009; Steinberg & Silk, 2002). There is a substantial renegotiation of roles, rules, and expectations in caregiver and child

relationships during adolescence (Collins & Laursen, 2004). Although peer influences increase, caregivers' supervision and influence often provide important guidance for adolescents as they engage with particular peer groups (Collins & Laursen, 2004). From an attachment theoretical perspective, it is the sense of security in their family relationship through which adolescents develop competence to explore and master new environments outside of the family thereby promoting social and identity development (Collins & Laursen, 2004). Evidence indicates that caregiving styles and dimensions have been found to be relatively stable over time (Chester, Jones, Zalot, & Sterrett, 2007; Holden & Miller, 1999; Loeber et al., 2000).

This has particular significance as applied to ER development. Unfortunately, relatively few studies of emotional development have examined ER in relation to caregivers' functioning during the adolescent period (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Studies on the development of anger regulation and its impact on behavioral outcomes increasingly recognize the significance of caregiver-child relationships. Children's risk for early-onset, persistent aggressive and antisocial behavior is closely related to caregivers' failing to provide the social conditions that foster anger regulation. Research indicates that anger dysregulation and overt forms of antisocial behavior might evoke and be shaped by different sets of environmental contingencies. Caregivers' supervision and emotional coaching are inversely related to the child anger dysregulation (Gottman, Fainsilber-Katz, & Hooven, 1997; Snyder et al., 2003). Conversely, families characterized by high rates of caregivers' negative reactions and lack of monitoring may have children who are more prone to under-regulated anger and aggressive and antisocial behavior (Dishion & Patterson, 2006; Snyder et al., 2003).

### **Transaction between adolescent ontogenic development and caregiving**

A number of contemporary theories emphasize the interaction patterns occurring between caregivers and aggressive youth as key to understanding the etiology of aggressive antisocial behavior following an ecological-transactional point of view. These theories highlight the pathogenic impact of repeated failures on the part of the caregivers to react contingently and supportively to the prosocial behaviors of the adolescent. For example, the Coercion theory (Patterson, 1982) focused on the contributions of transactional emotional processes between ontogenic factors (e.g., adolescent irritable disposition) and microsocial factors (i.e., caregiver-provoked conflicts) to early and chronic aggressive antisocial behavior. This social interaction model emphasizes caregiver-adolescent emotional exchanges and failure to monitor as the proximal causes of aggressive antisocial behavior throughout the life span (Dishion & Patterson, 2006).

The developmental model proposed by Loeber and Farrington (2000) posits a temporal sequence of risk for chronic and violent offending behavior. The idea is that sets of individual characteristics (ontogenic level) (e.g., neurological impairment and aggressive characteristics) and microlevel risks (e.g., lack of caregiver supervision and poor caregiver-child relations) emerge early in life and that the interactions of these characteristics and environmental risks culminate into serious antisocial behavior. Moffitt's (1997) dual taxonomy model also indicates that life course persistent antisocial behavior stems from the combination of ontogenic (i.e., the child's neuropsychological impairments) and microsocial risk factors (i.e., ineffective caregiving). In line with the aforementioned propositions, this study proposes and examines the transaction between ER and caregiving as a means toward understanding the developmental pathways to aggressive behavior among juvenile offenders.

## **ER, Caregiving, and Aggressive Behavior: An Attachment Theoretical Perspective**

Current research doesn't provide adequate explanation regarding the influence of caregiving on ER among juvenile offenders. From an attachment theoretical perspective, the present study therefore attempts to provide an explanation regarding the psychological mechanism of caregiving influence on the development of ER and the interactive roles between ER and caregiving that may have impact on the development of aggressive behavior.

As previously discussed, this study examines two caregiving dimensions—caregiver-child affective relationships (i.e., warmth and hostility) and monitoring. These two fundamental components of caregiving have been referred to as support (also loosely referred to as warmth) and control (Maccoby & Martin, 1983), and it has been suggested that these two dimensions are closely linked to each other (Lac, Alvaro, Crano, & Siegel, 2009). A supportive component is defined by “an assortment of affective, nurturant, or companionate types of caregiving behavior” (Barber, Stolz, & Olsen, 2005, p. 2). A controlling component is defined as “a range of regulating, disciplinary behaviors” (Barber et al., 2005, p. 2). These two dimensions are fundamental components of caregiving to evince the quality of child-caregiver attachment.

### **Caregiver-adolescent affective relationships (Caregivers' warmth and hostility)**

Primary caregivers' warmth is the most important and ubiquitous element among caregiving dimensions (Rohner, 1986). Often labeled acceptance, warmth refers to “the expression of affection, love, appreciation, kindness, and regard; it includes emotional availability, support, and genuine caring” (Skinner, Johnson, & Snyder, 2005, p.185). The

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<sup>1</sup> A portion of the content in this section was modified and published elsewhere: Kim, Y. J. (2017). Early parenting and depression: The mediating role of anger control. *Journal of Human Behavior in the Social Environment*, 27, 171-179.

conceptual opposite of acceptance is rejection. Often referred to as hostility, caregivers are rejecting when they actively dislike their children. Expressions of rejection include “aversion, hostility, harshness, overreactivity, irritability, and explosiveness; they also include overt communication of negative feelings for the child, such as criticism, derision, and disapproval” (Skinner et al., 2005, p.185).

The affective quality of the caregiver-child relationship is a significant facet of caregiver-child attachment. Bowlby (1980) posits that the goal of attachment behavior is to maintain an affectional bond. Ainsworth and Bell (1970) define attachment as “an affectional tie that one person or animal forms between himself and another specific one—a tie that binds them together in space and endures over time” (p.50). Thus, research on caregiver-child affective relationships and intimacy has largely relied upon the attachment theory emphasizing that securely attached children, in westernized societies in particular, typically have an affectionate relationship with their caregivers (MacDonald, 1992; Main & Cassidy, 1988; Sable, 2007). In this view, warm, sensitive, and responsive caregiving is assumed a necessary and sufficient condition for secure attachment (MacDonald, 1992). Within this perspective, insecure infants may be hypothesized as having failed to establish an affectionate relationship with the caregiver. A basic interest of attachment theorists is to explain the affective content of intimate relationships and, especially, feelings of love, affection, and grief. Profiles of insecure attachment also emphasize hostility and anger (Ainsworth, Blehar, Waters, & Wall, 1978).

A variety of studies have focused on the absence of support, such as withholding love and affection or hostility and its impact on youth psychosocial outcomes. Meta-analysis conducted by Hoeve and colleagues (2009) revealed a strong link between caregivers’ support and child delinquency in 161 published and unpublished manuscripts. Lack of caregivers’ support and warmth has been associated with aggressiveness (Dodge, Price, Coie,

& Christopoulos, 1990). Barnow, Lucht, and Freyberger (2005) observed that low caregivers' warmth, inconsistency and caregivers' rejection could lead to aggressive and delinquent behavior. In addition, Wills, Mariani, and Filer (1996) and Pires and Jenkins (2007) concluded that adolescents who engaged in deviant behavior reported high levels of hostility and low levels of support from their caregivers. Gainey and colleagues (1997) also concluded that maternal attachment may serve as a protective factor against delinquency, even when the parent is a substance abuser.

### **Caregivers' monitoring**

Caregivers' monitoring has been defined as "a set of correlated caregiving behaviors involving attention to and tracking of the child's whereabouts, activities, and adaptation" (Dishion & McMahon, 1998, p. 61). Monitoring is a fundamental component of effective behavioral regulation, especially in adolescent years and produces well-adjusted youths by providing a regulating structure within which youths develop self-regulatory strategies (Barber et al., 2005; Patterson, Reid, & Dishion, 1992; Pettit, Laird, Dodge, Bates, & Criss, 2001).

The association between caregivers' monitoring and behavior problems during adolescence has been well established within current literature. Research has linked the presence of monitoring with the absence of adolescent delinquent behavior (Crouter & Head 2002; Kerr & Stattin, 2000). Monitored youths are less likely to engage in substance use and delinquent behavior or spend time with deviant peers in numerous studies (Barrera, Biglan, Ary, & Li, 2001; de Kemp, Scholte, Overbeek, & Engels, 2006; Dishion, Nelson, & Kavanagh, 2003; Hoeve et al., 2009; Laird, Criss, Pettit, Dodge, & Bates, 2008). However, few studies have attended to the relationship between caregivers' monitoring and adolescent ER despite strong links between these types of caregiving practices and adolescent self-regulation (Steinberg & Morris, 2001; Steinberg & Silk, 2002).

Recent theoretical discussions about attachment have suggested that monitoring is an important predictor of attachment quality (Kerns, Aspelmeier, Gentzler, & Grabill, 2001; Kobak, Rosenthal, Zajac, & Madsen, 2007; Marotta, 2002). A more secure attachment is associated with more (effective) monitoring (Kerns et al., 2001). Inadequate monitoring such as neglect or low levels of caregivers' control may indicate insecure attachment quality. Early primary caregiver-child attachment quality is hypothesized to determine the caregiver's ability to monitor the child (Kerns et al., 2001). When children have a history of interactions with the caregiver wherein the caregiver played a role as a secure base they are more willing to cooperate with caregivers' requests regarding monitoring (Waters, Kondo-Ikemura, Posada, & Richters, 1991). Effective monitoring requires reciprocal cooperation between caregiver and child, and the reciprocal cooperation develops as a consequence of secure attachment (Kerns et al., 2001). Or, alternatively, higher levels of monitoring may help promote or maintain a secure attachment relationship (Kerns et al., 2001).

Kerns and colleagues (2001) reported that children did not distinguish in their perception or experience of either attachment relationships or more specific caregiving practices (e.g., monitoring) in their daily lives. Darling and Steinberg (1993) indicated that impact of specific caregiving practices might be moderated by the affective quality of caregiver-child relationship. Taken together, these findings illustrate the importance of embedding attachment within a larger child rearing context (Kerns et al., 2001).

### **Key concepts of attachment theory**

Attachment theory provides a fruitful framework for exploring the developmental roots of cognitive vulnerabilities to emotion dysregulation and maladaptive behavior such as aggressive behavior. This theory describes an infant's bond with her primary caregiver, or attachment figure, which persists throughout the life span (Bowlby, 1979). Bowlby (1979) stressed that attachment processes continue "from the cradle to the grave" (p.129); an

emphasis on attachment in adolescents is also prominent. Attachment behavior is defined as a “seeking and maintaining proximity to another individual” (Bowlby, 1969, p. 194).

Attachment theory (Bowlby, 1969, 1973) assumes that human beings’ innate psychological systems (i.e., the attachment [behavioral] system) prompt proximity to significant others (i.e., attachment figures) to protect themselves from physical and psychological threats and to alleviate distress. Individual differences in quality of attachment relationships are broadly divided into two main categories: “secure” and “insecure” attachment (Ainsworth et al., 1978). Attachment security can be defined as individuals’ feelings or appraisals that they can trust and be supported by an attachment figure in times of need (Ainsworth, 1989; Weinfield, Sroufe, Egeland, & Carlson, 2008). The attachment system is activated by stress and has the goal of reducing arousal and reinstating a sense of security (Lyons-Ruth, 1996). One important function of the attachment bond is to allow children to use their caregiver as a secure base from which to explore their environments (Sroufe & Waters, 1977).

