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DOCTORAL DISSERTATION
**ADOLESCENTS' EXPOSURE TO COMMUNITY VIOLENCE: LINKS
WITH COGNITIVE, AFFECTIVE AND TEMPERAMENTAL
DIMENSIONS**

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INTRODUCTION

Based on Bronfenbrenner's ecological systems model (1979), youth are shaped by multiple environments, from the most intimate home ecological system moving outward to the larger school system and the most expansive system which is society and culture. Each of these systems inevitably interact with and influence each other in every aspect of the child's life. As such, the ecological theory has guided much of the research on exposure to community violence, providing a useful framework for understanding how the involvement in a violent community can impact on individual development and well-being (Cicchetti & Lynch, 1993).

To date, the research on neighborhood characteristics as predictors of child and adolescent adjustment has accumulated evidence suggesting that both objective (e.g., assessments on the basis of census data) and subjective (e.g., family members' ratings of safety and security) features of neighborhoods are associated with children's behavioral adjustment (e.g., Richters & Martinez, 1993). Furthermore, the impact of these neighborhood characteristics on children's adjustment has been shown to operate independently of family structure and family economic well-being. For example, Brooks-Gunn, Duncan, Klebanov, and Sealand (1993) found that the presence of affluent neighbors was associated with lower rates of adolescents' dropping out of school, even after controlling for family socioeconomic characteristics.

Various explanations have been put forth to explain the links between neighborhood characteristics and children's adjustment (Jencks & Mayer, 1990; Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995). One reason that has been posited focuses on the importance of collective socialization, that is, the extent to which adults in the neighborhood share the responsibilities of child-care supervision and behavior regulation (Chase-Lansdale & Gordon, 1996; Sampson, Raudenbush, & Earls, 1997): From this perspective, neighborhood qualities are presumed to exert an impact

on adolescent adjustment through the availability of role models and the provision of non-parental guidance and supervision (Wikström & Sampson, 2003).

Following this line of research, in the present dissertation we tried to offer our contribution to the comprehension of the psychological and behavioral correlates of being exposed to community violence in a sample of Italian adolescents. Our focus on the Italian context is a first important novelty in the research literature on the topic of community violence exposure, which has a long tradition in US, whilst its prevalence and the investigation of its consequences are relatively unexplored in adolescents living in European communities. Specifically, we were interested in examining (i) how self-regulatory temperament (i.e., effortful control) is longitudinally linked to community violence exposure and aggressive behavior, and (ii) whether a desensitization mechanism, both cognitive and emotional, can be invoked in the explanation of the relation between community violence and aggressive behavior.

In the next paragraphs, we will provide a systematic review of the literature on the topic of community violence exposure, first addressing what it means and how it differs from other forms of violence that may be experienced by youth; then, we will discuss the well documented consequences of community violence exposure and review the specific risk factors that research has identified as associated to both community violence exposure and its negative outcomes.

Chapters II (study 1) examines the factor structure of the community violence scale (adapted from Schwartz & Proctor, 2000) in order to investigate whether victimization and witnessing could be considered two distinct constructs in our sample. For this study's purposes, we specifically applied a bifactor modeling approach (Chen, West, & Sousa, 2006).

Chapter III (study 2) aims to analyze cross-lagged associations between effortful control, community violence and aggressive behavior; we specifically took in account

the trait-like, time invariant nature of the temperamental construct of effortful control by adding a random intercept, as suggested by Hamaker, Kuiper, & Grasman, 2015.

The central goal of Chapter IV (study 3) is to provide evidence that a process of cognitive desensitization occurs in response to repeated experiences of violence and as a consequence of low effortful control. Using a Conditional Latent Growth Mixture Model with the manual three-step approach for including predictor and distal outcomes (Asparouhov & Muthen, 2014), we investigated how community violence and low effortful control are associated to developmental trajectories of moral cognitive distortions, and how trajectories of moral cognitive distortions impact on the increase of aggressive behavior across time.

Finally, Chapter V (study 4) presents the results of a pilot experimental study on youth emotional desensitization. Applying Hayes's moderated mediating approach (2015), we examined the role of gender in the desensitization process, which, in turn, would increase the likelihood to adopt aggressive conducts.

The use of innovative methodological techniques in this dissertation was possible thanks to a period of study spent at Arizona State University and at Global School of Empirical Research and Methods (Switzerland).

A brief description of the sample

The sample used for this dissertation, specifically for study 1, 2 and 3, consisted of 745 adolescents (339 Males) who were part of a still ongoing Italian longitudinal project carried out by Professors Bacchini (University of Naples "Federico II") and Affuso (University of Campania "Luigi Vanvitelli"). The project aimed to investigate the main determinants and pathways of successful development and maladjustment from early to late adolescence. The study began in 2013: All the middle and high schools of Arzano, near Naples, accepted to participate. The neighborhood served by

these schools is characterized by serious social problems, such as high unemployment, school-dropout, and the presence of organized crime (CNEL, 2014).

The longitudinal design involved two cohorts of adolescents: 400 in sixth grade (younger cohort; M age = 11.16 at T1, SD = .51; range = 11–13 years) and 345 in ninth grade at T1 (older cohort; M age = 14.27 at T1, SD = .69, range = 13–15). For the present dissertation, we used both cohorts assessed longitudinally from 2013 to 2016 (4 data points, 1-year intervals).

CHAPTER I

A review of the literature

Chapter I

A REVIEW OF THE LITERATURE

Defining Exposure to Violence in the Community

The definition of community violence exposure has known a variety of interpretations over time. As Guterman and colleagues (2000) have noted, two main questions are strictly linked to this issue: First, what the term “community” denotes when talking about youth exposure to community violence? And, second, what the term “violence” denotes? With respect to the first question, in early studies of community violence among adolescents, the term “community” has often been used to designate the locations or “meeting places” (Puddifoot, 1996) where violent events occur, for example, in neighborhoods, schools, play and recreation areas, shops, and streets close to home. However, while some studies have differed regarding whether community violence includes events occurring in schools or neighborhoods, as well as those occurring inside the home, such as child abuse, domestic violence, or even violence observed on television, many other studies explicitly included family violence and in-home incidents as community violence (DuRant, Cadenhead, Pendergrast, Slavens, & Linder, 1994; Farrell & Bruce, 1997; Richters & Saltzman, 1990; Schubiner, Scott, & Tzelepis, 1993), and still others did not specify whether violence experienced is in- or out-of-home (e.g., Bell & Jenkins, 1993; Campbell & Schwarz, 1996; Fitzpatrick & Boldizar, 1993; Gladstein, Slater Rusonis, & Heald, 1992; Lorion & Saltzman, 1993; Schubiner et al., 1993; Schwab-Stone et al., 1995). Furthermore, some researchers included television violence as a type of community violence (Cooley-Quille, Turner, & Beidel, 1995), while others conceived television violence as a correlate, but not a type of community violence (Gladstein et al., 1992). Still others, such as Richters and Martinez (1993), explicitly excluded media violence as a form of community violence.

Although there are still inconsistencies in what exactly community violence constitutes, to date it is generally defined and measured by researchers as instances of interpersonal harm or threats of harm within one's neighborhood or community, and excludes related constructs such as domestic violence, physical maltreatment, sexual abuse, peer bullying, and media and video game violence (Kennedy & Ceballo, 2014).

With respect to the second question - what is denoted and connoted by the term "violence" when talking about youth experiences of community violence - many studies concur that "community violent acts" include such events as rapes, assaults, knifings, and gunshootings (e.g., Gladstein et al., 1992; Horowitz, Weine, & Jekel, 1995; Richters & Saltzman, 1990). At the same time, however, substantial variation exists with respect to specific other events and experiences labeled as "community violence." Richters and Saltzman (1990) include events such as being chased by gangs or older youths, drug dealing, serious accidents, arrests, forced entry, or weapons possession in their survey of community violence exposure. Although Horowitz and colleagues (1995) also include serious accidents, they do not assess being chased, drug dealing, arrests, forced entry, or weapons possession. Still more restrictive, Cooley et al. (1995) include only "deliberate acts intended to cause physical harm against a person or persons in the community," thereby excluding events such as forced entry, drug activity, or weapons possession.

Beyond the necessity to differentiate between these two distinct levels of community violence exposure - mild violence exposure consisting of beating, chasing, pushing/shoving, or slapping, *vs.* severe violence including exposure to robbery, threats with a weapon, shootings, and stabbings – other scholars (Buka, Stichick, Birdthistle, & Earls, 2001; Gibson, Morris, & Beaver, 2009) identified three levels of violence exposure: primary (victimization), secondary (violence seen), and tertiary (i.e., learning of a violent death, serious harm, or threat of death or injury to another person). With

respect to the latter point, particularly, Margolin and Gordis (2000) argued that unlike other forms of violence, community violence is widely discussed and children who do not directly witness these violent incidents may still experience its effects. Indeed, children often hear repeated accounts of a specific incident, which in turn causes them to form their own mental imagery of the event. However, despite the results are mixed, in general the research suggests that the effects of violence exposure on negative outcomes vary in function of the physical proximity of children to the violent event, such that victimization is associated with stronger effects than witnessing or hearing experiences (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009).

Prevalence of Community Violence Exposure

Research on the topic of community violence exposure has a long tradition in US and still now violence within the community is considered one of the most serious public health problems of contemporary society (Federal Bureau of Investigation, 2015). Overall, children and adolescents in the United States - particularly poor, racial minority, urban youth (Gibson et al., 2009; Stein et al., 2003) - are exposed to community violence at alarmingly high rates. As reported by Kennedy and Ceballo (2014), in a substantial body of literature that include youth living in nonurban neighborhoods, 38% reported witnessing community violence (Turner, Finkelhor, & Ormrod, 2006; Zinzow et al., 2009). In addition to witnessing violence in their communities, over half of urban youth in many studies have been directly victimized (Aisenberg, Ayón, & Orozco-Figueroa, 2008; Lambert, Nylund-Gibson, Copeland-Linder, & Ialongo, 2010). Although some findings suggest that boys experience more community violence than girls do (Menard & Huizinga, 2001; Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998), others have found that girls and boys are exposed to community violence at equal rates (e.g., Aisenberg et al., 2008; Lambert et al., 2010), especially when considering sexual assaults and threats (Turner et al., 2006).

The prevalence of violence exposure and the investigation of its consequences are relatively unexplored in adolescents living in European communities. To the best of our knowledge, three studies comparing the effects of community violence across Belgium, Russia and Connecticut have been conducted by Vermeiren (University of Antwerp, Belgium) and its colleagues (Schwab-Stone, Kuposov, Vermeiren, & Ruchkin, 2013; Vermeiren, Schwab-Stone, Deboutte, Leckmant, & Ruchkin, 2003). One other European study examined the relationship between exposure to violence in different contexts (home, community, school, media, war related stress) and psychopathology in incarcerated male adolescents (Erdelja et al., 2013). In general, the substantial investments in research programs on the topic of community violence like those by the US Justice Department and other organizations in US (e.g., Kilpatrick and Saunders: National Survey of Adolescents in the United States, 1995; Finkelhor and Turner: National Survey of Children's Exposure to Violence, 1997-2014) seem to be lacking in Europe.

With respect to the Italian context, episodes of crime and violence occurring within the community are reported in all national daily newspapers. Despite the growing social interest, however, to date there are not national research projects addressing this issue. As reported in national statistics, from 2009/2010 especially the rates of crime for financial gains (e.g., robberies) have increased in all Italian regions, whereas a decrease of the feeling of security within the community has been observed (CNEL, Istat, 2014). Starting from 2015, trends are slightly decreasing (- 4.2% compared to 2014), although the number of crimes each year remains significantly high (nearly 1 500 000; CNEL, Istat, 2016). According to the most recent data from Istat, in particular, the Italian region with the higher number of crimes (including robberies, menaces, extortions, presence of criminal organizations, trafficking and drugs possession) reported to the judicial

authorities in 2015 was Lombardia, with nearly 77000, followed by Lazio (52701) and Campania (51438).

Noteworthy, based on the statistics reported on NationMaster.com, the world's largest online statistical database for country comparisons, Italy ranked low among the list of countries rated highest for feeling safe walking alone at night (65th /131, with a score of 47.97, Mean across countries = 99.61; US: 78th/131; survey conducted from July, 2011 to February, 2014); similarly, recent OECD (Organization for Economic Co-operation and Development; 2016) reports indicated that Italy had one of the lowest global safety index (6.9), based on people's perceptions of feeling safe and number of murders in a year.

In one of the few studies focusing on community violence within the Italian context (Affuso, Bacchini, Aquilar, De Angelis, & Miranda, 2014), the authors highlighted the massiveness of violence experience in adolescents' everyday life: 76% reported that they had witnessed violence or had been victims of violence in the neighborhood (assault, robbery, threats) at least one time in the last year, whereas 15% of the sample claimed to have been involved, at least one time, in all forms of violence considered in the study (community, school, family and media violence). Another similar evidence comes from a recent cross-cultural study comparing the perception of neighborhood danger in 9 different countries (Italy, China, Kenya, Philippines, Sweden, United States, Colombia, Jordan and Thailand), where Italian and Kenyan adolescents (10-11 years) and their parents exhibited the highest scores (Skinner et al., 2014).

Community violence and youth problem behavior

To date, the majority of research classifies community violence exposure into two categories of personal victimization or witnessing violence (Bell & Jenkins, 1991). This distinction in types of violence is probably the most explored dimension of community violence exposure. In fact, some researchers have attributed the somewhat

varied findings of violence's impact on psychological wellbeing to the differential effects of witnessing violence versus experiencing direct victimization (Horowitz et al., 2005). A factor analyses of exposure to community violence items demonstrated that victimization and witnessing violence are conceptually dissociable (van Dulmen, Bellison, Flannery, & Singer, 2008). Some of the studies that investigated the differential impact of these constructs on adolescents' adjustment reported that witnessing violence is linked specifically to externalizing behaviors: It is likely that witnessed violence provides behavioral models for deviant and antisocial behavior, increases the tendency to believe that such behavior is acceptable or even expected, and desensitizes young people to the emotional effects of violence (Mrug & Windle, 2009). The experience of being witness to violence repeatedly, in fact, would be more likely related to the acquisition of deviant social information patterns, such that selective attention to hostile peer cues, an attribution that others are being hostile toward the self, rapid accessing of aggressive responses, and positive evaluations of aggressive responses all increase the likelihood of aggressive behavior (Crick and Dodge, 1994). In contrast, victimization appears to be more strongly linked to the development of internalizing symptoms (Cooley-Quille, Boyd, Frantz, & Walsh, 2001), mainly related to dysfunctions inherent mechanisms of emotional self-regulation, such that anxiety, depression, difficulty in managing the activation emotional, compromise the more general ability of individual's adaptive behavior (Schwartz & Proctor, 2000).

However, the few studies comparing the effects of witnessing vs. victimization have showed controversial results. Ozer and Weinstein (2004), for example, found very high correlations between the different status of violence and similar associations with maladaptive symptoms, suggesting a kind of equifinality of effects. Other studies, instead, showed different results (Cooley-Quille et al., 2001), in particular as regards intrusive thoughts and avoidance strategies, mostly associated to the experience of

witness violence rather than being victims (Hammack, Richards, Luo, Edlynn, & Roy, 2004). Some other researchers have concluded that victimization is more strongly associated with all psychological outcomes than is witnessing violence (e.g., Brennan, Molnar, & Earls, 2007; Fowler et al., 2009).

With some exceptions (e.g., Brennan et al., 2007; Scarpa, Hurley, Shumate, & Haden, 2006), most studies neglect the possible impact of a third category of exposure: hearing about community violence (Buka et al., 2001). However, one study found that simply hearing about violence in one's neighborhood at a high frequency was associated with a range of negative psychological outcomes in a sample of young adults (Scarpa et al., 2006). Therefore, it seems likely that this relatively indirect form of community violence is not uniquely associated with any outcome in particular. Instead, as the authors postulated, perhaps hearing about community violence is associated with the same outcomes as are the more direct forms of witnessing and victimization, but to a lesser extent. Alternatively, some findings suggest that there is no significant difference in the degree to which victimization, witnessing, and hearing about violence within the community predict Post-Traumatic Stress Disorder (PTSD) symptoms (Fowler et al., 2009). Thus, at least for PTSD, merely hearing about community violence may be as detrimental to youths' well-being as more direct forms of exposure. However, it is important to note that despite an effort to disentangle the effects of different types of community violence exposure, different forms of community violence are highly overlapping for the most part of urban youth, whereas few youths experience solely victimization or solely incidents of witnessing violence (Schwartz & Proctor, 2000).