According to Bowlby (1969/1982), early caregiving experiences are internalized as working models—mental representations derived from history of the primary attachment relationship. An internal working model serves as a template for future relationships with significant others, which includes affect, cognition, and expectations about future interactions (Bowlby, 1969/1982). Thus, this theory assumes that quality of parent-child relationship is stable over time and that the functions of attachment relationships for adolescents are not differentiated from those for younger children (Laursen & Collins, 2009). Attachment manifestation may be differently characterized as children continue to develop; however, these changes are consistent with the underlying quality of the relationship (i.e., internal working model), which tends to be durable (Ainsworth, 1989).



## **Attachment and the development of ER**

Bowlby (1973) viewed emotions as important regulatory mechanisms within attachment relationships (Cassidy, 2008). For example, functional (neither excessive nor destructive) anger expression can serve to promote, and not to disrupt, the attachment bond by alerting the attachment figure to the child's interest in maintaining the relationship (Bowlby, 1973). Attachment theory assumes that different patterns of interactions with significant others result in the development of different attachment-related strategies of ER and a sense of attachment security is achieved from the successful accomplishment of these ER functions (Bowlby, 1973, 1988; Mikulincer, Shaver, & Pereg, 2003). If a caregiver is warm, available, and responsive, the infants will develop a secure attachment and ER strategies involved with distress will be characterized by seeking comfort and support from the caregiver (Ainsworth et al., 1978; Bowlby, 1980). If a caregiver is emotionally unavailable or rejecting during times of distress, the infant may develop an avoidant-insecure attachment. The avoidant strategies of ER deemphasize the importance of attachment where the communication of anger and distress will be restricted (Allen, Moore, & Kuperminc, 1997). If a caregiver is inconsistent, the infant may develop an ambivalent-insecure attachment. In this case, the infant will adopt ER strategies that heighten distress with displays of fear and anger toward the caregiver (i.e., under-regulation of emotion) (Allen et al., 1997; Cassidy, 1994). In support of these views, Bowlby (1969/1982) emphasized that caregiving influence and early attachment between caregiver and child play a crucial role in the healthy emotional development of a child.

***Insecure attachment and anger regulation.*** Bowlby (1973) hypothesized that insecure attachment was a predictable correlate of dysfunctional anger. He defined anger as a response to separation or threat of separation (Bowlby, 1973). During an episode of separation from an attachment figure, the role of a child's anger is to empower the child to

overcome obstacles until they are reunited with their attachment figure as well as to discourage the attachment figure from going away again (Bowlby, 1973). However, repeated threats of abandonment and rejection by an attachment figure may lead to intense and/or persistent angry feelings by weakening the bond between a child and his or her attachment figure (Bowlby, 1973). This anger becomes dysfunctional crossing an unspecified “threshold of intensity” (Bowlby, 1973, p. 249). Initially, this intense anger is directed at the attachment figure, but later it can become repressed and directed toward others, suggesting that insecure attachment is one route that may lead to hostile attributional biases and, possibly, aggressive behavior (Bowlby, 1973).

Study findings provided empirical support for Bowlby’s original hypothesis regarding attachment and anger regulation. Kobak and colleagues (1993) showed that American teens with insecure parental attachments displayed more dysfunctional anger during interactions with their mothers than did those who viewed their early parental attachments as secure (a finding replicated by Zimmermann [2004] in a study of German adolescents). Mikuliner (1998) found that securely attached people’s anger expression was controlled and nonhostile with intentions of repairing their relationship with the instigators of anger. In contrast, insecurely (anxiously) attached people’s anger experience was characterized by being prone to intense anger, lack of anger control, the tendency to ruminate on feelings of anger, and hostile attributional bias.

### **Attachment and aggressive behavior**

Poor attachment to caregivers has been identified as one of the causes of delinquent behavior (Bowlby, 1944, 1973). A number of studies have highlighted children’s attachment with parental figures as an important factor in decreasing the likelihood of aggressive and antisocial behavior (e.g., Bandura & Walters, 1959; Glueck & Glueck, 1962; Hirschi, 1969). In a recent meta-analysis, Hoeve and colleagues (2012) indicated that poor attachment to

caregivers was significantly linked to aggressive and antisocial behavior in boys and girls in 74 published and unpublished manuscripts.

The relationship between attachment and aggressive and delinquent behavior is adequately explained by social control theory (Hirschi, 1969). Hirschi (1969) conceptualized attachment as an affective bond through which children internalize the conventional norms of society and as a mechanism in controlling misbehavior. According to Hirschi (1969), juveniles who are strongly attached to their caregivers are less likely to engage in aggressive and delinquent behavior because they care about the normative expectations of their caregivers, which protects against delinquent impulses.

The basic assumption of social control theory is that everyone is inclined to engage in deviant behavior (Hirschi, 1969). However, individuals refrain from deviance because they would not want to damage their relationships with others to whom they are attached by committing aggressive and deviant acts (Hirschi, 1969). Thus, strong attachment serves as an indirect control (Hirschi, 1969). Hirschi (1969) defines indirect caregivers' control as the psychological presence of the caregivers. In other words, the stronger the bond of attachment to caregivers, the more likely the child will take into account the caregivers' expectations when the temptation to commit a deviant act appears. In contrast, when children have weak attachment with their caregivers, these attachments (or absence thereof) place children at greater risk for criminogenic influences; thereby, increasing aggressive and delinquent behavior (Hirschi, 1969).

### **Conceptual Approach to ER and Caregiving**

Spielberger (1972) divided emotional experience into two major axes: trait and state. Emotional traits serve as an "enduring emotional pattern for an individual"; emotional states, on the other hand, are "acute responses to stimuli and are representative only of a particular moment in time" (Plattner et al., 2007, p.157). ER research, as a whole, is concerned with the

extent to which individuals differ in effectively regulating emotions, and most studies assess ER as a general trait (e.g., Gross, 1999; John & Gross, 2004; Snyder, Schrepferman, McEachern, & DeLeeuw, 2010). These trait approaches assume ER as temperament or personality constructs, measuring those constructs by global reports (or ratings) that average emotional response during a substantial period of time across broad range of situations (Snyder et al., 2010). However, trait approaches provide little information regarding the mechanisms through which emotional responses and regulation may trigger environmental reactions or be influenced by environmental experiences in ways that may impart maladaptive behavior (Snyder et al., 2010).

Given the aforementioned developmental considerations of adolescent ER, the present study conceptualizes ER as a malleable construct (i.e., a state) which is shaped, varied, and maintained by social environmental events as well as by intra-individual ER processes throughout the adolescent period. Conceptualizing adolescent ER as a state or time-varying construct offers a more sensitive approach to examining developmental changes in ER through capturing situation-specific and time-dynamic responsiveness to caregiving influences.

Regarding the conceptual approach employing HLM techniques, ER was conceptualized as a time-varying covariate, level-1 predictor, as discussed above. Caregiving, on the other hand, was conceptualized as a level-2 predictor. This conceptual approach is consistent with the attachment theoretical point of view that the underlying quality of caregiver-child relationship tends to be stable overtime and caregiver-adolescent relationships are parallel to those of younger children. This conceptualization was also guided by an ecological-transactional perspective. In terms of the structure of the relationship between ER and caregiving, level-1 predictor ER (i.e., ontogenic level) is nested within level-2 predictor caregiving (i.e., the microsystem), and these two ecological levels are assumed to interact to

affect developmental trajectories of aggressive behavior. Taken together, conceptualizing ER as a level-1 and caregiving as a level-2 predictor and investigating the cross-level interaction between these two predictors clearly aligns with developmental considerations of ER and assumptions from both ecological-transactional and attachment theoretical perspectives.

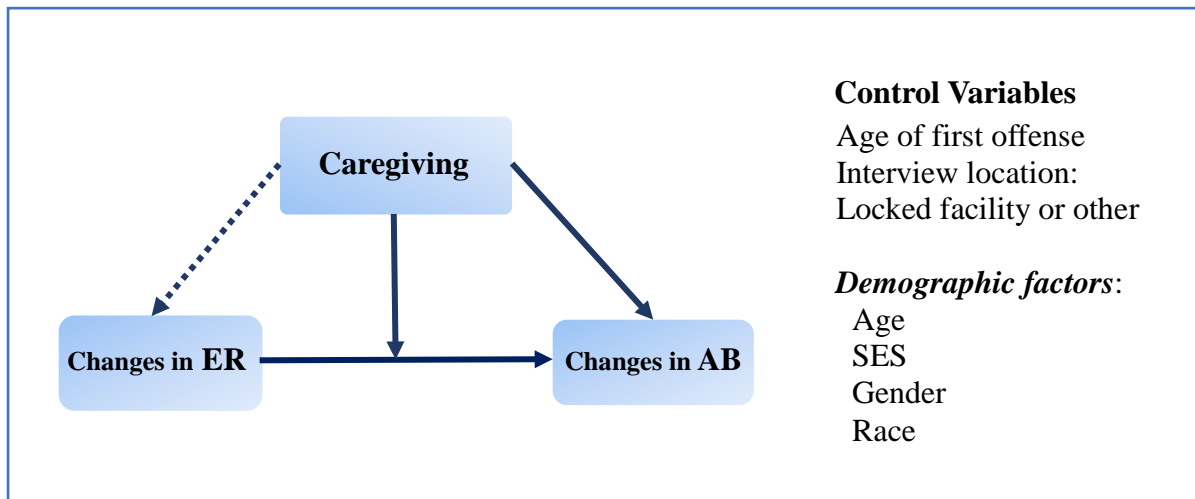
### **Conceptual Model: An Integrative Model for the Etiology of Development of Aggressive Behavior among Juvenile Offenders**

The present study proposes a complete developmental model for aggressive behavior by the integration of adolescent ER and caregiving based on the discussions and theoretical framework presented above. Until recently, few researchers have attended to the effect of the combination of both ER and caregiving on aggressive behavior. Recent developmental research has increasingly focused on the interaction between ER and caregiving as a means toward understanding the developmental pathways leading to externalizing behavior; however, no theoretically grounded process model exists within current literature. The literature establishing interaction effects between these two factors is underdeveloped at this stage.

This study has discussed the possible mechanism underlying the links among anger regulation, caregiving, and aggressive behavior from two theoretical propositions and highlighted that aggressive behaviors are not solely related to factors within the individual or their environment but, rather, to interactions between individual attributes (i.e., ER) and their proximal environment (i.e., caregiving). Specifically, this study hypothesizes that changes in ER and caregiving interact to predict changes in adolescent self-report of aggressive offending.

Several investigators have explicitly examined the associations among ER (or ER related regulation factors), caregiving (or parenting), and externalizing behavior. Gottman and colleagues (1997) found that parents who were supportive of children with respect to

appropriate expression of emotions and coaching about their emotions had children who were relatively high in ER and low in aggression. In a three-wave longitudinal study involving 186 early adolescents, Eisenberg and colleagues (2005) found that adolescents' effortful control mediated the relation between positive parenting (i.e., parental warmth and positive expressivity) and low levels of externalizing problems. Snyder and colleagues (2010) indicated that the interaction of ineffective parental discipline (i.e., a multi-indicator construct including parental anger toward child, harsh tactics, and inconsistent discipline) and executive inhibition (processes for intentional control or suppression) was significantly associated with growth of physical aggression during middle childhood. Cross-sectional analyses by Shortt, Stoolmiller, Smith-Shine, Eddy, and Sheeber (2010) supported the hypothesized model in which maternal emotion coaching relating to anger was associated with better anger regulation among adolescents, which in turn was associated with decreased externalizing behavior. Hollist, Hughes, and Schaible (2009) investigated the mediational relationships among parental maltreatment, negative emotions, and juvenile delinquency. They indicated that adolescent maltreatment had significant effects on delinquency and the mediation of trait anger was somewhat larger than the mediation of either trait depression or trait anxiety. In sum, building upon the findings of previous studies and theoretical framework, the present study seeks to examine the effects of ER and caregiving on the development of aggressive behavior. The conceptual model, the specific research questions and hypotheses that guide the study are described below.