The Paradigm of Pathologic Adaptation to Violence

The impact of exposure to community violence on youths' well-being becomes even more complex when considering the chronicity, or persistence, of violence exposure over time (Garbarino, 1999). The question of how the long-term chronicity of exposure

to community violence affects youths' well-being is remarkable, because most youth in urban areas are exposed to chronic and cumulative community violence over their lifetimes (Aisenberg et al., 2008; Kennedy et al., 2010; Menard & Huizinga, 2001). It seems to be reasonable assuming that witnessing or being victim of violence over time may have a greater (or different) impact than one isolated experience of witnessing or victimization, but the research examining how repeated experiences of community violence longitudinally are associated with psychological outcomes, and how this pattern of exposure may be differentially related to outcomes from one-time exposure is still needed (Feerick & Prinz, 2003; Foster & Brooks-Gunn, 2009). To date, we know that community violence is linked to youths' psychological adjustment according to a "cumulative effects" model of community violence exposure (Lynch, 2003), or a dose-response mechanism, such that as experiences of violence exposure accumulate over time, more severe psychological symptoms develop (e.g., Kennedy et al., 2010). One theory that may account for differential outcomes of repeated exposure of community violence *versus* one-time exposure is that youth become desensitized to violence over time, leading to emotional numbing. As pointed out by Huesmann (1998, as cited in Guerra, Huesmann & Spindler, 2003), "children who are repeatedly exposed to violence during childhood inhabit it and experience it as less adverse" (p.1561).

Over time, desensitization would account for a weaker association between violence exposure and emotional symptoms, such as depression, but a stronger link between violence and aggressive behaviors, indicating a greater acceptance of the use of violence as a normative problem-solving strategy (Garbarino, 1999; Ng-Mak, Salzinger, Feldman, & Stueve, 2004). Several studies of adolescent community violence exposure have demonstrated stronger associations with aggression than internalizing symptoms (Jenkins & Bell, 1994; Kliwer, Lepore, Oskin, & Johnson, 1998), and others have even revealed a negative association between community violence and depression

(Fitzpatrick, 1993). Even if in line with the cumulative effects theory, one problem in previous research is to have tested the relation between community violence and adjustment problems using linear models only. By definition, linear models imply that on a frequency scale of community violence exposure, an increase from zero to one exposure is proportional to an increase from, for instance, nine to ten exposures (Selner-O'Hagan et al., 1998; Trickett, Duran, & Horn, 2003). However, aside from statistical convenience, there is no apparent justification for presupposing equally weighted intervals between ordinal scale points. A more informative test of whether a linear, dose-response association between cumulative violence exposure and youths' problem behaviors truly exists would involve testing curvilinear relationships, which are the basic assumptions of a desensitization model of violence (Ng-Mak et al., 2004). Tests of the desensitization model have revealed quadratic negative associations between community violence and internalizing symptoms over time, such that as lifetime exposure increases, internalizing symptoms increase to a point, then begin to decrease at very high levels of exposure. At the same time, positive linear associations have emerged between community violence and externalizing problems (Kennedy & Ceballo, 2016; McCart et al., 2007; Mrug, Loosier, & Windle, 2008).

Biological evidence has shown that youth exposed to chronic community violence also experience physiological desensitization such as lower resting heart rates and basal cortisol levels (Aiyer, Heinze, Miller, Stoddard, & Zimmerman, 2014; Cooley-Quille et al., 2001; Kliewer, 2006; Scarpa, Tanaka, & Haden, 2008), which may be linked to the process of emotional numbing (Cooley-Quille et al., 2001) and dissociative symptoms (Mrug et al., 2008).

Despite this preliminary data, more investigations of the desensitization model of community violence are needed, particularly to determine whether these patterns reflect "pathologic adaptation" to violence exposure, or rather a form of emotional resilience

that develops over time (Foster & Brooks-Gunn, 2009; Ng-Mak et al., 2004). Furthermore, less is understood about the mechanism through which desensitization develops. In their first theoretical model, Ng-Mak, Salzinger, Feldman, & Stueve (2002) identified the crucial mechanism in moral disengagement processes (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996): That is, chronic exposure to violence leads to a normalization of violence through moral disengagement, which in turn promotes an active engagement in future episodes of violence. However, to the best of our knowledge, no study has systematically examined how being exposed to community violence influences the development of cognitive distortions as intended in their moral dimension (Arsenio & Lemerise, 2004; Bandura et al., 1996; Ribeaud & Eisner, 2010). Wilkinson and Carr (2008) tried to raise this point using qualitative data from male violent offenders; they noted that individuals respond to exposure to violence in many ways, some of which are consistent with traditional concepts of moral disengagement or emotional numbing, but also argued that those processes are not sufficient for behaving aggressively and that aspects of contingencies and configurations of situational and interpersonal factors play a powerful role in violent behavior.

Environmental and Personal Risk and Protective Factors for Exposure to Community Violence

To date, there has been much research focusing on the damaging consequences of youth exposure to community violence; during the last years, a growing body of literature is also examining those factors that could increase or attenuate the risk of youth experiences with neighborhood violence (Gardner & Brooks-Gunn, 2009; Lobo Antunes, 2012). What specifically is more or less likely to put youth at risk of involving in violent contexts? In particular, scholars explored neighborhood, family, peer, and individual elements as buffers or predictors of youth exposure to community violence (Gardner & Brooks-Gunn, 2009; Gibson et al., 2009).

As pointed out by several authors (Bacchini, Affuso, & Aquilar, 2015; Foster & Brooks-Gunn, 2009), an important issue when examining correlates of community violence exposure is the difficulty to distinguish the experience of violence within the community from the violence that youth experience in other contexts, such as the family or school. A consistent amount of research, in fact, supports the hypothesis that episodes of violence within the family context are associated with high levels of violence in the neighborhood (Lynch & Cicchetti, 1998; Margolin & Gordis, 2000), or make the child more vulnerable to the school victimization (Schwartz & Proctor, 2000). In a study by Affuso et al. (2014), adolescents who scored high on family violence reported levels of violence in the neighborhood and in the school as high as in the family. It is possible, as argued by Finkelhor, Turner, Hamby and Ormrod (2011), that victimization within a context may increase vulnerability for other forms and/or contexts of victimization through mechanisms such as lowered self-esteem, distorted cognitions, and lack of social support. In a study by Perry, Hodges and Egan (2001), for example, cognitive schemas acquired in families with aggressive interactional styles made children more susceptible to violence outside the family, and, consequently, more likely to be exposed to the risk of further opportunities for victimization.

To date, the research has paid special attention to the concept of “control”, both at the neighborhood (in terms of social control) and individual level (in terms of self-control), as a factor making youth more likely to engage in violent contexts. According to Buka et al. (2001), indeed, the nexus between neighborhood structural characteristics and youth community violence exposure may rest on the potential influence these conditions have on parental and community ability to exert social control (Ahlin & Lobo Antunes, 2017). Gardner and Brooks-Gunn (2009) examined how the presence of youth community organizations impacts youth exposure to community violence, finding that community violence is less frequent in neighborhoods with a greater variety of

youth organizations and activities, which served, according to the authors, as devices of neighborhood guardianship and social control.

Strictly related to social control is the concept of collective efficacy introduced by Sampson et al. (1997). In their formulation, indeed, collective efficacy is a property of neighborhoods, namely, “the capacity of residents to control group level processes and visible signs of disorder” which helps reduce “opportunities for interpersonal crime in a neighborhood” (p. 918). They specifically demonstrated that higher levels of collective efficacy are significantly associated with less neighborhood violence and crime, and this result has found support in several other studies (e.g., Morenoff, Sampson, & Raudenbush, 2001; Pratt & Cullen, 2005). Such reductions in violent crime rates in neighborhoods with high collective efficacy may translate to fewer opportunities for youth to experience violence in their communities.

Nonetheless, as pointed out by Wikström and Sampson (2003), collective efficacy within a community has a prominent role in shaping children’s ability to self-control, and there is evidence that youth can and often do serve as their own guardian (Antunes & Ahlin, 2017). However, the literature on the relevance of personality characteristics related to community violence exposure, though quickly developing, is still in its early period. In particular, in the criminology literature the concept of self-regulation, specifically of self-control (Gottfredson & Hirschi, 1990), has attracted increasing attention.

What we know about self-regulating abilities in adolescence is that young people are generally characterized by an easily aroused reward system, which inclines adolescents toward sensation seeking, and a low ability of self-control (otherwise stated, “a low ability to self-regulate”), which limits their capacity to resist these inclinations (“dual system” model; see Steinberg, 2008 for details). Only at around age 15, self-regulatory abilities may reach adult-like levels in relatively less arousing, “cool”

contexts (Casey, 2015), but when tasks become more demanding or emotionally arousing, adult-like performance may not be reached until closer to the mid-20s (Shulman et al., 2016; Veroude, Jolles, Croiset, & Krabbendam, 2013).

Low self-control is characterized as lacking inhibitory control, lack of the ability to delay gratification, risk seeking, a preference for simple tasks that do not require persistence, self-centeredness, preference for physical activities to mental ones, and bad temper (Gottfredson & Hirschi, 1990). As such, individuals with low self-control are more likely to place themselves in precarious situations, as well as in violent contexts, perhaps because they fail to see the long-term consequences of being exposed to violence, or they are engaged in criminal behavior themselves (see Schreck, 1999). Gottfredson and Hirschi (1990, p. 157) suggest youth with low self-control “gravitate to the street”. Compared to youth with higher levels of self-control, individuals with less self-control are at a higher risk of experiencing community violence (Higgins, Jennings, Tewksbury, & Gibson, 2009; Zimmerman & Messner, 2013). Low self-control may also place individuals in contexts that are prone to victimization due to a lack of guardianship and increased opportunities (see Forde & Kennedy, 1997), through delinquent peer associations (Schreck, Wright, & Miller, 2002). Compared to delinquent peers, low self-control has a stronger effect over risk of direct victimization, though high self-control has not been shown to act as a protective factor (Schreck et al., 2002).

Over the last decade, the criminology literature has attempted to incorporate temperament concepts in the explanation of antisocial and deviant behavior (Bridgett, Burt, Edwards, & Deater-Deckard, 2015), including the tendency to be involved in violent contexts. More specifically, in recent years, DeLisi and Vaughn (2014) articulated a temperament-based theory of crime and antisocial behavior, encouraging researchers in the criminological domain to consider explicit temperamental aspects in

their models (see, for example, Baglivio, Wolff, DeLisi, Vaughn & Piquero, 2016), such as temperamental effortful control, as something that is congenital, neurogenetic or brain-based (DeLisi, 2014). To date, there is no study exploring the association between effortful control and community violence exposure, yet.

Gender- and Age-related Differences

A wide literature has been devoted to understanding gender differences not only in aggressive and deviant behavior, but also in being victim or witness of community violence. Many studies have found that, compared to females, boys are at greater risk for community violence (Haynie, Petts, Maimon, & Piquero, 2009; Scarpa, 2001; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003). Frequently, research on gender differences in community violence has argued that differences depend on variations of parental monitoring and supervision (Lobo Antunes, 2012; LaGrange & Silverman, 1999), or may be explained by gender stereotypes related to the socialization processes involving male and females and their socially constructed roles, such that girls are encouraged more to remain at home (so that they can undertake domestic roles, which are perceived as typically female), and then to spend less time in community activities.

With respect to age, studies have consistently established that older children experience more violence in their community compared to younger children, perhaps because they are much more likely to spend time in their neighborhood where they form peer relationships and engage in community activities (Ahlin & Lobo Antunes, 2017; Selner-O'Hagan et al., 1998; Singer, Anglin, yu Song, & Lunghofer, 1995). In a series of studies using the PHDCNdata, Lobo Antunes (2012), Lobo Antunes and Ahlin (2014, 2015), and Ahlin and Lobo Antunes (2017) found that the older cohorts in their sample reported higher risk for community violence. Also in this case, like for gender differences, the authors demonstrated that younger youth are subjected to higher levels

of parental control, which means they are less likely to spend time unsupervised in their community and more likely to be monitored at home.

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CHAPTER II

Study 1

Chapter II

Confirmatory Factor Analysis of the Exposure to Community Violence

Scale: Are victimization and witnessing conceptually distinct?

Non-war time exposure to violence by urban adolescents occurs with such frequency that the neighborhoods in which they reside have been defined as “war zones” of a different kind (Bell & Jenkins, 1991). The exposure the authors generally refer has a dual nature. The community violence concept, in fact, applies not only to direct personal exposure (*happened to you*), but it also includes exposure through witnessing (*saw it happen to someone else*). One of the main question about this issue is to understand whether being a victim or a witness of violence within the community reflects two specific domains of experience, which can occur one independently from the other, or, instead, they mostly appear in co-occurrence. Certainly, elucidating the relation between witnessing violence and victimization would open to new research questions, such as if one may cause the other, if their risk factors are correlated, if their co-occurring presentation share the same etiology as a “pure” presentation, or instead the co-occurring presentation is distinct from each “pure” presentation, and so on.

Overall, studies suggest that witnessing violence or being a direct victim of violence affect the youth’s psychological well-being in different ways (Horowitz, McKay, & Marshall, 2005). However, results are controversial. Some early research in the United States (Fitzpatrick, 1993) showed that being directly victimized by violence produced greater psychological distress than witnessing it. Similar to Fitzpatrick’s results, later research by Paxton, Robinson, Shah, and Schoeny (2004) also found that only direct victimization had an effect on symptoms of depression when witnessing violence was controlled. Similarly, Shields, Nadasen, and Pierce (2009) reported that direct victimization had more substantial effects on children’s social and psychological

distress than witnessing violence; in their meta-analysis, also Fowler and colleagues (2009) concluded that victimization is more strongly associated with all psychological outcomes than witnessing violence is.

Nonetheless, some other studies indicate that witnessing violence is linked specifically to externalizing behaviors: It is likely that witnessed violence provides behavioral models for deviant and antisocial behavior, increases the tendency to believe that such behavior is acceptable or even expected, and desensitizes young people to the emotional effects of violence (Mrug & Windle, 2009). Still others have found no differences between the specific outcomes associated with victimization and witnessing violence (e.g., Ozer & Weinstein, 2004).

Although some investigators have conceptualized exposure through witnessing and exposure through victimization as distinct constructs (Bell & Jenkins, 1997), or found that not all children who witness violence in the community are also victims of such violence (Richters & Martinez, 1993), some other researchers have claimed that personal victimization and the witnessing of violence are not mutually exclusive experiences. To the contrary, in most studies youth described being both victims and witnesses of violence: A study of the cumulative involvement by Chicago inner-city youth in violence (Bell & Jenkins, 1993), for example, revealed that 86% of those who participated in violence had been victims and witnesses as well. Furthermore, there are evidence showing moderate to strong correlational values between children's self-reports of each of these two forms of community violence (Kliewer, Lepore, Oskins, & Johnson, 1998; Schwartz & Proctor, 2000).

Also the results from factor analyses of exposure to community violence scales are mixed. Van Dulmen and colleagues, for example, have demonstrated that victimization and witnessing violence are conceptually dissociable (van Dulmen, Bellison, Flannery, & Singer, 2008), whereas Hasting and Kelley (1997) were unable to

find a distinction between victimization and witnessing violence. Specifically, they found that severe victimization and severe exposure via witnessing loaded on the same factors, regardless of whether they related to victimization or witnessing violence. Other work using factor analysis has not supported the idea that being victimized and witnessing violence have distinct effects (Singer, Anglin, Song, & Lunghofer, 1995).

To begin to address these limitations in the existing research, the aim of the current study was to investigate whether victimization and witnessing could be considered two distinct constructs in our sample, specifically by testing the factor structure of the measure of exposure to community violence through a bifactor modeling approach (Chen, West, & Sousa, 2006). In a bifactor model, in particular, there exists a general factor that is hypothesized to account for the commonality of the items; and there are multiple domain specific factors, each of which is hypothesized to account for the unique influence of the specific domain over and above the general factor (Chen et al., 2006); thus, although it is a form of hierarchical analysis, unlike higher-order factor analysis, the overarching dimension exerts direct effects on the indicators (Brown, 2014). Given these structural properties, as pointed out by Chen and colleagues, the bifactor model can be extremely useful to evaluate the importance of domain-specific factors. In the specific case of this study, the proposed bifactor model would be comprised by a global CVE factor plus two substantive specific factors: “Victimization” and “Witnessing”.

Measuring Exposure to Community Violence

A number of scales measuring exposure to community violence have been developed. One of the more commonly used measures to assess violence exposure in children and adolescents is the “Things I Have Seen and Heard Scale” (Richters & Martinez, 1993), originally developed for children in grade 1 and 2. The scale contains 20 items that probe exposure to community violence, exposure to violence-related

activities (for example, seeing drug deals or someone being arrested), violence exposure in the home, violence directly experienced, and feelings of safety at home and school, amongst others. Given its target, a pictorial format is used to facilitate child comprehension of response options. On the response form, five stacks of balls are depicted below each description of violence, each with a different number of balls, ranging from no balls (an empty circle) to four balls (representing many times). This scale, in its various forms, is commonly utilized as a multi-item single-factor scale, providing a global index of violence exposure by summing item scores (Thompson et al., 2007). In its original form, good short-term test–retest reliability was reported and the validity of the scale as a measure of violence exposure was supported (Richters & Martinez, 1993).

Based on this scale and other existing measures in literature, Schwartz and Proctor (2000) identified 25 items assessing exposure to community violence by direct victimization and by witnessing. Their specific aim was to investigate how children’s social adjustment in fourth, fifth and sixth grade was linked to their experience as victims or witnesses of violence within the community. Results showed that victimization in the community was associated to impairments in emotion regulation, and concomitant social difficulties, but was not associated with aggressive social-cognitive biases; witnessed violence, on the other hand, was linked to problematic social-cognitive structures and aggression but was not predictive of more pervasive social difficulties (i.e., peer rejection or bullying by peers) or impairments in emotion regulation.

Quite different from the above measure, Singer and colleagues (1995) developed the Recent Exposure to Violence Scale (REVS), a 22 items scale designed to capture violence in different contexts (at home, at school, or in the neighborhood) and by different status. An initial principal component analysis (PCA) of the REVS indicated

five factors: witnessed in neighborhood, victimized or witnessed at home, witnessed at school, victimized at school or in neighborhood, and shooting/knife attack (Singer et al., 1995). More recently, Van Dulmen et al. (2008) found that the seven-factor structure of the REVS best represented the REVS (three factors reflecting victimization in different contexts, three factors reflecting witnessing in different contexts and witness/victim shooting/knife attack), also supporting that witnessing and victimization are two conceptually distinct constructs.

The present study

For the current study's purposes, we selected 12 items assessing exposure to violence through witnessing and victimization (see table n. 1) from a review of existing measures, particularly Schwartz and Proctor's. The choice of the items was made on the base of their relevance to our specific urban context. We conducted three studies with the aim to address several psychometric issues pertaining to the use of the community violence scale. The first study was designed to provide empirical support for the bifactor model as described above (Model 1): One "general factor" of co-occurring victimization and witnessing plus two specific factors of "victimization" and "witnessing" (Model 1; Fig. 1). The goodness fit of this model was evaluated and compared with those of two alternative models (Table 2): A single-factor model in which all items load onto a general factor representing the exposure to community violence measure (Model 2; Fig. 2); a second model specifying the presence of two intercorrelated factors (victimization and witnessing) (Model 3; Fig. 2). Subsequent analyses aimed to corroborate (i) the concurrent validity of the three factors, and (ii) their equivalence across gender.

Figure 1. Model 1 – Bifactor Confirmatory Analysis. V = Victim; W = Witness

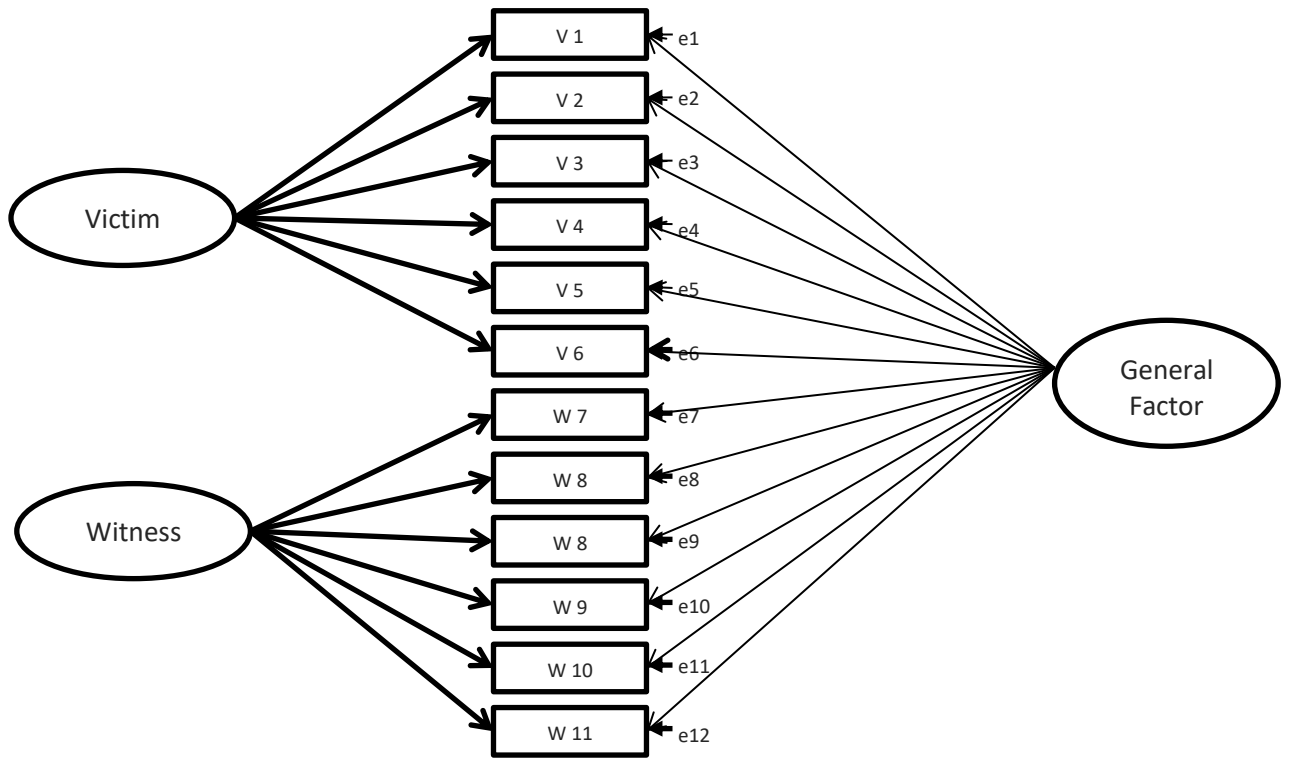
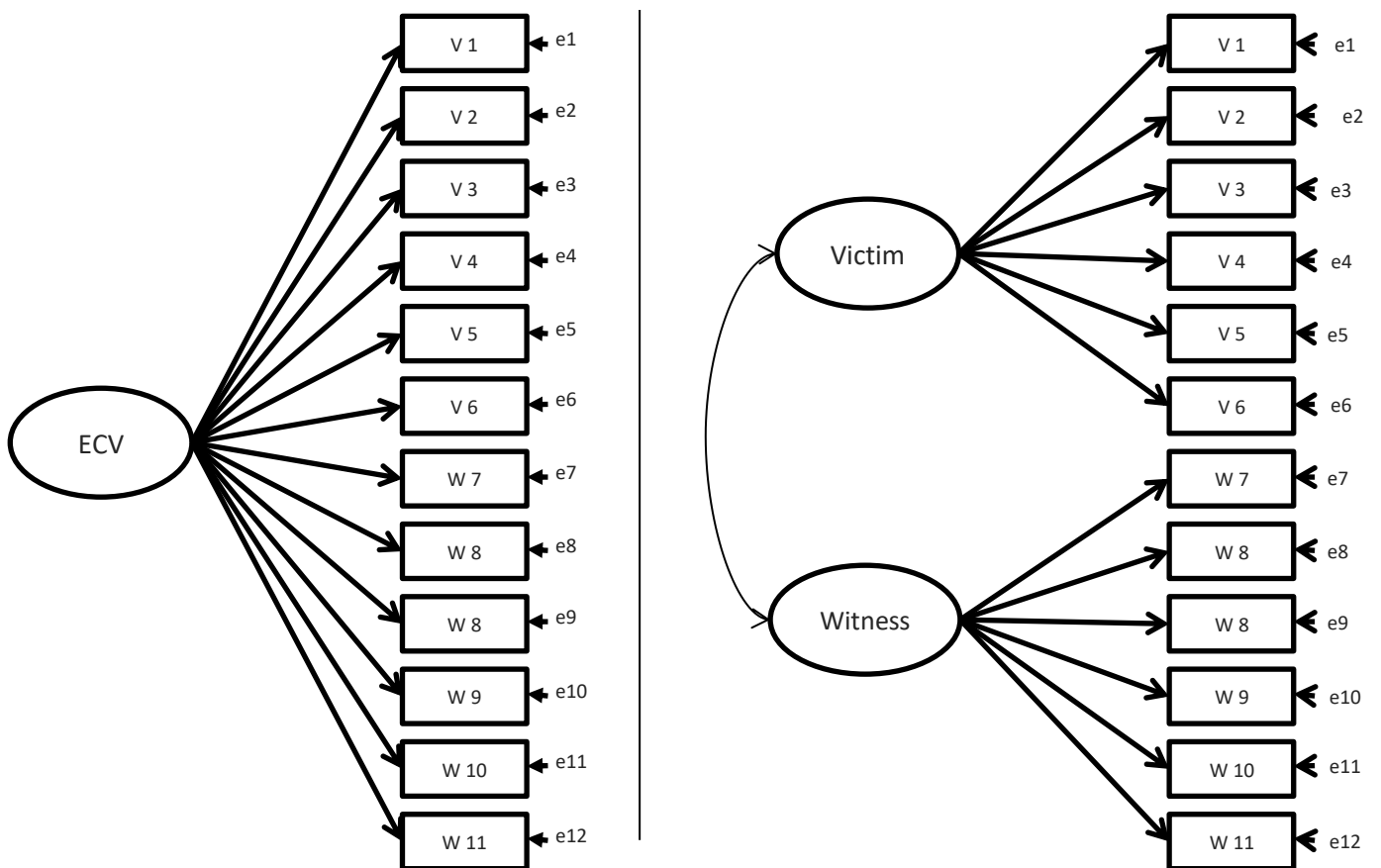


Figure 2. Model 2 – One-Factor Confirmatory Analysis. Model 3 – Two-correlated Confirmatory Factor Analysis. V = Victim; W = Witness; ECV = General Factor of Exposure to Community Violence



METHOD

Participants and procedure

The sample consisted of 745 adolescents (339 Males) ranging in age from 11 to 15 ($M_{\text{age}} = 12.56$, $SD = 1.61$). They were from the main middle and high schools of Arzano, near Naples, that were involved in 2013 in a still ongoing longitudinal study aiming at investigating the determinants and pathways of typical and atypical development from early to late adolescence. The neighborhood served by these schools is characterized by serious social problems, such as high unemployment, school-dropout, and the presence of organized crime (CNEL, 2014).

Approval of the University Institutional Review Board (IRB) was obtained for collecting data. Data collection took place during spring. Parents' and adolescents' written consents were obtained prior to the administration of questionnaires, which was conducted during classroom sessions by trained assistants. To reassure participants about reporting sensitive information and to encourage honest reporting, a complete guarantee of confidentiality was emphasized. Additionally, they were informed about the voluntary nature of participation and their right to discontinue at any point without penalty.

Measures

Exposure to community violence. Exposure to community violence was self-reported using two adapted scales for the local context (Bacchini, Miranda, & Affuso, 2011) of the Community Experience Questionnaire by Schwartz and Proctor (2000). The resulting assessment device does not represent an empirical advance over existing measures but was optimized for use with this specific sample. Adolescents were asked to report violent incidents that had occurred during the last year and instructed to report only serious real-life events from their neighborhoods and their communities and not

incidents from movies or television or from day-to-day conflicts with other children at school.

Each scale included six items, and adolescents were asked to report the frequency (1 = never to 5 = more than five times) of their being the victim or witness of violence in the neighborhood during the last year. A sample item of being victimized was, “How many times have you been chased by gangs, other kids, or adults?”; a sample item for witnessing community violence was, “How many times have you seen somebody get robbed?” All respondent had at least 80% non-missing values and missing item scores were replaced with the mean of the respondent’s scores on the other items in the scale.

Aggressive behavior and anxiety-depression. Ratings of aggression and anxiety-depression were obtained using the relative scales of the Youth Self Report Questionnaire (YSR 11/18; Achenbach & Rescorla, 2001). Adolescents were asked to rate (0 = not true, 1 = somewhat or sometimes true, or 2 = very true or often true) the extent to which they had exhibited a series of problem behavior during the last 6 months (e.g., “I physically attack people” for aggression, and “I cry a lot” for anxiety-depression; alphas = .83). All respondent had at least 80 percent non-missing values; scale scores were computed by averaging the item scores, with missing item scores replaced with the mean of the respondent’s scores on the other items in the scale.

Data Analysis

Confirmatory factor analysis

To investigate the fit of alternative models, confirmatory factor analysis was used, using the program Mplus 7.2 (Muthén & Muthén, 2012). Because the hypothesis of multivariate normality was untenable in the present sample we employed the Yuan and Bentler (2000) scaled chi-square statistic ($YB\chi^2$), which takes into account the non-normal distribution of the data (Mplus estimator MLR: maximum likelihood parameter

estimates with robust standard errors). Because chi-square is highly sensitive to the size of the sample, the Chi-square likelihood ratio statistic was supplemented with other indices of model fit, such as the Comparative Fit Index (CFI) and the root mean square error of approximation (RMSEA) with associated 95% confidence intervals (CIs). We accepted CFI values greater than .90 and RMSEA values lower than .08 (Hu & Bentler, 1999).

The bifactor model hypothesized that responses could be explained by one general factor, which we term global ECV, and two specific factors: Victimization (items 1-6) and witnessing (items 7-12). The model was defined as the following: each item had nonzero loading on the factor that was designed to measure, and zero loadings on the other factor; the two factors were uncorrelated each other; error terms associated with each item were uncorrelated. Finally, items that did not load significantly ($p < .05$) on the designed specific factor were deleted on that specific factor. The Akaike information criterion (Burnham & Anderson, 2004) was used to compare the alternative non-nested models. The lower the Akaike information criterion, the better the fit of the model.

Internal consistency was evaluated by calculating Cronbach's alpha, omega total, and omega hierarchical coefficients (Zinbarg, Revelle, Yovel, & Li, 2005). Omega total estimates the reliability of a latent factor combining the general and specific factor variance whilst omega hierarchical estimates the reliability of a latent factor with all other latent construct variance removed (Brunner, Nagy, & Wilhelm, 2012), thus providing useful information on whether scores for a specific factor can be interpreted with confidence or only the total score (general factor score) should be used.

Empirical correlates

After having established the best-fitting model, aggression and depression were added to the model as observed variables predicted by the "Victimization",

“Witnessing” and “Global ECV” factors. Specifically, each outcome was predicted in a separate model to maintain orthogonal factors.

Cross-Gender Invariance

A series of nested multi-group CFAs was used to evaluate three levels of measurement invariance (i.e. configural invariance, metric invariance, and scalar invariance). The first step in testing for measurement invariance is to establish configural invariance, that provides a baseline against which subsequent models can be compared (Vandenberg & Lance, 2000). Configural invariance indicates that the factor structure is the same for all groups, and is attained if a CFA fits well when the intercepts, factor loadings, and residual variances vary freely across groups, and the factor means are fixed to zero in all groups. Metric invariance indicates that the factor loadings are the same across all groups. To establish metric invariance, a model is estimated in which factor loadings are constrained to be equal across groups, intercepts and residual variances are free, and factor means are fixed to zero in all groups. Then, the chi-square statistics for the configural invariance model is compared with the metric invariance model to determine whether the fit for these two models is significantly different; a non-significant test indicates that metric invariance is likely to hold. Finally, scalar invariance indicates that the intercepts are the same across all groups. For the scalar invariance model, intercepts and factors loadings are constrained to be equal across groups, the residual variances are free, and the factor means are set to zero in one group and free in the others. Again, this model is compared using the chi-square difference test of model fit to the metric invariance model. If this test is not statistically significant at $\alpha = .05$, full scalar invariance is achieved and groups are comparable.

RESULTS

Table 2 reports goodness-of-fit indices for alternative models. In a first bifactor model, all items loaded significantly onto the global ECV factor; however, the items 5

and 6 did not load significantly with their specific domain of victimization, suggesting that these items may measure only global ECV. Since the factor loading of these items on the main factor were quite strong ($B_s = .92$ and 1.01 , for item 5 and item 6 respectively) – suggesting that these items represent valuable components of the construct, and the non-significant domain loading is not a result of item inadequacy – we removed these items from the specific factor only. The final model fits the data well, $MLR\chi^2(44, N=745) = 141.45, p < .001$; $CFI = .941$; $RMSEA = .05$, 90% C.I. [.045, .065], suggesting that a bifactor model with a 2 + 1 factor structure fits the data best resulting in a significantly better fitting model compared to the other models. The standardized loadings are presented in table 1. These loadings ranged from .42 to .62 for the general factor of ECV, from .34 to .70 for the “Victimization” factor, and from .37 to .54 for the “Witnessing” factor. Note that, following inspection of the modification indices, we tested also an alternative two-correlated factor model with correlated item 5 and 6 in order to improve the model fit, but this adjustment did not lead to an improvement of the model compared with the bifactor models.

With respect to internal reliability, the traditional Cronbach’s alpha values were very good concerning the global scale of ECV (.85) and the subscales “Victimization” (.80) and “Witnessing” (.83). The less traditional omega total indicator showed very similar results to those observed using the alpha coefficient (see Table 4).

Table 1. Standardized Factor Loadings (continued)

	G	S
VICT1. How many times has somebody stolen something from you using violence?	.46	.55
VICT2. How many times has somebody physically assaulted you?	.51	.70
VICT3. How many times have you been chased by gangs, other kids, or adults?	.58	.43
VICT4. How many times has somebody tried to use violence or threats to get you to do something that you didn't want to do?	.60	.34
VICT5. How many times has somebody stolen something from your family using violence?	.48	----
VICT6. How many times has somebody in your neighborhood threatened you or your family?	.62	----
WITN7. How many times have you seen somebody get robbed?	.42	.53
WITN8. How many times have you seen somebody else get physically assaulted?	.50	.54
WITN9. How many times have you seen somebody else get chased by gangs, other kids, or adults?	.51	.38
WITN10. How many times have you seen or heard somebody else get threatened?	.55	.37
WITN11. How many times have you seen somebody get threatened with a stick or a knife?	.51	.46
WITN12. How many times have you seen somebody carrying a gun or other weapon (besides police, military, and security guards)?	.42	.49

Note. All factor loadings were significant at $p < .001$. G = Loadings on the General Factor; S = loadings on Specific Factors (items 1-4 load on the Victim Factor; items 7-12 load on the Witness Factor).