**Figure 1.** A conceptual model for investigating the roles of Emotion Regulation (ER) and Caregiving in the development of Aggressive Behavior (AB)

### Research Questions and Hypotheses

The following primary and secondary hypotheses were tested in this study based on the aforementioned conceptual model.

**Research Question 1: Does aggressive behavior decline over the 2-year study period?**

Hypothesis 1: Aggressive behavior, on average, significantly declines over the study period.

**Research Question 2: Do changes in ER predict changes in aggressive behavior?**

Hypothesis 2: Positive changes in ER predict decreases in aggressive behavior over the study intervals.

Hypothesis 2.1: Average ER is negatively associated with the initial status of aggressive behavior.

Hypothesis 2.2: Higher average ER predicts a faster rate of decline in aggressive behavior over the study period (relative to lower average ER).

**Research Question 3: Does caregiving predict changes in aggressive behavior?**

Hypothesis 3.1: Higher average caregivers' warmth predicts a faster rate of decline in aggressive behavior over the study period (relative to lower average parental warmth).

Hypothesis 3.1.1: Average caregivers' warmth is negatively associated with the initial status of aggressive behavior.

Hypothesis 3.2.: Higher average caregivers' hostility predicts a slower rate of decline in aggressive behavior over the study period (relative to lower average parental hostility).

Hypothesis 3.2.1: Average caregivers' hostility is positively associated with the initial status of aggressive behavior.

Hypothesis 3.3: Higher average caregivers' monitoring predicts a faster rate of decline in aggressive behavior over the study period (relative to lower average parental monitoring).

Hypothesis 3.3.1: Average caregivers' monitoring is negatively associated with the initial status of aggressive behavior.

**Research Question 4: Does caregiving moderate the relationship between changes in ER and changes in aggressive behavior?**

Hypothesis 4.1: The magnitude of the negative association between changes in ER and changes in aggressive behavior is amplified when caregivers' warmth is higher.

Hypothesis 4.2: The magnitude of the negative association between changes in ER and changes in aggressive behavior is reduced when caregivers' hostility is higher.

Hypothesis 4.3: The magnitude of the negative association between changes in ER and changes in aggressive behavior is amplified when caregivers' monitoring is higher.



## CHAPTER III

### RESEARCH METHODS

#### **Background of the Pathways to Desistance Study**

The present study used data from the Pathways to Desistance study, a large-scale, two-site longitudinal investigation of serious adolescent offenders transitioning from adolescence to young adulthood. The goal of the Pathways study was to elucidate how developmental processes, social context, and intervention and sanctioning experiences affect the process of desistance from antisocial behavior. The Pathways study employed a prospective design with a broad measurement focus and multiple sources of information (self-report, collateral report, and official record) to provide a picture of intra-individual change over time. A total of 1,170 adjudicated youths from the juvenile and adult court systems in Maricopa County (Phoenix), Arizona ( $N=565$ ) and Philadelphia County, Pennsylvania ( $N=605$ ) were enrolled into the study during the recruitment period (November, 2000 through January, 2003). Each study participant was followed for a period of seven years past enrollment with the end result a comprehensive picture of life changes in a wide array of areas over the course of this time.

#### **Research Design**

This study employed a longitudinal-research design. It examined the impact of ER and caregiving on aggressive behavior outcome over five consecutive waves (0, 6, 12, 18, and 24months). With a longitudinal design a sample is surveyed and surveyed again on at least one further occasion. Thus, the benefit of a longitudinal study is that it can allow some insight into the time order of variables and therefore, relative to a cross-sectional study, may be more able to allow causal inferences to be made (Bryman, 2008).

## Participants

Adolescents were eligible for study participation if they were between the ages of 14 and 17 and had been charged with a felony or similarly serious nonfelony offense (e.g., misdemeanor weapons offense, misdemeanor sexual assault). These youths provided informed assent or consent (parental consent was obtained for all youth under the age of 18 at the time of enrollment). Each study participant was followed at 6, 12, 18, 24, 30, 36, 48, 60, 72 and 84 months past baseline with very low attrition rates (lower than 10 % at each subsequent observation period). Because a large proportion of offenses committed by adolescents are drug offenses, enrollment of males was limited to 15% drug offenders to maintain a heterogeneous sample of serious offenders (Schubert et al., 2004).

Eligibility for enrollment extended to youth who had been arraigned and who could possibly stand trial in the adult system. Of eligible youth, 67% of located individuals who were invited to participate in the research agreed to enroll in the study ( $N=1,170$ ). The study sample was predominantly comprised of people of color (41.4 % African American and 33.5 % Hispanic) males (86.4 %), who were, on average, 16 years of age ( $SD=1.1$ ) at the time of the baseline interview. Information regarding the theoretical foundation for the study can be found in Mulvey and colleagues (2004), and details regarding recruitment, a description of the full sample, and the study methodology were discussed in Schubert and colleagues (2004).

There were modest but statistically significant differences between youth who declined to participate and agreed to participant (see Schubert et al., 2004 for additional information). Overall, the enrolled adolescents appeared to be slightly more serious offenders than those who were not enrolled. The enrolled participants were younger at their adjudication hearing (15.9 vs. 16.1 years old), had more prior petitions to court ( $M=2.1$  vs. 1.5), had more prior arrests leading to formal charges ( $M=2.1$  vs. 1.5), were slightly younger

at first arrest ( $M=13.9$  years vs. 14.2 years), and were slightly more likely to be non-Hispanic Caucasian (25% vs. 20%).

The sample for the present analyses consisted of 892 males and females (15.9% were female). The data analyzed herein were collected at five consecutive observational periods of six-month follow-up interviews (0, 6, 12, 18, and 24 months). The values of frequencies for aggressive behavior (ranging from 51 to 1624) comprised 12% at time 0, and the frequencies for aggressive behavior (ranging from 51 to 1003) consisted of only 2-3% from time 1 to time 4. Therefore, the maximum value for aggressive behavior was capped at 50 to address these few extreme cases that may bias findings. This group of participants was, on average, 16 years of age ( $SD=1.15$ ) and predominantly of lower socioeconomic status. 2.4% of the participants' parents held a 4-year college degree, and 51.9 % of participants' parents had less than a high-school education. 96% of the participants have at least one adult figure who could be responsible for taking care of them. 76.8% of the participants were living with their biological mother and 0.9% of the participants were living with adults who were not kin (adoptive parents). The ethnic backgrounds of participants were 78.8% people of color (40.5% Black, 33.5% Hispanic, and 4.8% other) and 21.2% non-Hispanic Caucasian (see Table 1).

**Table 1**

*Demographic Characteristics of the Baseline Sample ( $n=892$ )*

Characteristics	% of sample
Gender (Male)	84.1
Age	
14	12.8
15	19.1
16	30.7
17	29.3
18 and 19	8.2

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Parental SES		
College graduate		2.4
High school diploma		45.7
Less than high school education		51.9
Race		
White		21.2
People of color		78.8
Age of first offense		
9 and younger		46.6
10 and older		53.4
Interview location		
Locked facility		45.7
Other		54.3
Caregiver in house		
Present		96.0
Absent		4.0
Biological mother in house		
Present		76.8
Absent		23.2
<hr/>		

## Procedures

A baseline interview was conducted within 75 days of adjudication for enrolled youth in the juvenile system. For youth referred to the adult system, the baseline interview was conducted within 90 days of their legal certification as adults (as the result of a decertification hearing in Philadelphia or an adult arraignment hearing in Phoenix). The baseline interview was administered over two days within two, 2-hour sessions. All recruitment and assessment procedures were approved by the institutional review boards of the participating universities, and adolescents were paid \$50 for their participation in the baseline interview (when allowed by facility rules).

The follow-up interviews (time-point interviews) were then conducted every 6 months for the first 3 years and yearly thereafter through 7 years. Each of the follow-up interview was completed in one 2-hour session, and incentive payments for the participants were

gradually increased with each contact in order to minimize attrition. These interviews utilized a life calendar approach for capturing information regarding the nature, number, and timing of important changes in the life circumstances of youth. Data collection using the life event calendar method has been successfully employed in studies of criminal offending, antisocial behavior, and mental health service use (Caspi et al., 1996; Horney, Osgood, & Marshall, 1995). Data were collected with computer-assisted interviews that took place in the participants' homes, in libraries (or other public places), or in facilities. All measures and associated skip patterns were programmed onto laptop computers. Trained interviewers read each item aloud and, to maximize privacy, respondents could choose to enter their responses on a keypad. Honest reporting was encouraged, and confidentiality was assured through confidentiality protections provided by statute to the Department of Justice.

## **Measures**

### **Aggressive behavior**

Aggressive behavior was assessed by the Self-Reported Offending (SRO) inventory using four items measuring frequency of aggressive offending in each survey period. This measure is a revised version of a commonly used self-reported offending measure (Huizinga, Esbensen, & Weiher, 1994). Research demonstrated adequate reliability and validity for the SRO in the general population (Thornberry & Krohn, 2000) as well as in the population of offenders from which the current sample was drawn (Knight, Little, Losoya, & Mulvey, 2004). The Pathways to Desistance study provides 11 SRO items which are named “aggressive offending”. The 11 aggressive offending items are the following:

Destroyed/damaged property; Set fire; Forced someone to have sex; Killed someone; Shot someone-bullet hit; Shot at someone-no hit; Took by force with a weapon; Took by force without a weapon; Beat up someone-serious injury; In a fight; and Beat someone as part of gang. Two of these items are not available due to issues of confidentiality: Forced someone to

have sex and Killed someone. Among the other 9 items, the 4 items correlated with the independent variables (emotion regulation and caregiving) were selected to develop the measure of this study. The four items are Destroyed/damaged property, Beat up someone serious injury, In a fight, and Beat someone as part of gang. The individual four items were weighted based on the severity of violence motivation to capture qualitative differences among items. Higher weights were assigned to the items which reflect signs of more severity. The weights assigned to each item were as follows: Beat up some one resulting in a serious injury (5) Fight part of gang (4) Been in a fight (3) Destroyed or damaged property (2). Each item was then multiplied by the given weights and a sum of the weighted frequencies was calculated for each subject at each time point (i.e.,  $\text{Sum} = \text{Frequency of beat up some one resulting in a serious injury} \times 5 + \text{Frequency of fight part of gang} \times 4 + \text{Frequency of been in a fight} \times 3 + \text{Frequency of destroyed or damaged property} \times 2$ ).

### **Emotion Regulation (ER)**

Suppression of Aggression (a dimension of The Weinberger Adjustment Inventory [Weinberger & Schwartz, 1990]), consisting of seven items which measures anger regulation (e.g., "people who get me angry better watch out") was used. Although this scale is named Suppression of Aggression, the items also measure anger regulation (Farrell & Sullivan, 2000; see Table 2). There is conceptual confusion between the construct of anger and aggression within the current literature (Spielberger, Jacobs, Russell, & Crane, 1983). The measure asks participants to assess how accurately a series of statements matched their own behavior in the previous months (on a 5-point scale, from "False" to "True"). Each item was reverse scored; higher scores indicate greater degree of ER. Individuals needed to have data for five of the seven items to be included as having a mean across the seven items.

## **Caregiving**

***Caregivers' warmth and hostility.*** An adaptation of the Quality of Parental Relationships Inventory (Conger, Ge, Elder, Lorenz, & Simons, 1994) was used to measure caregivers' warmth (e.g., "How often does your mother tell you she loves you?") and hostility (e.g., "How often does your mother get angry at you?")(see Table 2). The 20-item scale assesses maternal or primary female caregivers' warmth and hostility on a 4-point scale ranging from "never" to "always". Warmth is the mean of nine items (responses to seven items must be obtained to constitute valid data). Hostility is the mean of 11 items (responses to nine items must be obtained to constitute valid data). Higher scores on the warmth scale indicate a more supportive and nurturing caregiver-child relationship. Higher scores on the hostility scale indicate a more hostile relationship.

***Caregivers' monitoring.*** An adapted version of the Parental Monitoring Inventory (Steinberg, Lamborn, Dornbusch, & Darling, 1992) was used to assess the amount of caregiver supervision or monitoring. Five items assessed parental knowledge (e.g., "How much does X know about how you spend your free time?") and were answered on a 4-point scale ranging from "doesn't know at all" to "knows everything" (data in four of the five items was required to receive a computed mean). Confirmatory Factor Analyses were conducted for each of the follow-up data sets through the 24-month follow-up interviews. These results indicated that a satisfactory fit to each data set (CFI greater than .92 and RMSEA less than .08). Higher scores on this scale indicate more monitoring.

## **Control variables**

The empirical model used in this study controlled for age of first offense, interview location, and demographic factors (age, SES, gender, and race). Age of first offense was included considering the heterogeneity of aggressive behavior. Moffitt (1993) theorized that there were two primary subtypes of antisocial behavior distinguished primarily by age-of-

onset: childhood-onset versus adolescence-onset antisocial behavior. The former represents a relatively rare (5-10%), more severe, persistent, and often more violent condition than the latter. Interview location was measured dichotomously as either locked facility or other to control for the effect of incarceration. Regarding background demographic factors (age, SES, gender, and race), age was assessed continuously, ranging from 14 to 19 years. SES was measured by the mean of the biological mother and father's education level; Higher SES value reflects lower levels of education. For the purpose of the analysis, race was categorized as White and people of color (see Table 2).

**Table 2**

*Description of the Measures*

<b>Variables</b>	<b>Source (items)</b>	<b>Code</b>	<b>Calculations</b>
<b>Aggressive Behavior</b>	(1) Destroyed or damaged property		Sum of weighted frequencies
	(2) Beaten up someone badly		
	(3) Been in a fight		
	(4) Beaten up, threatened or attacked someone as part of a gang		
<b>Emotion Regulation</b>	(1) People who get me angry better watch out	1=False 2=Somewhat False 3=Not sure	Mean of items
	(2) Fight back	4=Somewhat True 5=True	
	(3) I make sure I get even with them, if someone tries to hurt me		
	(4) I lose my temper and let people have it when I'm angry		



(5) Say something  
mean

(6) Yell at them if  
someone does  
something I really  
don't like

(7) Pick on people

**Caregiving**  
Warmth

(1) Let you know that  
she really cares about  
you?

1=Never  
2=Sometimes  
3=Often  
4=Always

Mean of items

(2) Say nice things to  
you or tell you that  
you are a good  
boy/girl?

(3) Hug, kiss, tickle,  
or smile at you?

(4) Act lovingly and  
affectionate toward  
you?

(5) Thank you for  
doing things or tell  
you that he/she likes  
what you did?

(6) Let you know that  
she appreciates you,  
your ideas or the  
things you does?

(7) Help you when  
you need it, like with  
a hard job?

(8) Help you do  
something that was  
important to you?

(9) Tell you that she  
loves you?

Hostility	(1) Get mad (angry) at you?	1=Never	Mean of items
		2=Sometimes	
		3=Often	
	(2) Tell you that you didn't do something right?	4=Always	
	(3) Criticize you or your ideas?		
	(4) Shout or yell at you because he/she was mad at you?		
	(5) Argue with you when you and he/she don't agree on something?		
	(6) Argue with you whenever you disagreed about something?		
	(7) Threaten you, or tell you that you're going to get in trouble if you do something wrong?		
	(8) Hit, push, or spank you?		
	(9) Hit, push, grab or shove you?		
Monitoring	(10) Ignore you or not pay any attention to you?		Mean of items
	(11) Ignore you when you tried to talk to him/her?		
	(1) How much does X know who you spend time with?	1=Doesn't know at all	Mean of items
		2=Knows a little bit	
		3=Knows a lot	
		4=Knows everything	

(2) How much does X know how you spend your free time?

(3) How much does X know how you spend your money?

(4) How much does X know about where you go right after school or work is over for the day?

(5) How much does X know about where you go at night?

### Control Variables

Age of first offense

Continuous

Age

Continuous

SES (Education level of parents)

1=Higher executives, proprietors, major professionals; professional degree; graduate school

Mean of mother and father's SES items

2=College graduate

3=Business or trade school/some college graduate of 2-year college

4=High school diploma

5=Some high school

6=Grade school or less than seven years of school

Gender

1=Male  
2=Female

Race

0=White

	1=People of color (Black+Hispanic+ Other)
Interview Location	0=Locked facility 1=Other

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## Data Analysis

Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002) techniques were used to construct individual linear growth curve models in order to investigate the associations among ER, caregiving, and aggressive behavior among the overall sample of 892 individuals during two years. The HLM procedure does not require complete data from each subject for all waves. The HLM analyses conducted herein estimates the within-person relationships if at least 2 waves of data exist, and greater weight is assigned to subjects when more waves of data are provided (Teasdale, Silver, & Monahan, 2006). Analyses were performed using HLM version 7.01 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011).

HLM is a useful technique for the present study because in contrast to other approaches to trajectory analysis (e.g., structural equation modeling), it provides reliable estimates of within-subject change and thus enables researchers to precisely understand changes in aggressive behavior over time. These data were modeled with a Poisson distribution to account for the highly skewed outcome variable given that 30 to 70% of juveniles reported no incidents of aggressive behavior across observations. The Poisson distribution has been usefully applied in the area of criminology and criminal justice to model highly skewed data (Osgood, 2000). It is assumed that the Poisson distribution has a variance equal to the mean count. However, the variance of aggressive behavior exceeded the mean in this study, and the assumption was violated. Therefore, the over-dispersion function in HLM was utilized to adjust the standard errors (Raudenbush et al., 2011). The HLM software uses a log-link function in order to transform the distribution of count data to allow for multilevel

modeling. Due to this transformation, estimates derived from the models within this study represent log-odds of the count (i.e., the actual number of predicted aggressive behavior).

The HLM output distinguishes between unit-specific and population-average estimates (Zeger, Liang, & Albert, 1988). The unit-specific effects estimate can be conceptually described as the coefficient for a hypothetical case with no random effect, providing information about how effects of predictors vary across groups. Thus, unit-specific estimates are used for individual prediction questions. The population-average effects represent an average over the sample and are more appropriate for making inferences about the predicted population. Population-average inferences are based on fewer assumptions and are quite robust to erroneous assumptions about the random effects in the model (Heagerty & Zeger, 2000). This study used population-average estimate with robust standard errors.

### **Centering time-varying covariate ER, time, and age**

In growth models the slope of a level-1 (time-varying) predictor confounds inter-individual change and between-person variability. Person-mean centering could resolve this issue by removing between-person variability from the model. Within HLM analysis, person-mean centering with reintroduction of the aggregate means at level-2 (to regain between-person variability) always provides an unbiased estimate of the within-person slope. This strategy results in orthogonal within and between person effects. This approach is also recommended to avoid multicollinearity between level-1 ER and level-2 ER (Raudenbush & Bryk, 2002). Thus, time-varying covariate ER was person-mean centered at level 1 with reintroduction of the mean aggregated ER at level 2. Person-mean centered, time-varying ER was calculated by subtracting each person's score from their own mean score for each time point. The time variable was centered at the beginning of the study and age was grand-mean centered so that the intercept in this study represents an interpretable value. The intercept,  $\pi_{0i}$  represents an individual  $i$ 's true initial status for an average-aged participant of 16 years.

## Model building

**Unconditional growth model.** These analyses were conducted by first fitting an unconditional growth model such that outcomes of aggressive behavior were predicted from time (coded as 0=0 month, 1=6months, 2=12months, etc.) to examine 2-year trajectories of changes in aggressive behavior. The unconditional model is presented below.

Level 1:

$$E(Y_{ti}|\pi_i) = \lambda_{ti}$$

$$\text{Var}(Y_{ti}|\pi_i) = \lambda_{ti}$$

$$\log(\lambda_{ti}) = \pi_{0i} + \pi_{1i}(\text{Time})_{ti} + e_{ti}$$

Level 2:

$$\pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10} + r_{1i}$$

The Level1 equation represents scores on outcome  $Y$  for an individual  $i$  at time  $t$  as a function of his/her intercept,  $\pi_{0i}$ , and the rate of change,  $\pi_{1i}$ , plus error,  $e_{ti}$ . The Level 2 equation describes the initial status and rates of change on the aggressive behavior outcome  $Y$  as a function of the average initial status,  $\beta_{00}$ , and average rate of change,  $\beta_{10}$ , for the sample plus the individual variation in these parameters (i.e.,  $r_{0i}$  and  $r_{1i}$ ). Variability in the intercept and slope is captured by  $T$ , a 2 x 2 matrix containing variance components,  $\tau_{00}$ ,  $\tau_{11}$ , and  $\tau_{01}$ , which reflects the variance of the individual intercept and slope as well as covariance between the intercept and slope, respectively.

**Conditional growth model.** The analysis proceeded by expanding the unconditional model to a conditional growth curve model, where the outcomes of aggressive behavior were

predicted from time, a time-varying covariate ER, caregiving, and the cross-level interaction between ER and caregiving after adjusting for the variance accounted for by control variables, including gender, race, age, SES, age of first offense, and interview location. The caregiving-moderated conditional growth model used to fit these data is presented below. As described in Level 2 equation, the coefficient for the time-varying ER slope ( $\beta_{10}$ ) represents the relationship between changes in ER and changes in aggressive behavior for participants over the study period.