However, although there are no specific cut-off values, omega hierarchical coefficient, estimating reliabilities with the effects of all other factors removed, was considerably low for the specific factor of “Victimization” (.23) and somewhat moderate for the specific factor of “Witnessing” (.40), whereas it was high enough for the general ECV factor (.68).

Table 2. Fit statistics for the confirmatory factor analysis models (N = 745)

	<i>MLRχ^2</i>	Df	CFI	RMSEA	AIC	BIC
Model 1a Bifactor model	142.70 (<i>p</i> <.001)	42	.94	.06	23719.55	23940.87
Model 1b Bifactor model**	141.45 (<i>p</i> <.001)	44	.94	.06	23718.67	23930.77
Model 2 1-Factor (unidimensional) model (ETCV)	491.24 (<i>p</i> <.001)	54	.74	.10	24336.07	24502.05
Model 3a 2-Correlated Factor model (ECV -Victim and ECV-Witness)	205.53 (<i>p</i> <.001)	53	.91	.06	23830.96	24001.55
Model 3b 2-Correlated Factor model (ECV-Victim and ECV- Witness) *	181.98 (<i>p</i> <.001)	52	.92	.06	23790.63	23965.83

Note. *Correlation between etv5 and etv6 in the 2-Factors model; **etv5 and etv6 loaded 0 on the specific factor of victimization.

Otherwise stated, only a small proportion of variance can be attributed to the specific factor of victim, while a larger proportion can be explained by the general factor of community violence. Data concerning variances showed a very similar pattern: The computed explained common variance (ECV), in fact, is between .52 and .58, meaning that the general factor explains 52%-58% of the common variance extracted with 42% - 48% of the common variance spread across groups factors.

Table 4. Reliability indices for the bifactor model

Scales	Ω	ω_h	ECV
General Factor	.88	.68	
Victim Factor	.82	.23	.57
Witness Factor	.83	.40	

Note. **Omega** (ω) estimates the proportion of variance in the observed total score attributable to all “modeled” sources of common variance. It represents the reliability of a latent factor combining the general and specific factor variance. It accounts for their common variance. **Omega hierarchical** (ω_h) is more appropriate in evaluating bifactor models. It estimates the reliability of a latent factor with all other latent construct variance removed, thus providing useful information on whether scores for a specific factor can be interpreted with confidence or only the total score (general factor score) should be used. **ECV** is the percent of common variance explained by the general factor. This is a degree of unidimensionality index and is directly related to the relative strength of the general factor. ECV indexes variance specific to a general factor by taking the ratio of variance explained by a general factor and dividing it by the variance explained by a general and group factors where factors are assumed to be uncorrelated.

Empirical correlates

Results from structural equation modeling showed that aggression was significantly and positively predicted by “Global ECV” (.45; $p < .001$) and “Witnessing” (.38; $p < .001$) but not by “Victimization” (.06; $p > .05$). Depression was positively predicted by “Global ECV” (.37; $p < .001$), but was unrelated with both “Witnessing” and “Victimization” (.10 and .11, respectively; $p > .05$).

Cross-sex invariance

The multi-group model testing configural invariance fits the data well, $MLR\chi^2(90, n = 745) = 215.343, p < .001$ RMSEA = .061 (90% CI = .051–.072), SRMR = .043, as did the metric invariance model, $MLR\chi^2(109, n = 745) = 197.883, p < .001$, RMSEA = .047 (90% CI = .036–.057), SRMR = .05. Furthermore, the chi-square difference test between the configural invariance and metric invariance model was non-significant, $MLR\chi^2(19) = 7.48, p > .05$, suggesting that metric invariance between the sexes was attained. Next, the model for scalar invariance was run. This model had

acceptable fit, $\chi^2(116, n = 745) = 210.758, p < .001, RMSEA = .047$ (90% CI = .037–.057), SRMR = .046, and the chi-square difference test comparing the metric invariance model with the scalar invariance model was not statistically significant, $MLR\chi^2(7) = 12.97, p > .05$, indicating that also the full scalar invariance was met.

DISCUSSION

In this study, we investigated the factor structure of the measure of exposure to community violence using a bifactor modeling approach. The aim was to understand whether witnessing or being victim of community violence could be conceptualized as effective distinct constructs in our sample and be used in a meaningful way over and above the general factor of co-occurring witnessing and victimization. The bifactor model was compared with a unidimensional structure and two-correlated factors structure.

Results showed that the bifactor model composed by one general factor of co-occurring witnessing and victimization plus two specific or “pure” factors of witnessing and victimization was the best-fitting model. However, a detailed analysis of the internal consistency of each factor revealed that not all the factors had acceptable levels of reliability. Specifically, although the alpha coefficients and omega were adequately high, the omega hierarchical coefficient resulted considerably low for the specific factor of “Victimization”, suggesting that only a small proportion of variance can be attributed to the specific factor of victim, while a larger proportion can be explained by the general factor of community violence. In other terms, this result would indicate that a pure factor of victimization did not exist over and above the general factor, at least in our sample, but instead victimization was more likely to co-occur with violence witnessing. The experience of witnessing, on the other hand, seemed to account for unique variance in its own separate set of domain-related items.

When examining the predictive relationships between the specific and general factors and two external variables, aggression and anxiety-depression, we got similar findings: The specific factor of “victimization”, particularly, did not achieve a significant level of prediction of either aggression and anxiety-depression. The general factor was instead associated with both outcomes, whilst the pure factor of “violence witnessing” was associated only to aggression.

Of interest, the items 5 and 6 (“How many times has somebody stolen something from your family using violence?”; “How many times has somebody in your neighborhood threatened you or your family?”) did not load significantly on their domain-specific factor, “Victimization”, suggesting that they are not indicators of a pure factor of direct victimization. Given this finding, we hypothesize that they could indicate another form of victimization that is known in the literature as “vicarious” victimization (*know someone who happened to*; Foy & Goguen, 1998). Finally, configural, metric and scalar invariance were established across-sex, pointing to an equivalence between girls and boys and a satisfactory degree of robustness of the psychometric properties of the bifactor model.

Summarizing, the results of this study suggest that community violence exposure through victimization and through witnessing do not represent two distinct domains of experience, at least in our sample. Thus, these findings indicate that we are not able to use the scales of victimization and witnessing, one independently from the other, with wide confidence; instead, they point out the existence of a global scale of community violence, reflecting two (victimization and witnessing) or three (victimization, vicarious victimization and witnessing) strictly correlated experiences of violence within the community.

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CHAPTER III

Study 2

Chapter III

Effortful Control, Exposure to Community Violence and Aggressive Behavior: An Investigation of Cross-lagged relations in Adolescence¹

Adolescents living in urban neighborhoods experience high rates of community violence (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). There is a large body of evidence indicating that exposure to violence has a negative impact on youths' adjustment, particularly externalizing problems (see Fowler et al., 2009). Nonetheless, research into individual correlates and potential risk factors for exposure to violence is still expanding. In particular, in the criminology literature the concept of self-regulation, often defined as self-control (Gottfredson & Hirshi, 1990), has attracted increasing attention, first in relation to personal victimization and later in relation to the witnessing and hearing of violence (Gibson, Morris, & Beaver, 2009). To our knowledge, however, there is no longitudinal study investigating the bidirectional relations among exposure to community violence, self-regulatory abilities, and aggressive behavior or the ways in which they might affect one another over time, although there is widespread recognition of the importance of these issues within the field.

Thus, the current study sought to expand on previous knowledge in two specific ways. First, this is, to our knowledge, the first longitudinal investigation into reciprocal associations among the aforementioned constructs. Furthermore, this is also the first study to use an Italian sample of adolescents when examining relations between self-regulation and aggressive behavior, and self-regulation and community violence, which have already been investigated and sometimes documented in the literature. Thus, the

¹ Some of the work described in this chapter has been previously published in *Aggressive Behavior* (first on line in 2017, June).

present study tested the generalizability of some predicted (and partially confirmed) relations. We used a four-wave, cross-lagged panel design, which allowed us to control for baseline values of all variables in each wave and to examine the transactional nature and likely causal direction of the pathways linking exposure to community violence, self-regulatory abilities, and aggressive behavior. Second, we conceptualized self-regulation in terms of temperamental effortful control (EC; Bridgett, Burt, Edwards, & Deater-Deckard, 2015), which is a more common concept in the developmental literature and somewhat different from the wide criminological concept of self-control (including impulsivity, lack of the ability to delay gratification, preference for simple tasks that do not require persistence, risk seeking, self-centeredness, preference for physical activities to mental ones, and bad temper). Indeed, although both constructs—EC and self-control – involve top-down regulatory processes and are considered to be similar, the theorization of self-control within criminology has disproportionately focused on the role of parental socialization techniques in determining children’s self-regulation abilities rather than considering them as something that is congenital, neurogenetic or brain-based (DeLisi, 2014). Only in recent years, DeLisi and Vaughn (2014) articulated a temperament-based theory of crime and antisocial behavior, encouraging researchers in the criminological domain to consider explicit temperamental aspects (in particular EC and negative emotionality) in their models (see, for example, Baglivio, Wolff, DeLisi, Vaughn & Piquero, 2016).

Community Violence and Aggressive Behavior

Research into the effects of exposure to violence has provided strong support for a cumulative effects model, according to which adolescents’ adaptive functioning declines as exposure to violence accumulates (Lynch, 2003). Social learning theory offers an account of this association, suggesting that youth acquire pro-violence beliefs, attitudes, and behavior from aggressive models in their environment (Bradshaw,

Rodgers, Ghandour, & Garbarino, 2009). In addition, young people growing up in violent neighborhoods may infer from their experience of violence that the world is unsafe and they are unworthy of protection, resulting in negative self-perceptions, feelings of helplessness, and symptoms of anxiety and depression (Bacchini, Affuso, & Aquilar, 2015).

Some researchers have attributed the somewhat varied findings regarding the impact of exposure to community violence on psychological well-being to the differential effects of witnessing violence and being a direct victim of violence (Horowitz, McKay, & Marshall, 2005). Factor analyses of exposure to community violence have demonstrated that victimization and witnessing violence are conceptually dissociable (van Dulmen, Bellison, Flannery, & Singer, 2008). Some of the studies indicate that it is witnessing violence that is linked specifically to externalizing behaviors: It is likely that witnessed violence provides behavioral models for deviant and antisocial behavior, increases the tendency to believe that such behavior is acceptable or even expected, and desensitizes young people to the emotional effects of violence (Mrug & Windle, 2009). In contrast, victimization appears to be more strongly linked to the development of internalizing symptoms (Cooley-Quille, Boyd, Frantz, & Walsh, 2001), although some researchers have concluded that victimization is more strongly associated with all psychological outcomes than is witnessing violence (Fowler et al., 2009). Still others have found no differences between the specific outcomes associated with victimization and witnessing violence (e.g., Ozer & Weinstein, 2004).

Furthermore, to date, little attention has been paid to how externalizing behavior could influence exposure to violence in real life, although similar issues have been examined in the media violence literature (the so-called “selection hypothesis,” in opposition to “socialization hypothesis”; see Moller & Krahe, 2009; Krahe, Busching, & Moller, 2012). The few extant results, mainly from United States, are controversial.

Guerra et al. (2003), for example, reported that aggressive behavior and normative beliefs about aggression were unrelated to subsequent witnessing of community violence. In contrast, Mrug and Windle (2009) found that delinquency was a risk factor for both witnessing and being a direct victim of community violence and other researchers have found similar positive relations between violent behavior/delinquency and witnessing violence (Farrell & Sullivan, 2004) or a combination of witnessing and victimization (Farrell & Bruce, 1997). Such findings corroborate the lifestyle exposure theory (Hindelang et al. 1978), which posits that rather than being random, exposure to violence is closely related to individuals' behavior (or lifestyle)—that engaging in delinquent behavior tends to put young people in situations where they are more likely to witness or become a victim of violence.

The Role of Effortful Control (EC)

EC is defined as the self-regulation component of temperament, and is believed to play a central role in children's adjustment problems and psychopathology. EC reflects individuals' abilities to effortfully modulate their thoughts, emotions, and behavior and is genetically influenced, biologically based, and shaped by socialization and contextual experiences (Rothbart & Bates, 2006). One of the functions of EC is to regulate negative reactivity through the regulation of attention and the inhibition of automatic cognitive and behavioral responses (Eisenberg, Fabes, Guthrie, & Reiser, 2000). EC thus reduces the likelihood of children emitting inappropriate or undesirable responses as a result of high negative reactivity. Low EC has been conceptualized as (i) a direct predictor of externalizing problems in childhood and adolescence (e.g., Archer, Fernandez-Fuertes, & Thanzami, 2010; Eisenberg, Spinrad, & Eggum, 2010; Li, Nie, Boardley, Dou, & Situ, 2015), (ii) a moderator of the association between contextual risk and behavior problems (Lengua, Bush, Long, Kovacs, & Trancik, 2008; Wolff,

Baglivio, Piquero, Vaughn, & DeLisi, 2016) and (iii) a consequence of psychosocial adversity, which in turn affects social competence (Gibson, 2011).

It is noteworthy, however, that when it comes to the specific role of contextual factors, most researchers focusing on self-regulation abilities have examined a wide range of neighborhood characteristics, such as safety or economic disadvantage (e.g., Trentacosta, Hyde, Shaw, & Cheong, 2009), but, to the best of our knowledge, have not considered more specific measures of personal exposure to violence. Researchers refer to the concept of collective efficacy to explain how neighborhood factors influence development of effortful self-regulation abilities in childhood and adolescence. It is argued that children living in neighborhoods with low collective efficacy, that is, low informal social control, social cohesion and trust (Sampson, Raudenbush, & Earls, 1997), receive less support and their behavior is less well monitored; as a consequence of these social mechanisms, they develop low self-control (Wikström & Sampson, 2003). Other researchers have suggested that arousing events such as violence exposure make it more difficult for children, mainly those high in negative emotionality, to develop the regulatory mechanisms necessary to control their reactive emotions; as a result, children exposed to violent contexts should be at greater risk of developing aggressive habits of their own (Guerra, Huesmann, & Spindles, 2003). Also recent evidence from brain imaging studies confirms that early exposure to environmental adversity may have important consequences for the connectivity and activation of brain regions responsible for emotional regulation and inhibitory processes. In a prospective study, for example, Kim et al. (2013) found an association between childhood exposure to chronic stressors and reduced adult neural activity during effortful attempts to regulate negative emotions. Other evidence comes from the study of media violence consequences, in which the amount of television viewing of violent contents or video game experience has been associated with greater impairment in executive functioning

(e.g., Bailey, West, & Andeston, 2010; Hummer, Kronenberger, Wang, Anderson, & Mathews, 2014), even if the direction of this relation during development has not been well established. As Swing and Anderson (2014) pointed out, further research is needed to extend attention to other contexts of violence.

Earlier research has provided limited evidence of bidirectional relations between externalizing behavior and EC, and between EC and exposure to violence. Although EC is generally believed to predict (inversely) externalizing problems, there are some reasons to suppose that high levels of externalizing problems might undermine the development of EC and some evidence that this is indeed the case. Eisenberg et al. (2015) argued that children with relatively high levels of externalizing symptoms might elicit negative responses from their social environment and be less likely to create or take advantage of opportunities to learn attentional and behavioral self-regulation skills. For example, children high in externalizing problems might elicit punitive and inconsistent parenting, or become involved in dysregulated interactions with peers, which would in turn hinder their development of EC. However, these findings are based on research on toddlers and pre-school or elementary school children, and there is a relative lack of knowledge about bidirectional relationships between EC and aggressive behavior in adolescence. Some other evidence comes from the criminology literature, where top-down self-regulation capacities are operationalized in terms of low self-control (Arneklev, Grasmick, Tittle, & Bursik, 1993). Recently Murray, Obsuth, Eisner and Ribeaud (2016) reported a cross-lagged effect linking aggressive behavior at age 15 years to lower self-control two years later, but not *vice versa*. In contrast, de Kemp et al. (2008) found that greater delinquent behavior, but not aggression, predicted lower self-control in early adolescent boys, but not in girls, six months later.

In addition to evidence of the negative behavioral correlates of low self-control, several researchers have found that the probability of victimization in the community is

negatively associated with self-control and that individuals with low self-control are at risk of repeated victimization (Schreck, Stewart, & Fisher, 2006). According to Gottfredson and Hirschi's self-control theory (1990), individuals with low self-control tend to gravitate towards activities that bring short-term pleasure and do not consider the long-term consequences of their behavior (Gibson, 2011); hence, they continue to be victims of violence because they continue to follow a risky lifestyle (e.g., delinquency, drug use, socializing with delinquent peers), even after the direct experience of violence (Schreck et al., 2006). However, self-control has been found to significantly predict victimization while controlling for specific forms of offending behaviors (Schreck, 1999; Schreck et al., 2006; Stewart, Elifson, & Sterk, 2004), delinquent peer associations (Schreck, Wright, & Miller, 2002), risky lifestyles (Schreck et al., 2002; Stewart et al., 2004), previous victimization experiences (Schreck et al., 2006), and social bonds (Schreck et al., 2006). In addition, neighborhood disorganization has been found to moderate the relation between self-control and risk of victimization, such that low self-control enhanced the likelihood of experiencing violent victimization only in low or average, but not high, disadvantaged communities (Gibson, 2011; Holt, Turner, & Lyn Exum, 2014). Taking this evidence as their starting point, Gibson et al. (2009) argued that "hanging out" in high-risk settings makes it more likely that individuals will both witness violence and become direct victims.