Level 1:

$$E(Y_{ti}|\pi_i) = \lambda_{ti}$$

$$\text{Var}(Y_{ti}|\pi_i) = \lambda_{ti}$$

$$\log(\lambda_{ti}) = \pi_{0i} + \pi_{1i}(\text{ER})_{ti} + \pi_{2i}(\text{Time})_{ti} + e_{ti}$$

Level 2:

$$\begin{aligned}\pi_{0i} = & \beta_{00} + \beta_{07}(\text{Warmth}) \\ & + \beta_{08}(\text{Hostility}) \\ & + \beta_{09}(\text{Monitoring}) + r_{0i}\end{aligned}$$

$$\begin{aligned}\pi_{1i} = & \beta_{10} + \beta_{17}(\text{Warmth}) \\ & + \beta_{18}(\text{Hostility}) \\ & + \beta_{19}(\text{Monitoring}) + r_{1i}\end{aligned}$$

$$\begin{aligned}\pi_{2i} = & \beta_{20} + \beta_{27}(\text{Warmth}) \\ & + \beta_{28}(\text{Hostility}) \\ & + \beta_{29}(\text{Monitoring}) + r_{2i}\end{aligned}$$

Caregiving is a predictor of both the Level 2 intercept ( $\pi_{0i}$ ), time-varying ER slope

( $\pi_{1i}$ ), and growth rate/slope ( $\pi_{2i}$ ). The coefficients for the cross-level interactions between caregiving and time-varying ER ( $\beta_{17-19}$ ) represent the impact of caregiving on the longitudinal association between changes in ER and changes in aggressive behavior. When a significant interaction is found, it is common to further decompose or probe this conditional effect to better understand the structure of the relation (Aiken & West, 1991). Thus, the cross-level interaction between monitoring and time-varying ER ( $\beta_{19}$ ) was decomposed and graphically represented using HLM graph equation function in the next chapter (see Figure 2).



## CHAPTER IV

### RESULTS

#### Descriptive Statistics

Table 3 presents descriptive statistics for the participants' Emotion Regulation (ER), caregiving (warmth, hostility and monitoring) and aggressive behavior for each time point. Mean differences in aggressive behavior indicated that aggressive behavior declined over time, which suggests that the majority of juvenile offenders desist from aggressive behavior during the study period. In contrast, there were no real changes in the means of other variables over time; especially, ER where sample size remained consistent over time. Although small changes in warmth, hostility and monitoring were detected over time, it might be due to the changes in sample size and the fact that only a sub-sample responded towards the end of the interval. The participants, on average, reported moderate ER, very high caregivers' warmth, low hostility, and moderate to high monitoring across time points.

**Table 3**

*Descriptive Statistics for Aggressive Behavior, ER, Caregiving*

Variables	<i>n</i>	Mean	<i>SD</i>	Min	Max
Aggressive Behavior					
Baseline	892	9.82	11.51	0	50
6-month	892	4.65	8.31	0	50
12-month	892	3.45	7.15	0	48
18-month	892	2.80	6.66	0	47
24-month	892	2.53	6.11	0	47
Emotion Regulation					
Baseline	891	2.89	0.99	1	5
6-month	892	2.93	0.95	1	5
12-month	892	3.01	0.94	1	5
18-month	892	3.05	0.96	1	5

24-month	892	2.97	0.96	1	5
Warmth					
Baseline	866	3.22	0.69	1	4
6-month	807	3.19	0.73	1	4
12-month	769	3.17	0.68	1	4
18-month	743	3.12	0.73	1	4
24-month	733	3.12	0.72	1	4
Hostility					
Baseline	866	1.57	0.42	1	3.92
6-month	806	1.41	0.35	1	3.58
12-month	769	1.40	0.35	1	3.08
18-month	743	1.38	0.33	1	3.25
24-month	733	1.40	0.37	1	4
Monitoring					
Baseline	847	2.80	0.78	1	4
6-month	715	2.86	0.83	1	4
12-month	607	2.86	0.82	1	4
18-month	507	2.84	0.81	1	4
24-month	431	2.79	0.83	1	4

### Intercorrelations among Study Variables

Bivariate correlations between study variables across the five time points are presented in Table 4. All study variables were significantly correlated with one another. No multicollinearity was found. Correlation coefficients among all predictors were less than .40.

ER was negatively correlated with hostility and aggressive behavior. ER was positively correlated with warmth and monitoring. Warmth was negatively correlated with hostility and aggressive behavior and was positively correlated with monitoring. There were no noticeable patterns of the change in the correlations between warmth and hostility over time. Hostility was negatively correlated with monitoring and positively correlated with aggressive behavior. Finally, monitoring was negatively correlated with aggressive behavior.

**Table 4***Range of Concurrent Bivariate Correlations from Baseline to 24 months*

	Aggressive Behavior	ER	Warmth	Hostility	Monitoring
Aggressive Behavior	—	-.29 to -.22	-.10 to -.003 <sup>a</sup>	.05 to .26 <sup>b</sup>	-.19 to -.07 <sup>c</sup>
ER		—	.11 to .18	-.28 to -.24	.16 to .20
Warmth			—	-.38 to -.26	.19 to .34
Hostility				—	-.19 to -.11
Monitoring					—

*Note.* All correlations are significant at  $p < .01$  level unless otherwise noted.

<sup>a</sup> Warmth was only significantly correlated with aggressive behavior at 24-month follow-up.

<sup>b</sup> Hostility was not significantly correlated with aggressive behavior at 6-month follow-up.

<sup>c</sup> Monitoring was not significantly correlated with aggressive behavior at 24-month follow-up. Range of correlations was found when examining concurrent correlations among constructs. For example, the baseline measure was correlated with baseline measure, 6-month measure was correlated with 6-month measure, 12-month measure was correlated with 12-month measure, and so forth.

## Tests of Hypotheses

### Unconditional growth model

#### *Research Question 1: Does aggressive behavior decline over the 2-year study period?*

Hypothesis 1 predicted that aggressive behavior, on average, would significantly decline over the study period. From the results of the unconditional growth model (presented in Table 5), the mean intercept ( $\beta_{00}$ ) was significant ( $p < .001$ ), which indicates that the average predicted (log) aggressive behavior at the beginning of the study was estimated to be 2.132. The mean growth rate ( $\beta_{20}$ ) was also significant ( $p < .001$ ): participants were losing, on

average, .345 on aggressive behavior scores at each six-month follow-up during the study. This indicates that participants exhibited, on average, significant declines in aggressive behavior over the study period. Thus, hypothesis 1 was supported.

### **Conditional growth model**

After finding a significant average rate of change in aggressive behavior over the study period, a conditional growth curve model was constructed by expanding the previously fit unconditional model including a time-varying covariate ER, caregiving, and control variables (see Table 5).

#### ***Research Question 2: Do changes in ER predict changes in aggressive behavior?***

The primary hypothesis 2 predicted that positive changes in ER would predict decreases in aggressive behavior (after controlling for the effect of mean ER on initial status of and changes in aggressive behavior as well as the effect of caregiving on initial status of and changes in aggressive behavior). This hypothesis was supported ( $\beta_{10} = -1.103, p < .05$ ). The associated effect-size correlation was  $r_{\text{effect}} = .22$ , indicating a small-to-medium sized effect of changes in ER on changes in aggressive behavior over the study intervals (Cohen, 1992).

The secondary hypothesis 2.1 predicted that ER and aggressive behavior would be negatively associated at initial status. Average ER was a significant predictor for the initial status of aggressive behavior ( $\beta_6 = -.346, p < .001$ ); therefore, this hypothesis was supported. The secondary hypothesis 2.2 proposed that higher average ER would predict faster decline in aggressive behavior over the study period. This hypothesis was also supported. After controlling for the effect of mean ER on initial status of aggressive behavior and the effects of changes in ER and caregiving on changes in aggressive behavior, each additional score of ER per six months was associated with a .120 decline in the growth rate ( $\beta_{26} = -.120, p < .001$ ).

***Research Question 3: Does caregiving predict changes in aggressive behavior?***

*Warmth.* The primary hypothesis 3.1 proposed that higher average caregivers' warmth would predict a faster rate of decline in aggressive behavior over the study period. After controlling for the effects of changes in ER and caregivers' hostility and monitoring on changes in aggressive behavior as well as the effect of caregiving on the initial status of aggressive behavior, the negative association between warmth and changes in aggressive behavior was significant ( $\beta_{27} = -.063, p = .05$ ); therefore, this hypothesis was supported. The secondary hypothesis 3.1.1 predicted that average warmth would be negatively associated with the initial status of aggressive behavior. This hypothesis was not supported; warmth was positively associated with aggressive behavior at initial status ( $\beta_7 = .248, p = .001$ ).

*Hostility.* The primary hypothesis 3.2 predicted that higher average hostility would predict slower decline in aggressive behavior over the study period. After controlling for the effects of changes in ER, warmth and monitoring on changes in aggressive behavior as well as the effect of caregiving on the initial status of aggressive behavior, the relationship between hostility and changes in aggressive behavior was significantly positive ( $\beta_{28} = .173, p < .01$ ); thus, hypothesis 3.2 was supported. The secondary hypothesis 3.2.1 predicted that average hostility would be positively associated with the initial status of aggressive behavior. This hypothesis was also supported ( $\beta_8 = .317, p < .05$ ).

*Monitoring.* The primary hypothesis 3.3 predicted that higher average monitoring would predict faster decline in aggressive behavior over the study period. This hypothesis was not supported. After controlling for the effects of changes in ER, warmth and hostility on changes in aggressive behavior as well as the effect of caregiving on the initial status of aggressive behavior, monitoring ( $\beta_{29}$ ) was not significantly related to changes in aggressive behavior. The secondary hypothesis 3.3.1 stated that average monitoring was negatively

associated with the initial status of aggressive behavior. This hypothesis was supported ( $\beta_9 = -.243, p < .001$ ).

***Research Question 4: Does caregiving moderate the relationship between changes in ER and changes in aggressive behavior?***

Next, the three moderating effects of caregiving on the relationship between changes in ER and changes in aggressive behavior were examined. The results of the cross-level interactions are provided in Table 5 for each of the caregiving variables.

*Warmth.* Hypothesis 4.1 proposed that the magnitude of the negative association between changes in ER and changes in aggressive behavior would be amplified when warmth was higher. The cross-level interaction was significant; however, the direction of interaction opposed the aforementioned hypothesis ( $\beta_{17} = .198, p < .05$ ). Therefore, hypothesis 4.1 was not supported.

*Hostility.* Hypothesis 4.2 predicted that the magnitude of the negative relationship between changes in ER and changes in aggressive behavior would be reduced when hostility was higher. This hypothesis was partially supported ( $\beta_{18} = .223, p = .08$ ).

*Monitoring.* Hypothesis 4.3 predicted that the magnitude of the negative association between changes in ER and changes in aggressive behavior would be amplified when monitoring was higher. This hypothesis was supported; the effect of positive changes in ER on decreases in aggressive behavior was strengthened when monitoring was higher ( $\beta_{19} = -.211, p < .01$ ). The associated effect-size correlation was  $r_{\text{effect}} = .19$  indicating a small sized effect of interaction between changes in ER and monitoring on changes in aggressive behavior (Cohen, 1992).

This significant interaction was further probed by comparing the slopes in groups with high (the top 75th percentile) versus low (the bottom 25th percentile) mean of monitoring (Aiken & West, 1991). Figure 2 shows that the negative relationship between

changes in ER and changes in aggressive behavior was stronger (indicating a steeper slope) when monitoring was high than when it was low, supporting hypothesis 4.3.