The Present Study

The central goal of the present study was to examine the interplay between adolescents' EC, exposure to community violence in a high-risk context, and externalizing behavior using a longitudinal panel design. Consistent with the above arguments and findings, our hypothesis was that EC would inversely predict aggressive behavior. In addition, because relevant bidirectional empirical data are lacking, we examined whether aggression also inversely predicted EC in the present adolescent

sample. Second, we expected positive associations between violence exposure and aggressive behavior, with violence exposure predicting aggressive behavior, and examined whether a bidirectional relation (with aggression also predicting violence exposure) would be found. Third, nonetheless, we predicted that not only would violence exposure relate to low EC and predict it longitudinally, but also EC would be inversely related to violence exposure over time through the mediation of aggressive behavior. After establishing the direct paths in the models, we also investigated whether the effects of each variable assessed at a given time (e.g, EC at T1) on the same nonadjacent variable (e.g., EC at T3) were longitudinally mediated by other variables (i.e., aggressive behavior at T2). In addition, because relations of age and gender to the variables in our study have sometimes been noted (e.g., Farrel & Bruce, 1997; Lengua et al., 2008), we controlled for these variables in the analyses.

METHODS

Participants

Overall, the study design included 4 data points (1-year intervals). At T1, the sample consisted of 745 adolescents (339 Males) ranging in age from 11 to 15 ($M_{\text{age}} = 12.56$, $SD = 1.61$). They were from the main middle and high schools of Arzano, near Naples, that were involved in 2013 in a still ongoing longitudinal study aiming at investigating the determinants and pathways of typical and atypical development from early to late adolescence. The neighborhood served by these schools is characterized by serious social problems, such as high unemployment, school-dropout, and the presence of organized crime (CNEL, 2014).

Attrition and missing data analysis

Participants (745) provided self-reports over four years (one-year intervals). Twenty-two (3%) of T1 participants did not participate at T2; 43 (5.8%) did not participate at T3; and 134 (18%, total attrition rate) did not participate at T4. The total

attrition rate was mainly due to the absence of adolescents from school at assessments. The Little's test (Little, 1988) as implemented in SPSS 21 resulted in a significant chi-square ($\chi^2 = 349.954$, $df = 298$; $p = .02$). Thus, the hypothesis of data missing completely at random (MCAR) was not confirmed. Overall, t-test analyses indicated that participants who were missing over time had lower levels of effortful control (t ranged from 2.8 to 3, $p < .05$) and higher levels of community violence exposure (t ranged from -2.6 to -2, $p < .05$) at previous waves. No differences in percentages were found with regard to gender and school grade.

Procedure

Data collection took place during spring, 2013 (T1), 2014 (T2), 2015 (T3), and 2016 (T4). Parents' and adolescents' written consents were obtained prior to the administration of questionnaires, which was conducted during classroom sessions by trained assistants. To reassure participants about reporting sensitive information and to encourage honest reporting, a complete guarantee of confidentiality was emphasized. Additionally, they were informed about the voluntary nature of participation and their right to discontinue at any point without penalty.

Measures

Exposure to community violence. Exposure to community violence was self-reported using two adapted scales for the local context (Bacchini, Miranda, & Affuso, 2011) of the Community Experience Questionnaire by Schwartz and Proctor (2000). The factor structure of the scale has been illustrated in Chapter 2. Based on the result that witnessing and victimization are not two distinct constructs in our sample, a global score of victimization and witnessing of violence were computed averaging the item scores, with each missing value replaced by the mean of the respondent's scores on the other items in the scale. All respondent had at least 80% non-missing values (α ranged from .85 to .88; ω_h ranged from .64. to .64).

Effortful control. To evaluate temperamental EC, adolescents were asked to rate items (1 = *almost never true* to 5 = *almost always true*) from the long version of the Early Adolescent Temperament Questionnaire - Revision (EATQ-R; Ellis & Rothbart, 2001). The measure was computed by averaging items ratings of the activation control (i.e., “if I have a hard assignment to do, I get started right away”), attention control (i.e., “I pay close attention when someone tells me how to do something”), and inhibitory control (i.e., “when someone tells me to stop doing something, it is easy for me to stop”) scales, after recoding inversely formulated items. All respondents had at least 80% non-missing values; missing values were replaced with the average of the respondent’s scores on the other items in the scale (α ranged from .76 to .78 across all assessments; ω_h ranged from .60 to .69).

Aggressive behavior. Ratings of aggression were obtained using the aggression scale of the Youth Self Report Questionnaire (YSR 11/18; Achenbach & Rescorla, 2001). Adolescents were asked to rate (0 = *not true*, 1 = *somewhat or sometimes true*, or 2 = *very true or often true*) the extent to which they had exhibited a series of problem behavior during the last 6 months (e.g., “I physically attack people”; α ranged from .78 to .88; ω ranged from .84 to .87). All respondent had at least 80 percent non-missing values; scale scores were computed by averaging the item scores, with missing item scores replaced with the mean of the respondent’s scores on the other items in the scale.

Control variables. Demographic data were obtained from the participants. Students reported their gender (0 = *female*, 1 = *male*) and age.

Analytic strategy

All the analyses were run in Mplus 7.2. Missing data and non-normality of distributions were handled by using the maximum likelihood estimation with robust estimators (MLR; Muthén & Muthén, 2012). A four-wave Random Intercept Cross-Lagged Panel Model (RI-CLPM) was performed to test the relations among all three

study variables across time. Unlike the traditional cross-lagged panel design, the RI-CLPM takes into account the fact that there are stable, trait-like individual differences that endure over time. The strategy consists of including a random intercept that partials out the between-person stability over time, such that the lagged coefficients represent within-person patterns of change (Hamaker, Kuiper, & Grasman, 2015).

Because only effortful control is considered to have trait like qualities with relatively stable individual differences over time, we included a random intercept for this variable only; the mean structure for aggressive behavior and exposure to community violence controlled for the temporal stability of aggressive behavior and exposure to community violence (Hamaker et al., 2015). Gender and school grade were covaried from all variables at each time.

We used the comparative fit index (CFI; Bentler, 1990) and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) to determine model fit: A CFI $\geq .90$, and RMSEA $\leq .08$ indicate a model's acceptable fit to the data (Hu & Bentler, 1999). The models included correlations among concurrent constructs at all time points, autoregressive paths for each construct across time, and all cross-lagged paths.

RESULTS

Preliminary analysis: Descriptive Statistics

Means, standard deviations, skew, and kurtosis values for all study variables are shown in Table 1. Zero-order correlations with MLR estimator are presented in Table 2.

Table 1. Descriptive statistics

	Means	SD	Skewness	Kurtosis
1. EC T1	3.41	.50	.50	.07
2. CVE T1	1.70	.68	1.47	2.15
3. AB T1	.42	.30	.95	.95
4. EC T2	3.44	.49	.35	-.15
5. CVE T2	1.66	.64	1.58	2.61
6. AB T2	.36	.31	1.35	2.64
7. EC T3	3.38	.49	.51	-.13
8. CVE T3	1.60	.64	1.58	2.54
9. AB T3	.41	.32	.89	.35
10. EC T4	3.43	.49	.55	-.15
11. CVE T4	1.58	.65	1.90	4.57
12. AB T4	.45	.33	.96	1.08

Note. EC, Effortful control; CVE, Community Violence Exposure; AB, Aggressive Behavior.

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 2. Zero-order correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. EC T1	1													
2. CVE T1	-.18***	1												
3. AB T1	-.41***	.38***	1											
4. EC T2	.60***	-.21***	-.36***	1										
5. CVE T2	-.16***	.42***	.25***	-.23***	1									
6. AB T2	-.30***	.19***	.41***	-.45***	.29***	1								
7. EC T3	.54***	-.15***	-.31***	.66***	-.19***	-.35***	1							
8. CVE T3	-.11***	.41***	.26***	-.22***	.49***	.28***	-.22***	1						
9. AB T3	-.29***	.11**	.40***	-.37***	.19**	.58***	-.42***	.27***	1					
10. EC T4	.49***	-.19**	-.31***	.54***	-.15***	-.26***	.65***	-.22***	-.31***	1				
11. CVE T4	-.12***	.32***	.20***	-.18***	.38***	.24***	-.22***	.58***	.29***	-.23***	1			
12. AB T4	-.22***	.26***	.42***	-.32***	.25***	.49***	-.36***	.35***	.59***	-.37***	.46***	1		
13. Gender	.02	.04***	.00	.01	.03*	-.01*	.00	.05***	-.01	-.01	.05***	-.01	1	
14. School grade	-.04***	-.04***	.02**	-.05***	.01	.03***	-.05***	.01	.04***	-.03***	.01	.02**	-.19***	1

Note. EC, Effortful control; CVE, Community Violence Exposure; AB, Aggressive Behavior.

* $p < .05$. ** $p < .01$. *** $p < .001$

In general, the measures of exposure to community violence and aggressive behavior had high levels of skew and kurtosis, indicating a non-normal distribution of data. As shown in Table 2, negative correlations were generally found between EC and aggressive behavior, concurrently and across time. Concurrent negative correlations were also found between EC and exposure to community violence. In general, males were higher in violence exposure ($r = .03$ to $r = .04$, $p < .05$, and $.001$); middle school participants were higher in effortful control ($r = -.03$ to $r = -.04$, $p < .001$).

Test of Mean Invariance

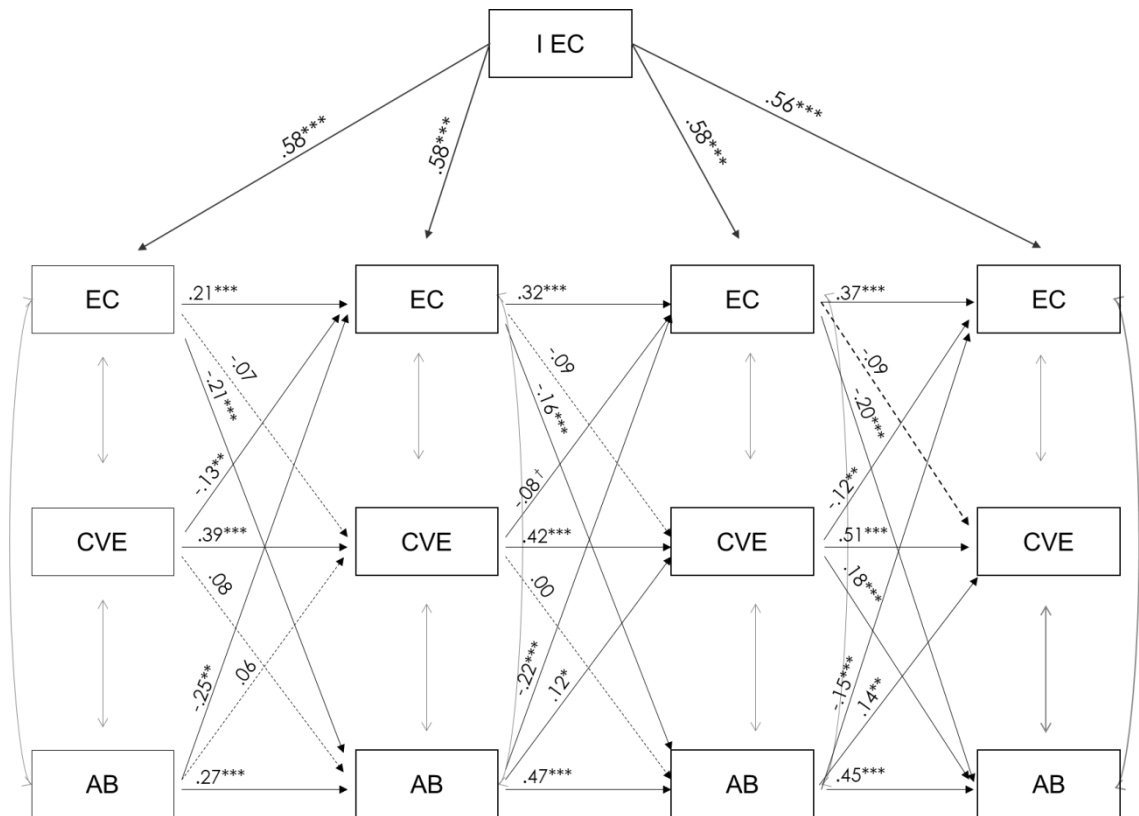
As suggested by Hamaker et al. (2015), before to implement the RI-CLPM, we tested whether all study variables were equal across time. Models in which the group means do not change over time facilitate interpretation, although time-invariant means are not a prerequisite for testing RI-CLPM. We then fit a model in which the means of each variable were constrained over time controlling for school grade and gender, while the covariance structure was unconstrained. The $MLR\chi^2$ was 49.553 ($df=9$) with a significant p value ($p < .001$), suggesting that means were not equal over time (note that the model in which the means are not constrained over time is actually the saturated model. Hence, the chi-square test of the model we specified could also be thought of as the chi-square difference test between the model with constrained means and the model without constrained means). Considering the modification indices, we released the means of aggressive behavior at T2 and T4 (the former was lower and the latter was higher than others), and community violence at T1 and T2 (showing higher values with respect to the other time points): This adjustment led to a significant improvement of the model, $MLR\chi^2(5, N = 745) = 9.077$, $p = .11$.

Random Intercept Cross-Lagged Panel Modeling

To examine cross-lagged relationships between effortful control, community violence and aggressive behavior over time, we estimated the path model shown in

Figure 1. Based on the previous analysis, means of community violence exposure were fixed to be equal across time, except for wave 1 and wave 2; similarly, means of aggressive behavior at T1 and T3 were fixed to be equal, while freeing means of T2 and T4.

Figure 1. The hypothesized Cross-lagged Panel Model



Note. I EC, Effortful control Random Intercept; EC, Effortful control; CVE, Community Violence Exposure; AB, Aggressive Behavior.

Solid lines represent significant paths. Dashed lines represent nonsignificant paths. Reported coefficients refer to standardized estimates. For the sake of simplicity, control variables are omitted.

* $p < .05$. ** $p < .01$. *** $p < .001$.

The model showed an adequate fit to the data, $MLR\chi^2(31, N = 745) = 115.98, p < .001$; CFI = .97; RMSEA = .06, 90% C.I. [.05, .07]. The standardized coefficients for the final model are presented in Figure 1. Overall, all the autoregressive paths were significant; lagged parameters indicated a general stability of effects over time. In regard to cross-lagged paths, EC inversely predicted aggressive behavior one year later at each time point, and this relation was reciprocal across all waves. Also, the path

from exposure to community violence to EC was significant and negative from T1 to T2 and from T3 to T4, whereas the path from T2 to T3 was only marginally significant ($p = .07$). EC did not directly predict community violence across time. The cross-lagged paths between aggression and community violence were significant at all times, but from T1 to T2, whereas community violence predicted aggression only from T3 to T4.

Finally, we examined whether the negative relation between EC and community violence was mediated through aggressive behavior and found two significant standardized indirect effects: one from low T1 EC to increasing of T3 violence exposure through aggressive behavior at T2, and one from low T2 EC to increased T4 violence exposure through T3 aggressive behavior, β s = $-.03$ and $-.02$; t s = -2.00 and -2.17 , p s = $.045$ and $.03$, 95% C.I.s $[-.05, -.003]$ and $[-.043, -.006]$, respectively. Also, we found an indirect positive path between community violence at T1 and aggressive behavior at T3 through lower EC at T2, $\beta = .02$; $t = 2.46$, $p = .014$, 95% C.I. $[.004, .038]$. Furthermore, we tested whether the relation between earlier aggressive behavior and later aggressive behavior was mediated through low EC or high community violence longitudinally. The results suggested that only EC and aggressive behavior might influence reciprocally the development of each other. Specifically, the standardized indirect effects of T1 aggressive behavior on T3 aggressive behavior through low EC at T2 and of T2 aggressive behavior to T4 aggressive behavior through low EC at T3 were significant (β s = $.04$, t s = 2.45 and 2.84 , p s = $.014$ and $.005$, respectively), and the associated confidence intervals did not include zero, 95% C.I.s $[.008, .067]$ and $[.013, .071]$, respectively, supporting mediation. The mediating role of community violence between early and later aggressive behavior was not totally confirmed ($p = .084$).

Control variables. Overall, adolescent gender positively predicted community violence (β ranging from $.07$ to $.09$, $p < .05$) with males scoring higher than females. Middle school participants scored higher on EC at each time point except for T4 (β ranging

from $-.15$ to $-.20$, $p < .001$) and lower on aggressive behavior at T1 ($\beta = .13$, $p < .001$), T2 ($\beta = .13$, $p < .001$) and T3 ($\beta = .08$, $p < .01$).