### **Findings from Control Variables on the Relationships among Changes in ER, Caregiving, and Changes in Aggressive Behavior**

In terms of findings from control variables, a moderating effect was detected with regard to race on the association between ER and aggressive behavior. As seen in Figure 3, The magnitude of the negative association between changes in ER and changes in aggressive behavior was more amplified for the people of color group (i.e., African American, Hispanic, and other) than it was for their White counterparts ( $\beta_{12} = -.273, p < .01$ ). The growth rates in aggressive behavior varied by gender, with female participants experiencing a significantly faster decline in aggressive behavior over time than male participants ( $\beta_{21} = -.200, p = .001$ )(see Figure 4). There was a marginally significant interaction effect between changes in ER and interview location (locked facility or other) ( $\beta_{110} = .159, p = .061$ ). Thus, the fact that some youth were in locked facilities (45.7%) during waves of the study might slightly influence the magnitude of the negative association between changes in ER and changes in aggressive behavior.

**Table 5**

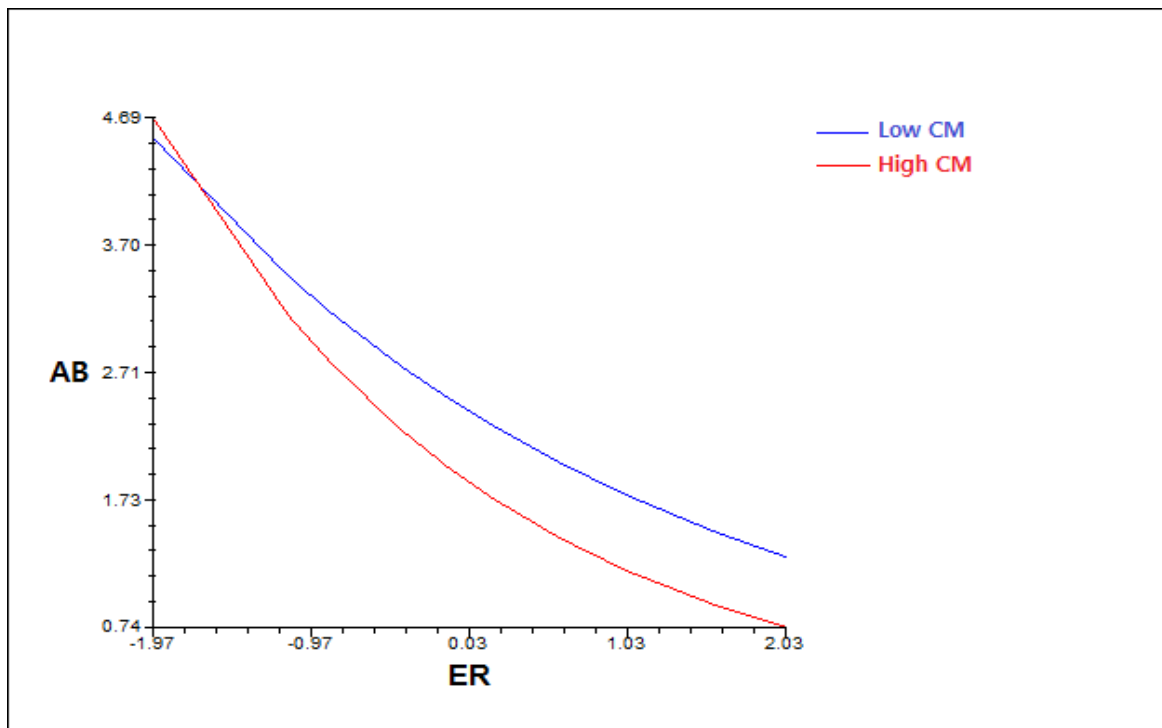
*Poisson Growth Models of the Predictors of 2-Year Trajectories of Aggressive Behavior(AB)  
(Population-average models with robust standard errors)*

	Unconditional Growth Model			Conditional Growth Model		
	<i>COEFF</i>	<i>SE</i>	<i>p</i>	<i>COEFF</i>	<i>SE</i>	<i>p</i>
Initial Status– $\pi_{0i}$						
Intercept– $\beta_{00}$	2.132	.037	.000	3.324	.530	.000
Gender– $\beta_{01}$				-.189	.108	.081
Race– $\beta_{02}$				-.190	.086	.027
SES– $\beta_{03}$				.023	.043	.584
Age of first offense– $\beta_{04}$				-.047	.024	.055
Age– $\beta_{05}$				-.117	.029	.000
ER– $\beta_{06}$				-.346	.054	<b>.000</b>
Warmth– $\beta_{07}$				.248	.076	.001
Hostility– $\beta_{08}$				.317	.140	<b>.024</b>
Monitoring– $\beta_{09}$				-.243	.063	<b>.000</b>
Interview location– $\beta_{010}$				-.162	.076	.033
Time-varying ER – $\pi_{1i}$						
Intercept– $\beta_{10}$				-1.103	.494	<b>.026</b>
Gender– $\beta_{11}$				.027	.094	.772
Race– $\beta_{12}$				-.273	.099	.006
SES – $\beta_{13}$				.062	.045	.175
Age of first offense– $\beta_{14}$				.027	.026	.293
Age– $\beta_{15}$				-.009	.032	.775
ER– $\beta_{16}$				-.028	.073	.703
Warmth– $\beta_{17}$				.198	.079	.012
Hostility– $\beta_{18}$				.223	.129	<b>.083</b>
Monitoring– $\beta_{19}$				-.211	.074	<b>.005</b>
Interview location– $\beta_{110}$				.159	.085	.061
Rates of change in AB – $\pi_{2i}$						
Intercept– $\beta_{20}$	-.345	.016	<b>.000</b>	.317	.231	.170
Gender – $\beta_{21}$				-.200	.062	.001

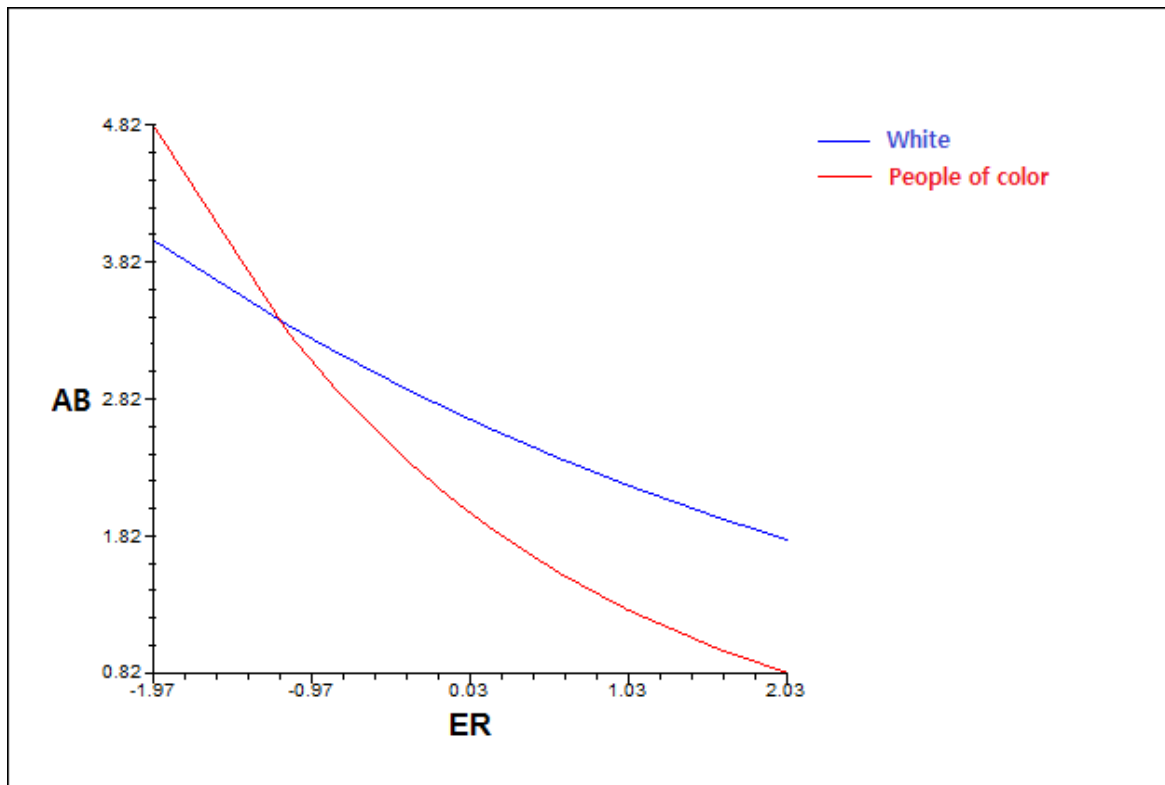


Race- $\beta_{22}$	-.057	.044	.189
SES- $\beta_{23}$	-.003	.020	.884
Age of first offense- $\beta_{24}$	-.015	.013	.252
Age- $\beta_{25}$	-.007	.015	.644
ER- $\beta_{26}$	-.120	.028	<b>.000</b>
Warmth- $\beta_{27}$	-.063	.032	<b>.050</b>
Hostility- $\beta_{28}$	.173	.059	<b>.003</b>
Monitoring- $\beta_{29}$	.002	.031	.944
Interview location- $\beta_{210}$	.040	.036	.268
Variance components			
Intercept	.690		.000
ER slope	.394		.000
Rate of change(Time) slope	.160		.000
Level-1 error	3.877		

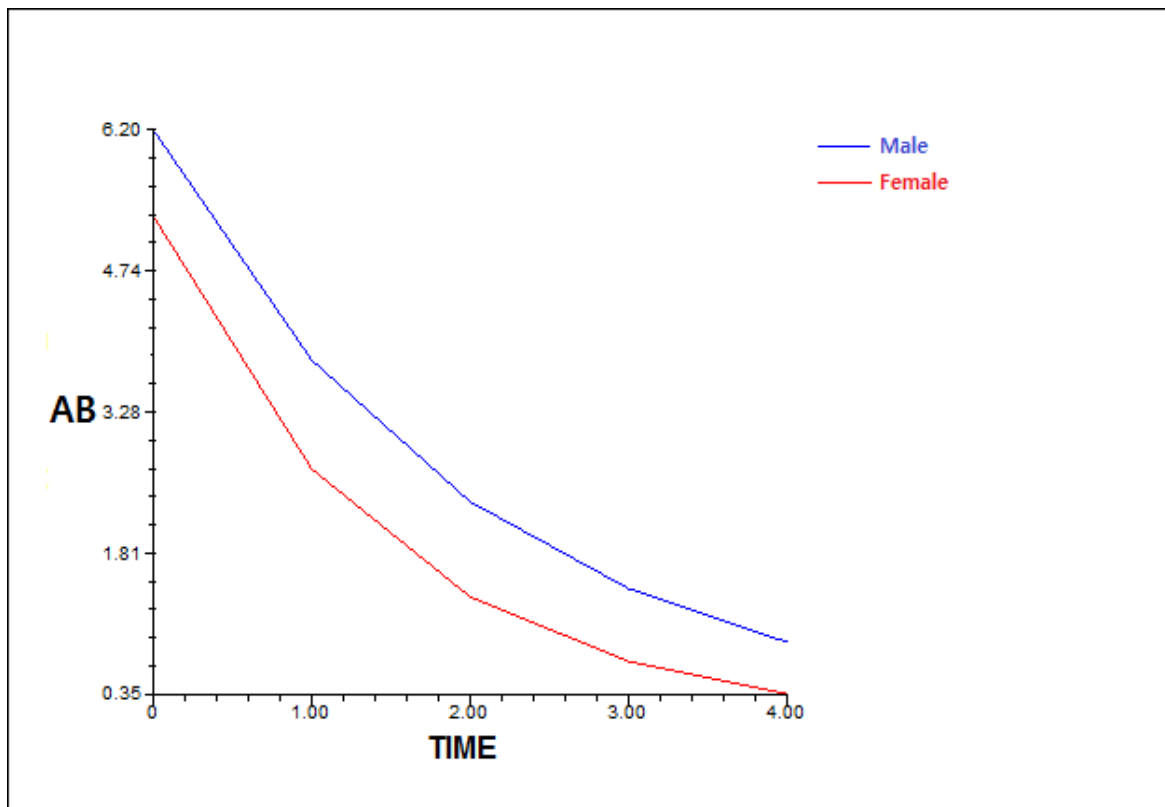
*Note.* Gender: 1=Male; 2=Female. Race: 0=White; 1=People of color. Interview location: 0=Locked facility; 1=Other.