DISCUSSION

It is widely recognized that self-regulation processes and violent contexts play an important role in determining whether children develop aggressive behavior (Archer et al., 2010; Chang, Wang, & Tsai, 2016). It is less clear how self-regulation and violence exposure are interrelated and additively predict youths' aggression, and how all three constructs are linked over time. Several researchers have argued that low self-regulation capacities increase the likelihood that individuals will engage in delinquent behavior (Pratt & Cullen, 2000; Vazsonyi, Mikuska, & Kelley, 2017), independent of ethnicity (Vazsonyi, Jiskrova, Ksinan, & Blatny, 2016), and become victims of violent crime, and choose risky environments or situations where the likelihood of violence is high (Gibson, 2011; Schreck et al., 2006). However, to the best of our knowledge there has been no systematic, longitudinal investigation into the dynamic interplay among adolescents' self-regulation ability (in our study, EC), exposure to community violence, and aggressive behavior. We attempted to address this gap a longitudinal panel model.

Consistent with expectations, our findings regarding the association between EC and aggressive behavior, within and across time, corroborates the general theory of crime (Gottfredson & Hirschi, 1990) and earlier research suggesting that low self-regulation is a strong predictor of externalizing behavior in adolescence (de Kemp et al., 2008; Wang, Chassin, Eisenberg, & Spinrad, 2015). Furthermore, our results provide partial support for the hypothesis that aggressive behavior and EC are bidirectionally related, with aggression related to a reduction in EC. Previous empirical research examining the possibility that the association between self-regulation and aggressive behavior is bidirectional in adolescence comes from the criminology domain (de Kempe et al., 2008; Murray et al., 2016). As suggested by Ge and Conger (1999), the reciprocal

relation between self-control and aggressive behavior might reflect a dynamic personality development process: Although earlier temperamental characteristics contribute to the development of emotional and behavioral problems during adolescence, the authors argued that repeated experiences in both emotional and behavioral domains that adolescents make, in an effort to expand their roles in a more complex social environment, coupled with rapid physical growth and psychological changes, contribute to the solidification of more enduring personality characteristics across the years of adolescence. Indeed, there is substantial agreement among researchers that in adolescence, self-regulation abilities should not be regarded as a stable, immutable feature of personality (Burt, Simons, & Simons, 2006). One other possibility discussed primarily in the developmental literature where the focus is on temperamental EC, is that there are other mechanisms through which aggressive behavior could affect EC, including, for example, the dysregulation of interactions with parents or peers (Eisenberg et al., 2015).

The results provided only partial support for the prediction of aggressive behavior from violence exposure (we found only one direct effect of exposure to violence at T3 on aggressive behavior at T4). Instead, unexpectedly, aggressive behavior longitudinally predicted exposure to community violence across each time point, except for the link from T1 to T2. The several longitudinal studies carried out to date have failed to clearly identify the direction of the associations between exposure to community violence and externalizing behaviors. Although there is a large number of rigorous empirical studies investigating the longitudinal relation of exposure to violence on subsequent externalizing problems while controlling for the previous level of problem behavior, the results have been mixed; there has been only a limited amount of research suggesting that externalizing behavior influences community violence and *vice versa*. Like those of Mrug and Windle (2009), our findings seem to confirm that young

people who engage in aggressive and delinquent behavior are more likely to put themselves in high-risk situations in which they are more likely to witness violence or to be victims of violence.

Furthermore, we found evidence supporting the prediction that exposure to violence was directly related to EC. In general, other studies focusing on the environmental or contextual correlates and predictors of self-regulation abilities have underscored the significant role of exposure to community violence, especially in adolescence, or have not examined EC specifically. Raver, Blair, and Willoughby (2013), for example, found that family poverty predicted worse executive functioning among 4-years olds, whereas Sharkey, Tirado-Strayer, Papachristos, and Raver (2012) found that exposure to community violence was associated with reduced impulse and attentional control, even if the sample included preschoolers.

Other interesting issues for discussion come from the analysis of indirect effects. We found that EC at T2 mediated the relation between community violence exposure at T1 and aggressive behavior at T3; this finding seems to suggest that one of the mechanisms through which community violence exposure could increase aggressive behavior is by reducing EC (Guerra et al., 2003). Furthermore, it is worth noting that EC was linked to violence exposure only through the mediation of aggressive behavior. This result is in line with several longitudinal studies (e.g., Gibson et al., 2009) that corroborate criminological research showing that young people with low self-control are more likely to engage in delinquent behavior, to associate with other delinquent youth, to become direct victims of violence and to put themselves in situations where violence is likely (Pratt & Cullen, 2000; Schreck et al., 2006). According to Gottfredson and Hirshi's general theory, in fact, individuals who are more impulsive tend to engage in self-gratifying behavior on the spur of the moment without carefully considering the consequences of their actions, including the importance of exercising caution to protect

themselves; similarly, having a short temper enhance the likelihood to instigate and escalate rather than defuse potentially dangerous situations given the individual propensity toward anger and aggression (Pratt, Turanovic, Fox, & Wright, 2014).

Also of importance, analysis of indirect effects showed only a marginal mediating role of community violence at T3 in the relation between earlier and later aggression, suggesting that part of the change observed in aggressive behavior over time was dependent on the increase of community violence. The more adolescents were aggressive, the more they were exposed to violence in the community, which in turn predicted an increase in their tendency to engage in acts of aggression and externalizing behavior, perhaps due to emotional desensitization (Kennedy & Ceballo, 2016), an increasing belief in the normative nature of violence (Crick & Dodge, 1994), or a reduction in EC, as described above and partially confirmed in our study. Further investigation is needed to confirm this result. In addition, increases in aggressive behavior from T1 to T3 were mediated by low EC at T2, a finding consistent with the view that the two constructs reinforce each other over time: Engaging in aggression might increase adolescents' disinclination to inhibit their impulses, which in turn encourages more externalizing behavior.

Overall, the substantial relations among self-regulation abilities, aggressive behavior, and exposure to violence within the community illustrate the importance of considering interventions that target the early stages of development of self-regulation or are aimed at reducing juvenile aggression (DeLisi & Vaughn, 2014), which are both strong precursors of exposure to violence. Our results, furthermore, call attention to the need to intervene before or during early adolescence, when efforts are more likely to be successful than later, after problem behavior and lifestyle tendencies have become inevitably overdetermined (Dodge & Pettit, 2003). We endorse the speculation by several scholars that reducing risk factors for maladjustment and preventing or reducing

externalizing behavior in young people is likely to reduce their exposure to violence, and hence to result in more adaptive functioning (Mrug & Windle, 2009).

Of course, future research needs to identify other mechanisms through which individual, familial (e.g., parental warmth or supervision), and neighborhood-level characteristics (e.g. collective efficacy) work independently and synergistically to increase maladjustment and exposure to violence. Gibson, Fagan and Antle (2014), for example, explored the possibility that adolescents could be efficacious in reducing their exposure to violence in communities, finding a strong negative association of youths' "street efficacy" (Sharkey, 2006) with violent victimization. Otherwise stated, the perceptions that adolescents have of their abilities to choose wisely behavior to engage in, or whom to befriend, might make them better able to avoid violent confrontations and less likely to become victims of violence, especially in highly disadvantaged neighborhoods. Similarly, Anderson's (1999, p. 107) "code of the streets" could be helpful in explaining why children living in multiply disadvantaged neighborhoods are more likely to be exposed to violence. As the author argued, indeed, macrostructural patterns of disadvantage, racial inequality, and limited economic opportunities lead to a sense of hopelessness and cynicism about societal rules and their application, thereby resulting in a street culture that undermines mainstream conventional norms and shapes values that influence violence among adolescents. Furthermore, exposure can occur in various contexts (e.g., family, school), which is not a factor we considered in our study. Investigating multiple contexts should determine whether (i) adolescents exposed to more violence in their neighborhood are also more likely to be exposed to violence in other contexts and, (ii) if so, whether individual propensities (e.g. low self-control) help to account for this relation. Future research could also investigate how neighborhood and individual factors potentially interact to exacerbate adjustment problems (Lengua et al., 2008).

Some limitations of our study must be acknowledged. First, we relied solely on adolescents' self-reports. Adolescents have direct knowledge of their own experiences and behavior; however, in future research, observational or multiple-source data, as well as objective neighborhood data, could be used to provide more objective information. Second, our results need to be replicated in other geographical areas and in areas with different neighborhood characteristics to determine their generalizability. For example, Mrug and Windle (2009) found that individuals' aggression was a stronger predictor of witnessing violence in the context of a safer, less violent neighborhood, whereas the relation was not significant in poorer, more disadvantaged neighborhoods, perhaps because, as the authors argued, a more random pattern of witnessing violence occurs when rates of violence are high. Third, our study focused on the number of times violence occurred during the last year; we omitted to collect data on other important dimensions of violence, such as severity of the violence or the relation between witness or victim and perpetrator, which may be relevant to the severity of the outcomes (Lynch & Cicchetti, 1998). A potentially important avenue for future research is the investigation of whether (1) witnessing violence but not being a direct victim and (2) being a direct victim but not a witness shares the same etiology and correlates as cases in which the individual is both a witness of violence and a victim.

In conclusion, the results of this study support the view that the relation between adjustment problems and exposure to community violence is transactional, as is the relation between EC and externalizing problems (although the relations of externalizing to community violence and of EC to externalizing were more consistent than *vice versa*). Moreover, although there was no evidence that EC directly predicted exposure to violence (and scant evidence of the reverse prediction), results showed that EC was indirectly related to exposure to violence through externalizing problems, and mediated the relation of witnessing community violence to aggression, supporting a complex role

of EC in the development of violence and other externalizing problems. These complex relations support the view that interventions in regard to any of the three variables discussed may have effects on the other two across time.

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CHAPTER IV

Study 3

Chapter IV

Developmental trajectories of moral cognitive distortions in adolescence and their associations with exposure to community violence, low effortful control and aggressive behavior: A Growth Mixture Modeling Approach

Social-cognitive theories posit that people act upon their interpretation of social events. Over the past three decades at least two similar information-processing models have been proposed to explain the psychological processes underlying social information processing (e.g., Dodge, 1986, Crick & Dodge, 1994; Huesmann, 1988, 1997). Although these models differ in their details, both hypothesize a similar core of information processing, including operations of encoding and interpreting social cues, selecting a goal and behaviors for attaining it, and evaluating the behaviors on multiple dimensions; in addition, both draw from Bandura's (1977, 1986) earlier formulations of cognitive processing in social learning as well as Berkowitz's (1990) neo-associationist thinking.

Bandura's (1986) social-cognitive formulations view social behavior as under the control of internal self-regulating processes and situational circumstances. What is important is the cognitive evaluation of events which take place in the child's environment, how the child interprets these events, and how competent the child feels in responding in different ways; these cognitive competencies, however, are developed and modified by social influences, including conditioning and observational learning. Berkowitz (1990), while not disputing the importance of internalized standards, has emphasized the enduring associations among affect, cognition, and situational cues,

arguing that such learned associations produce stable behavioral tendencies whenever specific situational cues occur.

Evidence indicates that children who grow up in a violent environment tend to see the world as a hostile and dangerous place (e.g., Lochman & Dodge, 1994; Schwartz, Dodge, Pettit, & Bates, 2000), and violence itself as a useful means for conflict resolution (Dodge, Coie, & Lynam, 2006): The internalization of these schemas about the world, along with the development of normative beliefs about violence amplify, in turn, the risk for behaving aggressively. There is now a large body of research showing how models of social information processing can be applied to explain aggression and delinquent behavior (Dodge et al., 2015). In terms of such cognitive process models, moral cognitive variables such as self-serving cognitive distortions well represent schemas that influence the individual's encoding, interpretation, attribution, and evaluation - and thereby impact on the individual's behavior - in social situations (Barriga, Gibbs, Potter, & Liau, 2001). However, whilst there exists strong evidence supporting the link between self-serving cognitive distortions and aggressive (physical and verbal) and delinquent (in terms of important violation of social norms that harms other people) behavior (see, for example, the review by Gini, Camodeca, Caravita, Onishi, & Yoshizawa, 2013), only a few studies have systematically examined the environmental precursors of biases affecting moral cognition (Hyde, Shaw, & Moilanen, 2010).

Nonetheless, it is noteworthy that the processing of information for behaving in a specific way is a function of executive capabilities, which support the exhibition of self-control by directing attention, organizing information, delaying impulsive action and moderating emotional responses (Wikström & Treiber, 2009). This is a line the contemporary research is dealing with; led by Wikström, the idea is to incorporate morality into the self-control theory of crime (Gottfredson & Hirshi, 1990).

Starting from these considerations, the current investigation was intended to fill the gap in the literature by integrating the study of exposure to community violence and effortful control abilities as explaining factors of specific longitudinal trajectories of moral cognitive distortions. We also considered their impact on the increase of aggressive behavior across time. The final aim was to provide evidence that a process of cognitive desensitization occurs in response to repeated experiences of violence and as a consequence of low effortful control. Such cognitive desensitization, indeed, would result in more approving violence beliefs, in more positive moral evaluations of aggressive acts, and in more justification for inappropriate behavior inconsistent with social and an individual's moral norms (Huesmann & Kirwil, 2007).

Cognitive distortions in the framework of moral developmental delay

Following Gibbs and colleagues' "three Ds" formulation (Gibbs, Potter, Barriga, & Liao, 1996), aggressive or deviant adolescent are generally characterized by a (i) delay in moral development, (ii) self-serving cognitive distortions, and (c) social skill deficiencies. Starting from a re-conceptualization of Kohlberg's moral developmental theory, indeed, Gibbs assumes that the sequence of developmental stages identified by Kohlberg is not an obligatory process and a moral delay can happen, with the persistence of the earliest levels of morality in adolescence and adulthood.

As pointed out by Carducci (1980) and reported by Gibbs (2013), in this stage of arrested moral development, the antisocial adolescent displays cognitive biases that make her/him judging the moral transgression as acceptable and does not feel her/his deviant behavior as dissonant with common moral standards; she/he "is fixated at a level of concern about getting his own throbbing needs [i.e., impulses and desires] met, regardless of effects on others", seem to "blame others for his misbehavior" and "does not know what specific steps [in a social conflict]... will result in [the conflict's] being solved [constructively]" (pp. 157–158).

Such inaccurate or biased ways of attending to or conferring meaning upon experiences are known as “self-serving cognitive distortions” (Barriga et al., 2001). Organizing the extant literature on cognitive distortions, Gibbs, Potter and Goldstein (1995) introduced a four-category typological model of self-serving cognitive distortions: Self-Centered, Blaming Others, Minimizing/Mislabeling, and Assuming the Worst. Self-Centered cognitive distortions are defined as attitudes where the individual focuses on his/her own opinions, expectations, needs, and rights to such an extent that the opinions or needs of others hardly ever or never are considered or respected. Blaming Others involves cognitive schemas of misattributing the blame for one's own behavior to sources outside the individual (i.e. external locus of control). Minimizing is defined as distortions where the antisocial behavior is seen as an acceptable, perhaps necessary, way to achieve certain goals. Mislabeling is defined as a belittling and dehumanizing way of referring to others. Finally, Assuming the Worst represents cognitive distortions where the individual attributes hostile intentions to others, considers the worst-case scenario as inevitable or sees his/her own behavior as beyond improvement.

There are several aspects that differentiate Gibbs and colleagues' from other theoretical accounts of self-serving cognitive distortions (e.g., Bandura's moral disengagement, or Sykes and Matza's neutralization theory). Specifically, a first consideration one might do in comparing Bandura's moral disengagement perspective with Gibbs' self-serving cognitive distortions concerns the moral functioning they hypothesized being behind the cognitive mechanisms which lead to behave (or not behave) aggressively. Indeed, according to Bandura, the moral (or immoral) agency depends on self-regulatory processes of individual moral standards and anticipatory self-sanctions, that needs to be activated for coming into play (Bandura, 2002), rather than depending on a moral reasoning. As a result, selective activation and

disengagement of internal control would permit different types of conduct with the same moral standards. Self-serving cognitive distortions as theorized by Gibbs, instead, seem to be relatively stable cognitive mechanisms that, once internalized, the individual applies in the interaction with the social environment.

Furthermore, the conceptualization of the relationship between cognitive distortions and antisocial or aggressive behavior is supposed to be quite different across models. Whilst other theories posit that they precede (or occur during) antisocial behavior, Gibbs suggests the possibility of multidirectional causality, so that self-serving cognitive distortions may precede and/or follow behavior. Specifically, Barriga and Gibbs (1996) divided self-serving cognitive distortions into two types: primary cognitive distortions, that are represented by self-centered attitudes (the category Self-Centered) and secondary cognitive distortions (the categories Blaming Others, Minimizing/Mislabeling, and Assuming the Worst). The primary cognitive distortions stem from the egocentric bias most prominently found among young children and reflecting less mature moral judgment stages as defined by Kohlberg (1984) and they are thought to precede engaging in immoral behavior. An example of a primary cognitive distortion could be the following quote from a male burglar: "... My idea in life is to satisfy myself to the extreme. I don't need to defend my behavior. My thing is my thing. I don't feel I am obligated to the world or to nobody" (Samenow, 2004, p. 86).

The secondary cognitive distortions support the primary cognitive distortion and have been characterized as pre- or post-transgression rationalizations that serve to neutralize potential feelings of guilt or feelings of empathy with the victim, in order to prevent damage to the self-concept resulting from one's own antisocial behavior. Secondary cognitive distortions can be illustrated by the words of another individual

described by Samenow (2004, p. 172): “Just because I shot a couple of state troopers doesn’t mean I’m a bad guy”.