**Figure 2.** The cross-level interaction between changes in Emotion Regulation (ER) and Caregivers' Monitoring (CM) on changes in Aggressive Behavior (AB).



**Figure 3.** The cross-level interaction between changes in ER and race on changes in AB.



**Figure 4.** The effect of gender on changes in AB.

## CHAPTER V

### DISCUSSION

#### **Summary of Research Findings**

This investigation provides important advances to the field of aggressive antisocial behavior research among juvenile offenders by addressing three gaps in the current literature. First, as previously mentioned, ER and caregiving have both been linked with aggressive and antisocial behavior in youth; however, prior research has not systematically compared the relative or combined predictive utility of these constructs. The present study represents an important step forward in this regard, as it first assesses the predictive main and interaction effects of changes in ER and caregiving among juvenile offenders. The findings of this study, specifically, provide evidence of the moderating effect of caregivers' monitoring on the relationship between changes in ER and changes in aggressive behavior during the 2-year study period. Second, this study improved understanding of the etiology of aggressive behavior among juvenile offenders by integrating separate literature bases (i.e., the ecological-transactional model, attachment theory, ER development, and caregiving), which can provide valuable information for researchers and practitioners who are interested in aggressive and antisocial behavior as a developmental outcome. Third, research has rarely applied developmental theories derived from normative populations in juvenile offenders, during the transition to adulthood. The conceptualization from two developmental theories and the results of this study advanced research on the caregiving and ER among serious juvenile offenders from ethnically diverse groups. The detailed findings of this investigation are discussed below.

#### **Overall changes in aggressive behavior**

Participants exhibited, on average, significant declines in aggressive behavior over the study period. Thus, this study's findings support the developmental theories regarding

trajectories of aggressive antisocial behavior: the vast majority of antisocial adolescents desist from aggressive behavior as they enter adulthood (Laub & Sampson, 2001; Piquero, 2008; Sampson & Laub, 2003).

### **The association between changes in ER and changes in aggressive behavior**

Consistent with previous research, the findings of the present study support the notion that ER is associated with externalizing behavior among adolescents. The increased ability to regulate anger was a strong protective factor against aggressive behavior. However, as previously mentioned, there is a dearth of research directly linking ER to aggressive behavior among adolescent offenders. The results of this study indicated that positive changes in ER was a powerful predictor for decline in aggressive behavior among adolescent offenders.

Although the primary goal of this study was to examine the moderating effect of caregiving on the association between changes in ER and changes in aggressive behavior, based on the size of effect, it appears that changes in ER (small to medium effect) are more predictive of changes in aggressive behavior than are the interactions between changes in ER and caregiving (small effect). The present study is differentiated from previous studies in that it employed a more rigorous analytic strategy, using HLM, to increase internal validity in the following ways. By treating ER as a time-varying covariate in the prediction of trajectories, this study effectively controlled for all time-invariant third-variable confounds (e.g., relatively stable variables such as socioeconomic status)(Duckworth, Tsukayama, & May, 2010). Furthermore, person-mean centered time-varying covariate ER including mean ER at level 2 produced an unbiased estimate of the within-person slope. Thus, the findings of the study suggest that changes in ER may cause—and do not merely predict—juvenile offenders' aggressive behavior. This result indicates that changes in ER had a significant and notable effect on aggressive behavior and there may be a causal association between changes in ER and changes in aggressive behavior.

This finding highlights that ER could be conceptualized as a time-varying construct and that predictions of frequency of self-report of aggressive offending are influenced by the degree to which juvenile offenders experienced changes in ER. Developmental changes in ER during adolescence may emerge from intrinsic processes, such as changes in the hormonal, neural, and cognitive systems (Thompson, 1994). However, changes in ER may also evolve from extrinsic processes; in other words, an individual-context transactional process (Gross & Thompson, 2007). Developing individual regulatory structure and social environment mutually influence each other and this interaction may contribute to changes in ER (Cole, Michel, & Teti, 1994; Davidson, Jackson, & Kalin, 2000).

### **The association between caregiving and changes in aggressive behavior**

The current study examined the main effects of three caregiving predictors on changes in aggressive behavior by including them simultaneously in a developmentally sensitive model. The results indicated that higher caregivers' warmth predicted a faster rate of decline in aggressive behavior and that higher caregivers' hostility predicted a slower decline in aggressive behavior over the study period. These results are consistent with the previous findings that aggressive antisocial behavior was associated with low levels of parental support (or warmth) and high levels of parental hostility (Barnow, Lucht, & Freyberger, 2005; Hoeve et al., 2009; Pires & Jenkins, 2007). Caregivers' monitoring was not a significant predictor for changes in aggressive behavior. However, when it comes to the interaction with changes in ER, monitoring was the most significant predictor of decline in aggressive behavior (discussed below).

### **The moderating effect of caregiving on the relationship between changes in ER and changes in aggressive behavior**

As indicate above, the primary goal of this study was to examine the moderating effect of caregiving on the association between changes in ER and changes in aggressive

behavior. HLM analyses provided the evidence of cross-level interactions between adolescent ontogenic development (ER) and the microsystem (caregivers' monitoring) over time. These findings provide support for the conceptualization of interaction effects between ER and caregiving from the ecological-transactional and attachment theoretical perspectives.

However, the evidence was not overwhelming given that the interaction effect was small in magnitude and less predictive of changes in aggressive behavior than was the main effect of changes in ER (small to medium effect) as previously noted. Thus, caution is warranted when interpreting the result that monitoring leads to changes in ER and these combined effects may predict changes in aggressive behavior. With this caution, the possible mechanism of influence of caregiving on changes in ER could be discussed in the following ways.

Specifically, caregivers' monitoring operated as a significant moderator in the link between ER and aggressive behavior. The negative relationship between changes in ER and changes in aggressive behavior was qualified, such that the magnitude of the relationship was amplified in the context of higher levels of monitoring. There was also a marginally significant interaction effect between changes in ER and caregivers' hostility, such that the magnitude of the negative association between changes in ER and changes in aggressive behavior was reduced in the context of higher levels of hostility. Thus, the findings imply that when both caregiving dimensions are considered simultaneously in the model, monitoring, or a control dimension, may be more important for the socialization of adolescent ER than hostility, or a support dimension.

Caregivers' use of monitoring and other forms of behavioral regulation play a significant role in socializing their children toward conformity to normative caregivers' and societal standards and, subsequently, the internalization of those standards (Pettit et al., 2001; Steinberg, 1990). Moderate levels of behavioral control are related to children's positive emotional and behavioral adjustment (Barber et al., 2005). As previously discussed,

caregivers' supervision was inversely related to the child anger dysregulation (Gottman et al., 1997; Snyder et al., 2003). Caregivers who use adequate monitoring could provide a regulating and supportive social structure within which adolescent could practice and develop ER skills, which may promote desistance from aggressive and delinquent behaviors.

Additionally, monitoring is an important part of the caregiver–child attachment bond (Kobak et al., 2007). Strong attachment to a caregiver may allow the caregiver's a “psychological presence” (Hirschi, 1969, p.88) by compelling an adolescent follow the caregiver's expectations and guidance regarding acceptable emotional expression and behavior even in the absence of the caregiver through strong caregiver–child psychological connections. Many scholars emphasize the importance of this monitoring aspect of caregiving during adolescence as more of their time is spent in unsupervised activities (e.g., Dishion & Patterson, 2006). Further studies will be needed to determine how caregivers' supervision influences acquisition of ER skills and how the interaction between these factors impacts aggressive behavior among adolescents throughout development.

In line with previous research on the negative relationship between caregivers' hostility and children's ER development (Morris et al., 2007; Ramsden & Hubbard, 2002), the result of this study suggests that hostility may adversely impact healthy ER development by teaching adolescents that under-regulation of anger is an appropriate way to deal with problems (See the description of the measure of hostility in Table 2). These effects may marginally contribute to reducing the magnitude of the negative relationship between changes in ER and changes in aggressive behavior. From an attachment theoretical point of view, as previously noted, children are more prone to under-regulated anger when they are affected by hostile caregiving. Caregiver–child relationships marked by anger and hostility represent insecure attachment quality. Further, hostility and rejection undermines effective monitoring of adolescents' emotion development and engagement in aggressive behavior because

effective monitoring requires reciprocal cooperation between caregiver and child, which fundamentally arises from secure attachment (Kerns et al., 2001).

Contrary to the hypothesized moderating effect of caregivers' warmth on the relationship between ER and aggressive behavior, higher warmth decreased the magnitude of the negative association between changes in ER and changes in aggressive behavior. The mechanisms underlying this finding are unclear. One possible explanation is that high levels of caregivers' warmth and high levels of caregivers' hostility might coexist in caregiver–adolescent relationships, especially when juvenile offenders were involved in abusive relationships with their caregivers, and the experience of ambivalence might create this result. Ambivalence toward a caregiver is associated with insecure attachment quality. There is evidence that abuse heightens the connectedness children feel with their caregivers (Roth & Sullivan, 2005). However, this possibility has rarely been examined in the current literature. Future research documenting the influence of caregivers' hostility and warmth on ER and aggressive behavior is therefore required to better understand these two aspects of caregiving and their unique and relative contributions to the development of ER and aggressive behavior.

In sum, these findings highlight that monitoring may be significantly influential in the relationship between adolescents' changes in ER and changes in self-report of aggressive offending behavior, especially among serious juvenile offenders who have relationships with the legal system and require increased monitoring and supervision by caregivers in general. However, caution is warranted when discussing this result given that the moderating effect of monitoring was slight in magnitude. Acknowledging this limitation, results from this investigation hold strong implications for treating antisocial youth and their families. If an adolescent offender is adequately monitored by an emotionally-invested caregiver, then he or she improves emotion management as well as behavior, which may significantly contribute to



declines in aggressive behavior. Taken together, effective monitoring may facilitate positive development of cognitive ER, while this synergetic effect, in turn, may contribute to decrease in aggressive behavior.

### **Findings from control variables**

Although the main goal of this study was to explain the longitudinal relationships among ER, caregiving, and aggressive behavior, these relationships could not be accurately understood without accounting for the findings from control variables. The effect of race on the relationship between changes in ER and changes in aggressive behavior was explored as a control variable. The magnitude of the negative association between changes in ER and changes in aggressive behavior was more amplified for the people of color (i.e., African American, Hispanic, and other) than it was for their White counterparts. The present finding may indicate that ER is a more salient factor for aggressive behavior among people of color compared to White adolescents.