Furthermore, in their attempt to integrate different neutralization concepts in a unique moral neutralization approach, Ribeaud and Eisner (2010) noticed that self-serving cognitive distortions as conceptualized by Gibbs and colleagues did not totally overlap with Sykes and Matzda’s neutralization techniques and Bandura’s moral disengagement, in that they are theorized to more specifically conflate moral rationalizations with biased information processing. According to the authors, Assuming the worst, in particular, that partly overlaps Bandura’s concept of external attribution of blame, really overcomes such concept including also the attribution of hostile intentions to others, typical of social information processing models. Also, the authors pointed out how Gibbs’ primary cognitive distortions are very similar to the Gottfredson and Hirshi’s concept of self-control (1990), in the specific meanings of self-centeredness and impulsivity, that are not contemplated in the other formulations.

Could effortful control and community violence be conceptualized as precursors of cognitive distortions development?

According to the social cognitive perspective, there are predisposing factors that may contribute to the developmental process of morality and to the emergence of certain specific cognitive routines, scripts, and schemas. However, these cognitions develop through interactions of the child with the environment and are designed to respond to different environmental situations (Huesmann, 1998).

So, why people behave aggressively? As posited by The Situational Action Theory (Wikström, 2006):

- (i) people habitually choose to harm someone (or not harm someone) if they see doing so (or not doing so) as the only action alternative;

(ii) people see violence as the only alternative when they do not see violence as wrong, as a result of a *high propensity* to engage in aggressive behaviors and *high exposure* to environmental inducements to behave in that way.

More specifically, people's propensity to act aggressively depends on their morality (weak moral rules that cannot refrain individuals from immoral behavior) and their abilities of effortful control (i.e., inhibition, attention to other factors and alternatives) when facing with strong negative emotions (e.g., anger) in absence of strong deterrent emotions (e.g., shame or guilt), whereas environmental settings conducive to act with violence are those whose moral context and deterrent qualities may encourage violence.

How contexts may influence the acquisition of pro-violence attitudes is well explained by observational learning theory. What children learn from models they observe within their daily contexts are not only specific behaviors, but also complex social scripts that, once established because of repeated exposure, are easily retrieved from memory to serve as cognitive guides for behavior (Dodge et al., 2006). Through inferences they make from repeated observations, children also develop beliefs about the world in general and about what kind of behavior is acceptable. So, it is theorized that being exposed to violent contexts increases the likelihood that children will (i) incorporate aggressive social scripts, (ii) develop hostile and unsafe world schemas for interpreting environmental cues and making attributions about others' intentions (iii) acquire normative beliefs about violence, suggesting the appropriateness of behaving aggressively (Huesmann, 1998). This process resulting in more approving violence beliefs, more positive moral evaluations of aggressive acts, and in more justification for inappropriate behavior inconsistent with social and an individual's moral norms been defined by Huesmann & Kirwil (2007) "cognitive desensitization to violence". Indeed, although desensitization is more properly used to refer to emotional changes that occur with repeated violence exposure, according to the authors, it is possible to talk about

“desensitization” also when changes regard cognitive aspects that lead the individual to develop stronger pro-violence attitudes (i.e. attitudes approving violence as a means of regulating interpersonal contacts; Huesmann, 1998). Consistent with this idea, several years before Ng-Mak and colleagues (2002) formulated a “pathologic adaptation” model according to which repeated exposure to community violence leads to a normalization of violence through moral disengagement, which, in turn, makes youth less emotional aroused in response to violence on one hand, and facilitates aggressive behavior on the other hand. However, this crucial role of moral disengagement as intervening mechanism between exposure to violence and further emotional and behavioral responses has not been tested empirically in a systematic way.

Turning to the empirical research, studies that investigate morality together with the capacity for effortful control are not common. It is a recent line the contemporary research is dealing with: In particular, the hypothesis that researchers have tested is that morality is the fundamental cause of deviant behavior as it regulates self-regulation. That is, the effect of self-control, which has been widely confirmed, has been found to be conditional upon individual levels of morality (Wikström & Svensson, 2010): Those with high morality do not engage in crime regardless of their level of self-control. No study, to our knowledge, has examined how self-control influences the development of moral cognition.

Nonetheless, several studies have found evidence of the mediating role of acceptance of violence cognitions or biased of social-information processing between community violence and aggressive behavior (see, for example, Allwood & Bell, 2008; Bradshaw, Rodgers, Ghandour & Garbarino, 2009), whereas the results from Bacchini, Affuso and De Angelis (2013) showed that higher levels of exposure to community violence as a witness, along with the perception of higher levels of deviancy among peers, reduced the strength of moral criteria for judging moral violations. However, to

the best of our knowledge, no study has systematically examined how being exposed to community violence influences the development of cognitive distortions as intended in their moral dimension (Arsenio & Lemerise, 2004; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Ribeaud & Eisner, 2010) and discussed above. One study by Wilkinson and Carr (2008) tried to raise this point using qualitative data from male violent offenders; they noted that individuals respond to exposure to violence in many ways, some of which are consistent with traditional concepts of moral disengagement or emotional numbing, but also argued that those processes are not sufficient for behaving aggressively and that aspects of contingencies and configurations of situational and interpersonal factors play a powerful role in violent behavior.

Much less scholars in the field of morality have investigated the developmental precursors of becoming morally disengaged from mainstream social values. We know only one study by Hyde and colleagues (2010) positing an additive model for the development of moral disengagement (MD); starting from the idea that potential precursors of MD should be experiences that directly model or at least expose children to attitudes and beliefs condoning the use of antisocial behavior (e.g., distribution and selling of illegal drugs, using violence as a primary conflict resolution strategy), they hypothesized that rejecting parenting and neighborhood impoverishment could be linked to MD and, indirectly through MD, to antisocial behavior; however, they found that MD mediated only the association between neighborhood impoverishment and antisocial behavior.

The present study

In light of the above considerations, the central goal of this study was to investigate how exposure to community violence and low effortful control are associated with developmental trajectories of moral cognitive distortions as theorized by Gibbs and colleagues (1996). To date, there is only one similar study examining stability and

change of MD using a trajectory modeling approach (Paciello, Fida, Tramontano, Lupinetti, & Caprara, 2008), and only a few studies investigating either correlates or antecedents of MD (Bandura, Capara, Barbaranelli, Pastorelli, & Regalia, 2001; Caprara et al., 2014; Paciello et al. 2008; Pelton, Gound, Forehand, & Brody, 2004); no study, however, has considered community violence and effortful control as developmental precursors. Since this was the first study focusing on self-serving cognitive distortions, we were not able to make hypotheses about development trajectories, but we expected that the membership to the most “distorted” group (e.g., high levels of cognitive distortions that show stability or increment over time) was predicted by high frequency of exposure to community violence and low effortful control. Also, we hypothesized that group membership predicted future aggressive behavior, even when controlling for early aggressive behavior, gender and age.

METHOD

Participants

Overall, the study design included 4 data points (1-year intervals). At T1, the sample consisted of 745 adolescents (339 Males) ranging in age from 11 to 15 ($M_{age} = 12.56$, $SD = 1.61$). They were from the main middle and high schools of Arzano, near Naples, that were involved in 2013 in a still ongoing longitudinal study aiming at investigating the determinants and pathways of typical and atypical development from early to late adolescence. The neighborhood served by these schools is characterized by serious social problems, such as high unemployment, school-dropout, and the presence of organized crime (CNEL, 2014).

Procedure

Data collection took place during spring 2013 (T1), 2014 (T2), 2015 (T3) and 2016 (T4). Parents’ and adolescents’ written consents were obtained prior to the administration of questionnaires, which was conducted during classroom sessions by

trained assistants. To reassure participants about reporting sensitive information and to encourage honest reporting, a complete guarantee of confidentiality was emphasized. Additionally, they were informed about the voluntary nature of participation and their right to discontinue at any point without penalty.

Measures

Exposure to community violence. Exposure to community violence was self-reported at T1 using an adapted scale for the local context (Bacchini, Miranda, & Affuso, 2011) of the Community Experience Questionnaire by Schwartz and Proctor (2000). The factor structure of the scale has been illustrated in Chapter 2.

For each participant, we averaged the items of each scale in order to form a global score of exposure to violence ($\alpha = .85$, $\omega_h = .68$).

Effortful control. To evaluate temperamental EC at T1, adolescents were asked to rate items (1 = almost never true to 5 = almost always true) from the long version of the Early Adolescent Temperament Questionnaire—Revision (EATQR; Ellis & Rothbart, 2001). The measure was computed by averaging items ratings of the activation control (i.e., “if I have a hard assignment to do, I get started right away”), attention control (i.e., “I pay close attention when someone tells me how to do something”), and inhibitory control (i.e., “when someone tells me to stop doing something, it is easy for me to stop”) scales, after recoding inversely formulated items ($\alpha = .77$, $\omega_h = .67$).

Self-serving cognitive distortions. At each time point, participants responded to the 39 items of the “How I think Questionnaire” (HIT) (Barriga et al., 2001; Italian validation by Bacchini, De Angelis, Affuso, & Brugman, 2016) measuring self-serving cognitive distortions. The HIT is based on Gibbs et al. (1995) four category typology of

self-serving cognitive distortion: Self-centered, blaming others, assuming the worst, and minimizing/mislabeling. Each item was rated on a 6-point Likert scale from “agree strongly” to “disagree strongly”. The mean response to the 39 items is the Overall HIT Score (α s range from .95 to .97; ω h range from .84 and .90).

Aggressive behavior and anxiety-depression. Ratings of aggression and anxiety-depression were obtained at T1 and T4 using the relative scales of the Youth Self Report Questionnaire (YSR 11/18; Achenbach & Rescorla, 2001). Adolescents were asked to rate (0 = not true, 1 = somewhat or sometimes true, or 2 = very true or often true) the extent to which they had exhibited a series of problem behavior during the last 6 months (e.g., “I physically attack people” for aggression, and “I cry a lot” for anxiety-depression). All respondent had at least 80 percent non-missing values.

Scale scores were computed by averaging the item scores, with missing item scores replaced with the mean of the respondent’s scores on the other items in the scale ($\alpha = .82$ and $.86$, $\omega = .84$ and $.87$ for aggressive behavior at T1 and T4, respectively; $\alpha = .83$ and $.86$, $\omega = .83$ and $.86$ for anxiety-depression at T1 and T4, respectively).

Attrition analysis

Fifteen (2%) of T1 participants did not complete the HIT questionnaire at T2, 39 (5.2%) at T3; and 142 (19.6%) at T4; 121 (16.2%) of T1 participants did not complete the YSR at T4. The total attrition rate was mainly due to the absence of adolescents from school at assessments. The Little’s test (Little, 1988) for data missing completely at random (MCAR) in SPSS 21 was nonsignificant ($\chi^2 = 91.278$, $df = 80$; $p > .05$).

Analytic approach

We used latent growth mixture models (GMMs) for identifying distinct growth developmental trajectories (or classes) of CDs (Muthen, 2004; Muthen & Muthen, 2000). Extending the logic of multiple-group growth models where groups are defined a priori, the growth mixture model (GMM) identifies classes of individuals post hoc, such

that individuals that are in the same class have similar trajectories and individuals in different classes have sufficiently different trajectories (Grimm, Ram, & Estabrook, 2016). Using a person-centered approach, GMMs are extremely useful for developmental researchers in that they allow not only to identify different classes of intra-individual (within-person) change, but also to test hypotheses about inter-individual (between-person) differences in that intra-individual change, by examining (a) antecedents, or predictors, and (b) consequences, or distal outcomes, of class membership (Wickrama, Lee, O'Neil, & Lorenz, 2016).

The GMM analysis consisted of three steps. First, we used simple growth models to determine the growth parameters for the GMM. Specifically, we tested and compared three unconditional (without any covariate) latent growth models: (i) intercept only, in which each individual has an intercept, but no change over time is estimated, (ii) intercept and linear slope, which allows individual scores to change linearly over time and permits individuals to differ in their rates of change, and (iii) intercept and quadratic slope, in which the rate of change is assumed to be non-linear. To compare these nested models, the value of -2Log Likelihood ($-2LL$) was used to perform χ^2 tests with degrees of freedom equal to the difference in the number of degrees of freedom between the models.

Second, once tested that the best model was the linear growth model, we fit five specific models to examine class differences in certain parameters of the linear growth model: The first model (M1) was the baseline (invariance) model where all estimated parameters were invariant across classes. This model treats the data as there is only one class; the second model (M2) was a latent class growth model (LCG), in which means are estimated and within-class variances fixed to zero. This model assumes that all individual trajectories within a class are homogeneous. In the third model (M3), the means of the intercept and slope are class specific. That is, individuals are

probabilistically placed in classes that differ in their baseline levels and rates of change. The fourth model (M4) is the means and covariances model, where the average trajectories, the magnitude of between-person differences in the intercept and slope, and the association between intercepts and slopes within each class are class specific. Finally, in the fifth model (M5), classes are allowed to differ in all estimated parameters of the linear growth model: means, covariances, and residual variances. These latter, particularly, provide information about within-person fluctuations in scores over time.

As recommended by Grimm et al. (2016), within each model type, we fit models with a different number of classes, starting with two-class models, and increased the number of latent classes incrementally until the model encountered convergence issues or model fit indicates that additional classes are unlikely to produce viable results.

Models were compared based on fit criteria and the interpretation of model parameters. Specifically, we first examined model convergence. Second, we examined the information criteria: BIC, AIC, and sample size adjusted BIC. In general, lower values indicate a better fitting model. Third, we examined the likelihood ratio tests (e.g., Lo Mendell Rubin: LMR-LRT, or the bootstrap likelihood ratio test), which provide additional information for model selection within model type (e.g., M2 models): Statistically significant values indicate that dropping one class from the model would significantly worsen the model fit. Then, a probability lower than .001 for a two-class model indicate that it is preferred to the one-class model, and so on. Fourth, we examined the entropy statistic and the average posterior probabilities. Specifically, entropy is a standardized index (i.e., ranging from 0 to 1) of model-based classification accuracy. Higher values indicate improved enumeration accuracy, which indicates clear class separation (Nagin, 2005). The entropy statistic is based on estimated posterior probabilities for each class: For example, a probability of .91 suggests that 91% of

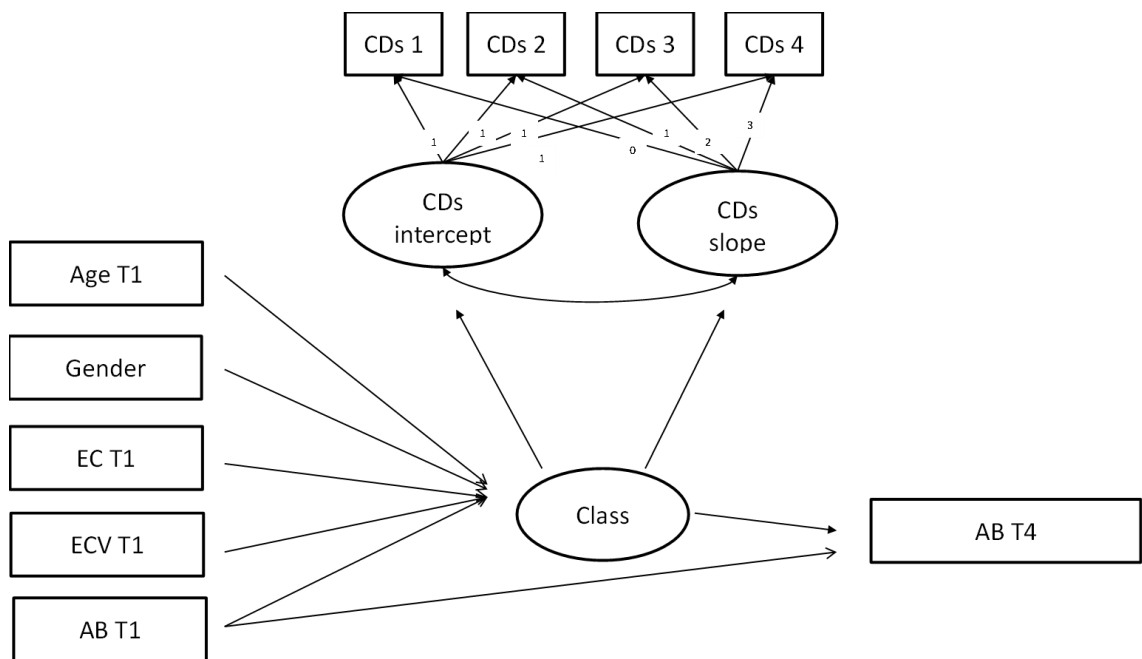
subjects in the assigned class fit that category, while 9% of the subjects in that given class are not accurately described by that category (Fanti & Henrich, 2010).

Overall, the model with lower information criteria, higher entropy and average posterior probabilities values, and statistically significant p-values for the likelihood ratio tests basically show the better fit. However, we also supplemented this information with substantive knowledge of the phenomena being studied in order to identify the model that best represented data, as generally recommended (Grimm et al., 2016; Muthen, 2003).