There is paucity of research regarding racial differences in the relationship between ER and aggressive behavior. However, empirical evidence suggests that under-represented racial groups may suppress their emotions more frequently than White individuals (Gross & John, 2003; Steele, Elliot, & Phipps, 2003). A study of youth (ages 7–18), found that African American youth reported *suppressing* their anger more than White youth, whereas White youth reported *expressing* their anger more than African American youth (Steele et al., 2003). Social factors such as racial discrimination and stigmatization were suggested as contributing factors to these racial differences in ER, and two competing effects of racial discrimination and stigmatization were proposed. Discrimination and stigmatization contribute to increased feelings of anger (Branscombe, Schmitt, & Harvey, 1999). On the other hand, stigmatized people of color may feel more social pressure than White group to suppress outward expressions of anger in order to conform to the dominant culture (Steele et al., 2003). Thus,

these societal factors may influence and prevent people of color from developing effective anger regulation styles and increase the likelihood that they will employ aggressive and delinquent coping when experiencing strain induced by social stigma and racism in the absence of effective ER strategies. According to General Strain Theory, strain seen as unjust, such as racism and stigmatization, is even more likely to lead to aggressive and delinquent behavior primarily because these experiences invoke feelings of anger that promote delinquent forms of adaptation (Agnew, 2001).

There was a main effect of gender on changes in aggressive behavior, with female participants experiencing a significantly faster decline in aggressive behavior over time compared to male participants. However, Figure 4 depicts that the slopes representing changes in aggressive behavior do not appear to be significantly different between males and females. The frequencies of aggressive behavior for female participants, on average, scored lower initially and this initial gap seemed to create significant differences in growth rates on aggressive behavior. Therefore, the trajectories in aggressive behavior between males and females identified in this study resemble each other, and it is inferred that males and females tend to decrease aggressive behavior at somewhat similar rates over time.

### **Limitations of the Study**

Although a number of important points are indicated by the current study, the results should be viewed within the context of its limitations. A main limitation of this study is that the measure of ER used in this study was not originally intended to measure ER. Therefore, when using this proximal measure, further independent and rigorous evaluation should be conducted to establish construct validity and reliability. However, it has been observed that measures of ER designed specifically for use with adolescents are scarce (Phillips & Power, 2007). The present study followed the current assumption that ER in youth can be measured by the use of behaviorally-based indicators (e.g., Eisenberg et al., 2005). Additionally, results

are solely based on adolescent self-reports; consideration of both adolescents' and caregivers' reports of ER and caregiving may be useful in future research to more objectively assess and understand bidirectional relationships between adolescents and their caregivers. Finally, caution is warranted when generalizing these findings beyond socio-economically marginalized male youth among people of color. The majority of adolescents in this study were African American and Hispanic males with low socioeconomic status. Although this group represents the largest portion of the national juvenile offender population, the findings of this study may not generalize to White and female offenders as well as adolescents from more affluent backgrounds. For example, prior research demonstrates greater neighborhood poverty among low-income African American families relative to low-income White American families (Logan, 2011). Higher levels of poverty may result in greater levels of personal and familial instability, which might have influenced ER ability, caregiving practices, and aggressive behavior. Further work is needed to identify combinations of other predictors such as social environmental context, gender, and race that may contribute to predictive accuracy of aggressive behavior, which will be discussed further in the following section.

### **Implications for Future Research**

The findings of the present study have important implications for future research. Juvenile violence (or aggressive behavior) is a complex issue, and challenges remain for both social work researchers and practitioners to increase intervention effectiveness so as to prevent and mitigate this serious problem. Results from this study support the etiology of juvenile violence in the context of the ecological-transactional model. In accordance with the ecological-transactional perspective, other contextual factors, in addition to caregiving, that appear to moderate the relationship between ER and aggressive behavior need to be

addressed to better understand the underlying mechanism of the association between ER and aggressive behavior.

Previous research indicated that youth violence was related to neighborhood characteristics such as low SES, ethnic heterogeneity, high crime neighborhoods, and high residential mobility. These weak neighborhood structural factors thwart neighborhood cohesion, support, and control and lead to an environment with less community adult supervision and monitoring of youth, which in turn may increase rates of aggressive and delinquent behavior (Chung & Steinberg, 2006; Tolan, Gorman-Smith, & Henry, 2003). Evidence reported that parenting was an important moderator of the relationship between neighborhood quality and problem behaviors (Brody et al., 2001; Supplee, Unikel, & Shaw, 2007). Specific to emotional competence, exposure to community violence can place children living in violent communities at risk for emotion dysregulation (Gilliom et al., 2002).

Thus, ER development may be especially critical for youth living in high-risk environments considering the neighborhood effects when these youths do not receive adequate adult supervision. From the ecological-transactional point of view, emotion socialization and adolescents' subsequent development of ER abilities occur within multiple contexts. In this regard, future research may consider a more complex interplay of ER and multiple contextual factors and test three-way interactions involving adolescents' ER, caregiving, and neighborhood quality to provide a more comprehensive picture of the etiology of juvenile violence.

In addition to exploring community context in further investigating the relationship between caregiving and adolescents' ER, more research is needed on gender and ethnicity, which also likely affect caregiving and ER development. For example, studies indicate that girls are typically better emotionally regulated than boys. Sex differences in ER may be in part due to different socialization by the caregivers between boys and girls. Parents appear to

socialize more relationship-oriented strategies for ER among girls as compared to more active and instrumental strategies for ER among boys (Sheeber, Davis, & Hops, 2002).

Over-representation of youth of color is a major issue in juvenile justice (Ryan & Testa, 2005). Previous research indicated that African American families tended to be less emotion focused in their parenting than other ethnic groups (Gorman-Smith, Tolan, Henry, & Florsheim, 2000). It has been argued that ethnicity affects parents' beliefs about the appropriateness and consequences of negative emotional expression, such as anger, by their children and accordingly emotion socialization practices (Mabry & Kiecolt, 2005; Nelson, Leerkes, O'Brien, Calkins, & Marcovitch, 2012; Pittman, 2011). Therefore, it is important to examine how ethnically different caregiving styles are differentially associated with the development of ER and juvenile violence.

Given the importance of adolescence in shaping gender and ethnic identity, there is need for scholars to further engage in research focused on gender and race as primary constructs of interest so as to disentangle the effects of gender in the relationships among ER, caregiving, and juvenile violence as well as address subgroup differences among ethno-culturally diverse populations regarding these relationships. Examining interactions among various levels of ecology, including community environment, gender, and ethnicity, will provide more substantial implications for violence prevention and intervention among juvenile offenders.

### **Implications for Social Work Practice**

The findings of the current study have implications for the assessment of aggressive or violent juvenile offenders as well as for prevention and risk reduction. These results have important insights for developing family-oriented intervention and prevention strategies in that they provide information on which caregiving dimensions are particularly relevant to the development of ER and aggressive behavior among adolescent offenders. In both clinical and

community settings, the profession of social work is mandated to work towards the creation of a more just society. In the context of juvenile violence, it is essential that social workers, who work in settings that addresses juvenile justice, understand the intricate transactions among adolescent ontogenic development and the multiple levels of their environments as well as the benefits and problems inherent in every treatment strategy.

Efforts to improve quality of caregiving are commonly incorporated into interventions designed to prevent or treat juvenile violence and delinquency (Greenwood, 2006). Many successful intervention programs have addressed the role of the family and individual cognitive and behavioral aspects of aggression and antisocial behavior in adolescents (Connor, 2002); however, few programs address the emotional aspects. The results of the current study support the notion that social work practitioners in juvenile justice setting need to make more intervention efforts to improve ER skills when treating severe juvenile offenders. There is need for social workers to educate juvenile offenders to effectively employ ER and teach adaptive ER skills, particularly anger regulation strategies.

Interventions focused on strengthening effective anger regulation skills, tolerating anger arousal, and modulating empathic arousal will be valuable for juvenile offenders (Izard, 2002). Specifically, the findings provide support for a more sensitive intervention approach for adolescent offenders and their caregivers by educating situation-specific and time-dynamic changes in ER.

A promising intervention strategy may be aiming to improve caregiver–child relationships with the ultimate goal of impacting the course of adolescent ER development (Broberg, 2000). In line with this view, several practical applications of this research for prevention and intervention programs of juvenile violence targeting caregiving practices are offered. Social work practitioners can assess for levels of monitoring to provide a more comprehensive intervention plan for promoting ER, caregiving practices, and prosocial

behavior among adolescent offenders. It is also important to communicate to caregivers that hostility and rejection are universally negative caregiving characteristics and to help caregivers identify and reduce the use of such attitudes and behaviors. Additionally, short-term or long-term behavioral interventions aimed at changing caregiving behavior and skills will be effective. Finally, an increased focus on preventive actions targeting neglectful families characterized by harsh punishment, inadequate discipline and supervision, and low levels of supportive caregiving will contribute to enhancing adolescent emotional development and reducing the risk of future juvenile violence (Hoeve et al., 2009).

## **Conclusions**

Aggressive behavior (or violence) among juvenile offenders is a major social problem in the United States, with one million juveniles being arrested in 2014 (OJJDP, 2015). However, there is paucity of research to understand the mechanisms that cause developmental pathways leading to this problem. No theoretically grounded developmental model has been proposed within current literature to understand the links among adolescents' ER, caregiving, and juvenile violence. The present study discusses the possible mechanism underlying the associations among ER, caregiving, and aggressive behavior of juvenile offenders through integration of two theories: ecological-transactional model and attachment theory.

The results of this study indicated that ER and caregiving both independently and interactively predicted aggressive behavior during adolescence. The most notable finding of this study is that positive changes in ER was a powerful predictor for decline in aggressive behavior among ethnically diverse adolescent offenders during the 2-year study period; changes in ER may cause—and do not merely predict—decline in juvenile offenders' aggressive behavior. This result suggests that social work practitioners in juvenile justice

setting make more intervention efforts to incorporate programs that address the emotional aspects when treating severe juvenile offenders.

Although the interaction effect was small in magnitude, higher monitoring interacted with positive changes in ER, which in turn, facilitated more rapid declines in aggressive behavior (relative to lower monitoring) among juvenile offenders. Caregivers who use adequate monitoring could provide sufficient behavioral control to improve adolescents' ability to regulate their emotions, which may significantly contribute to decreases in aggressive and delinquent behaviors. This finding underscores the contribution of caregiver-child interaction effects on the desistance of juvenile violence. Although adolescence is considered a period of increased striving for autonomy (Steinberg, 1990), the finding supports the attachment theoretical point of view that caregiving influence continues to be a significant predictor of adolescent psychosocial development and adjustment. Monitoring is an important predictor of attachment quality, and attachment relations reach across emotional, cognitive, and behavioral domains (Kobak et al., 2007; Marotta, 2002).

The present study has important implications for family-oriented social work practitioners and researchers aiming to develop programs and strategies that focus on deterring juvenile offenders from engaging in aggressive behavior. In an effort to improve outcomes for juvenile offenders, it may not only be important to increase ER abilities but also increase caregivers' awareness and instruction of the association between adequate monitoring and healthy ER development. Finally, in accordance with the ecological-transactional perspective, this study answers a call for further research to examine the impact of other contextual factors such as race, gender, and community environment, in addition to caregiving, on the development of ER and juvenile violence. Examining the complex interplay among ER and the multiple levels of adolescents' environments will provide a more



comprehensive picture of the etiology of and increase predictive accuracy of juvenile violence.

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