After selecting the optimal model, the third and final step was to extend the GMM to include covariates as predictors and distal outcomes of class membership. Some researchers (e.g., Li & Hser, 2011; Lubke & Muthén, 2007; Muthén, 2004) have recommended using the model with covariates when determining the appropriate number of latent classes, whereas others (e.g., Enders & Tofighi, 2007) have argued that class enumeration should be done without covariates. We used the latter approach because it assures that the latent classes are based on the longitudinal trajectories and not the covariates (Grimm et al., 2016). Following this suggestion, auxiliary variables (i.e., predictors and distal outcomes) were included in the GMM using a three-step approach (Nylund-Gibson, Grimm, Quirk, & Furlong, 2014). After a first step consisting in the estimation of the unconditional (without covariates) mixture model, in the second step individual probabilities of class membership estimated from the latent class posterior probabilities were used to classify individuals into one or another class, while retaining knowledge of the uncertainty of that classification (in principle, the standard error of that classification). Third, a new latent GMM was formulated that examines the relations among the covariates and the latent class variable. Thus, the effects of covariates can be studied while both assuring that the latent class variable is only derived from the repeated measures and the uncertainty inherent in the

classification is taken into consideration. Specifically, we added gender, age, exposure to community violence, effortful control and aggressive behavior at T1 as predictors of longitudinal trajectories of CDs, and aggressive behavior at T4 as distal outcome of these trajectories, controlling for aggressive behavior at T1 (see Figure 1).

Figure 1. The hypothesized model



Note. CDs, Cognitive Distortions; EC, Effortful control; CVE, Community Violence Exposure; AB, Aggressive Behavior.

According to this procedure, when a predictor is included in a GMM, a multinomial regression is performed to investigate the influence of a predictor on between-class variation; the relation between developmental trajectories and continuous outcomes, instead, is examined by estimating class means and analyzing the statistical significance of the differences in these means using a mean equality test (i.e., Wald test).

RESULTS

Descriptive statistics

Descriptive statistics and correlations between all variables used in the study are shown in Table 1. Values of skewness and kurtosis were slightly higher than one for the measures of Exposure to community violence and CDs at T4.

Table 1. Pearson correlations, means and standard deviations (SDs)

	1	2	3	4	5	6	7	8	9	10	Mean	SD
1.Age	1										12.56	1.61
2.Gender	-.18***	1										
3.EC T1	-.17***	.07 [†]	1								3.41	.50
4.ECV T1	-.06 [†]	.13***	-.18***	1							1.70	.68
5.CDs T1	.03	.11**	-.39***	.33***	1						2.38	.90
6.CDs T2	.10**	.13***	-.39***	.25***	.50***	1					2.27	.92
7.CDs T3	.24***	.09*	-.36***	.18***	.38***	.46***	1				2.19	.98
8.CDs T4	.02	.20***	-.28***	.25***	.34***	.43***	.41***	1			2.14	.92
9.AB T1	.14***	.01	-.41***	.38***	.32***	.32***	.27***	.24***	1		.45	.35
10.AB T4	.13***	-.04	-.24***	.26***	.24***	.24***	.33***	.39***	.42**	1	.45	.33

Note. CDs, Cognitive distortions; EC, Effortful control; ECV, Exposure to community violence; AB, Aggressive behavior.

*** $p < .001$, ** $p < .01$, * $p < .05$, [†] $p < .10$.

Developmental trajectories of CDs

The model fit information for all estimated models is presented in Table 2.

The quadratic growth model encountered convergence issue (the variance of the quadratic slope was negative; the mean for the quadratic slope was not significant), whereas the significant change of $-2LL$ between the no-growth and linear growth models suggested that the linear growth model fit the data significantly better than the no-growth model.

Table 2. Fit indices and means of the intercept, linear, and quadratic slopes for the baseline model (1-class model)

	Baseline Model (M1)		
	No-growht Model	Linear Growth Model	Quadratic Growth Model*
<i>-2LogLikelihood</i>	6979.71	6938.84	6928.59
AIC	6985.71	6950.84	6948.59
BIC	6999.55	6978.52	6994.72
RMSEA	.08	.05	.07
Intercept Mean	2.26***	2.36***	2.38***
Slope Mean		-.07***	-.12***
Quadratic Slope Mean			.02
<i>Δ-2LogLikelihood</i>		40.87, $p < .001$	10.25, $p = .96$

Note. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 3. Model comparison

Fit Statistic	Latent Class Growth (M2)			Means (M3)			Means + covs (M4)		Means + covs + residual variances (M5)		
	2-class	3-class	4-class	2-class*	3-class*	4-class**	2-class*	3-class**	2-class	3-class	4-class**
Proportions	.78/.22	.50/.11/.39	.50/.10/.34/.06	.84/.16	.13/.80/.06		.16/.84		.56/.44	.40/.46/.14	
AIC	6974.709	6872.366	6818.232	6883.578	6829.171		6863.043		6333.204	6230.836	
BIC	7002.389	6913.886	6873.592	6915.872	6875.305		6899.95		6393.178	6323.104	
ABIC	6983.337	6885.31	6835.488	6893.645	6843.551		6874.547		6351.899	6259.597	
ENTROPY	0.8	0.675	0.72	0.77	0.8		0.79		0.71	0.7	
VLMR P VALUE	<.001	0.0002	0.0012	0.0208	0.026		0.001		0	0	
BOOTSTRAP P VALUE	<.001	<.001	<.001	<.001	<.001		<.001		<.001	<.001	

Note. *p < .05. **p < .01. ***p < .001. ** Model did not converge.

When examining model convergence of GMM, as noted by asterisks in Table 3, several models did not properly converge. Specifically, the variance of the slope was negative in one or more of the classes in the two- and three-class means models (M3) and two-class means and covariances models (M4). In the four-class M3 and means, covariances and residual variances models (M5), and in the three-class M4, the best loglikelihood value was not replicated, indicating that additional classes are unlikely to produce viable results. Given these results, our evaluation was then specifically focused on the LGM (M2) and means, covariances and residual variances models (M5).

With respect to the information criteria (BIC, AIC, and sample size adjusted BIC), it was evident that there was a decrease when moving from one to two classes and from two to three classes in both models (M2 and M5). The likelihood ratio tests for LGC (M2) and means, covariances and residual variances (M5) models indicate that the two-class model was preferred to the one-class model, but also that the three-class model was preferred to the two-class model (all $ps < .001$). The entropy statistic was higher for the two-class LCG model (.80) compared with the three-class LCG and two- and three-class means, covariances and residual variances models. However, for the three-class models, the entropy value was higher for the means, covariances and residual variances model (.71 vs. .68 in the three-class LCG model); diagonal probabilities for the three-class M5 ranged from .84 to .92, and from .80 to .88 in the three-class M2.

Based on this information, we selected the three-class means, covariances and residual variances model (M5) as the best fitting model. The three trajectories classes we identified are shown in Figure 2: (a) high and stable CDs (N=323), (b) medium and decreasing CDs (N=307), and (c) low and decreasing CDs (N=115).

Parameter estimates from this model are shown in table 4. Specifically, the mean score of CDs at T1 was 2.81 for class 1, and the mean rate per year was not statistically significant. Class 2 included adolescents with a mean score of 2.15 in CDs at T1, and a

mean rate of change of $-.12$ per year. Finally, adolescents in class 3 had a mean level of CDs of 1.51 at the beginning and a mean rate of $-.09$ per year. In class 2 and 3, there was a significant negative covariance between the intercept and slope, indicating that CDs levels tend to decrease more slowly over time in adolescents who had higher values at T1. Also, there were significant between-person differences in the intercept, but not in the slope, in all classes.

Figure 2. 3-class means, covariances and residual variances model

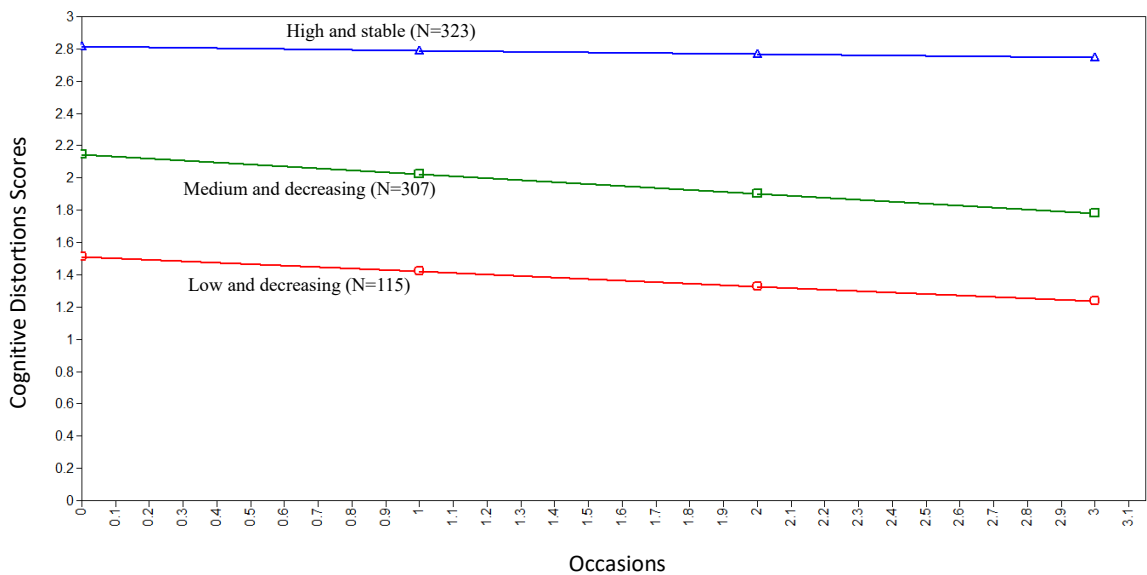


Table 5 presents the logistic coefficients and odds ratio resulted from the multinomial logit regression analysis, in which classes were regressed on gender, age, exposure to community violence, effortful control and aggressive behavior at T1. In interpreting the multinomial coefficients, Class 2 (moderate and decreasing) was used as reference class. Specifically, the log-odds of being in Class 1 (high and stable) in comparison to the log-odds of being in Class 2 increased by $.89$ for every one-unit increase in exposure to community violence. Similarly, low levels of effortful control and being male increase the log-odds of being in Class 1 relative to Class 2 ($logit = -1.54$).

Aggressive behavior was not associated with being in class 1, but instead negatively predicted Class 3 membership (low and decreasing; *logit* = -2.08).

Table 5. The Logit Coefficients of predictors from the Manual 3-Step and Auxiliary 3-Step Approaches

Predictors	Manual 3-step approach			
	Low and decreasing ^a		High and stable ^a	
	Est.	OR	Est.	OR
Male (vs. Female)	-.04	.96	1.44***	4.21
ETCV (T1)	.08	1.08	.89***	2.44
EC (T1)	1.10***	3.01	-1.54***	.22
Age	.14	1.15	.08	1.08
Aggressive Behavior (T1)	-2.08**	.13	.48	1.60

Note. Unstandardized coefficients are shown. Est.= Estimate. OR = Odds Ratio.

^a Medium and decreasing is the reference class.

*p < .05. **p < .01. ***p < .001

Table 6. The Means of Distal Outcomes for Two 3-Step Approaches (Manual 3-Step and Auxiliary 3-Step Approaches)

Outcome	Manual 3-step approach			Wald Test
	Low and decreasing	High and stable	Medium and decreasing	
	Mean	Mean	Mean	
Aggressive Behavior T4	.18	.37	.21	11.002** ^{ab}

Note. Unstandardized coefficients are shown.

*p < .05. **p < .01. ***p < .001

Finally, the test of distal outcomes associated with class membership showed that aggressive behavior at T4 was significantly higher in the class of high and stable CDs also controlling for aggressive behavior at T1, gender and age (see Table 6).

DISCUSSION

There is extensive research linking low self-control and community violence exposure with aggressive behavior (Esposito, Bacchini, Eisenberg, & Affuso, 2017); a large body of evidence also confirm that thinking distortions, such as justification of violence or distortion of consequences, amplify the likelihood to engage in aggressive or rule-breaking behaviors (Helmond, Overbeek, Brugman, & Gibbs, 2014).

This study sought to test the desensitization hypothesis that the literature has supposed to develop in response to violent contexts (Kennedy & Ceballo, 2014; Mrug, Madan, & Windle, 2016; Ng-Mak et al., 2002), particularly by considering the moral cognitive distortions as indicative of cognitive desensitization that would occur after repeated experiences of violence within the community. Furthermore, we integrated the investigation of the role of effortful control as an individual-level factor that could make individual more vulnerable to use cognitive distortions in interpreting social situations; finally, we were interested in examining how trajectories of moral cognitive distortions are associated with aggressive behavior. Thus, we first identified trajectories of cognitive distortions, then examined how being exposed to community violence, effortful control, gender and age predicted those trajectories and how these latter predicted later aggressive behavior.

Overall, three trajectories were identified to best explain variation in CDs over time. Approximately 46% of the sample demonstrated a high and relatively stable trajectory of CDs, whereas 40% reported initially moderate levels of CDs that decreased over time. Finally, a small number of participants (14%) showed low initial level of

CDs, with a decreasing tendency over time. We will specifically intend these two latter classes as “normative classes” and will try to provide a rationale for that.

Our results are partially consistent with those of Paciello et al. (2008); in particular, the authors found a general decline of MD over time that, in their opinion, could reflect changes in cognitive and social structures occurring during adolescence and that, in turn, promote moral reasoning and moral agency (Eisenberg, 2000). Following Gibbs’ sociomoral stage theory (1979; Gibbs, Basinger, & Fuller, 1992), that places moral reasoning within the context of traditional information processing theory drawing parallels between moral stages and schema, we similarly explain this result as a means of a normative developmental process through which, along with other cognitive and socioemotional achievements, youths progress from a relatively superficial level, characterized by schema generating egocentric and pragmatic self-serving thinking errors or cognitive distortions, to a more mature level of interpersonal and sociomoral reasoning, in which they can take on the roles or consider the perspective of others (Gibbs, 1995). Turning to youths that display, in the current study, initially high and over time stable CDs, we suggest they could be considered those that Gibbs names “developmentally delays”, where the “delay” stands for both (i) a prolonged immature or superficial moral judgment stage, and (ii) a persistent and pronounced egocentric bias that consolidates into cognitive distortions (e.g. Gibbs et al., 1995; Barriga, Landau, Stinson, Liao, & Gibbs, 2000).

However, what is interesting in our study is the investigation of trajectories’ correlates, which allows us to delineate a comprehensive picture of the environmental and personal factors characterizing class membership. First, we found that males were more likely to show high and stable levels of CDs over time rather than moderate and decreasing, but also that gender was not a significant predictor of showing low rather than moderate and decreasing CDs. These results support gender differences emerged in

the previous literature, such that, despite moral judgment appears to not vary according to gender and cognitive deficits seem to represent risk factors for both gender (Barriga et al., 2001), males generally self-reported more cognitive distortions than females (Lardén, Melin, Holst & Långström, 2006; Owens, Skrzypiec, & Wadham, 2014). Further studies are still needed to understand how these differences originate. Age, instead, was not predictive of class membership.

With respect to our focal interest, which was examining how effortful control and community violence exposure were related to developmental trajectories of CDs, the results confirm that both factors have an impact on the likelihood to show a developmental tendency rather than another. More specifically, a high frequency of exposure to community violence was a significant risk factor for being in the class with initially higher CDs and tendentially stable over time relative to the moderate and decreasing class. This finding seems to be consistent with the hypothesis above discussed that youths become desensitized to violence after repeated exposure (Huesmann & Kirwil, 2007), and with some other previous findings highlighting a strict association between community violence and the development of positive attitudes towards violence (e.g., Allwood & Bell, 2008), normative beliefs about violence (e.g., McMahon et al., 2013) or hostile attributional bias (e.g., Bradshaw et al., 2008). Despite the relatively great number of studies that have examined single indicators of the alteration of youths' cognitive processes through their experience of violence, our results extend prior findings by addressing this issue from a moral perspective. What this approach allows to speculate is that growing up in a violent neighborhood, as well as aversive parenting or deviant peer (Ribeaud & Eisner, 2015), undermines the normative process of moral development, thus causing the delays we have just talk about and that consolidate into self-serving cognitive distortions (Gibbs, 2004). Yet, we found that also effortful control plays an important role in the prediction of CDs

trajectories. Particularly, we can highlight two main related findings: first, the ability to plan actions, manage attention, and regulate behavior and emotions is positively associated with initially lower and over time decreasing levels of CDs, supporting the idea that moral development progress along with cognitive and socioemotional development, as suggested by Gibbs (2013); second, low effortful control predicts high and stable CDs over time, indicating that the persistence of thinking errors during adolescence depends not only on the influence of the environment in reinforcing schema of self-serving cognitive distortions, but also on a individual failure to take into account action-relevant information about action alternatives, or to adjust misguided goal-directed emotions (Wikström & Treiber, 2009).

Finally, we found that low early aggressive behavior significantly predicted the membership to the class with low and decreasing CDs with respect to the class with moderate and decreasing CDs, whereas it was not associated with the likelihood to be in the class with high and stable levels. That is, youths in the class with initially moderate and high CDs were not different in their initial level of aggressive behavior, consistent with the wide literature attesting associations between self-serving CDs and aggressive behavior (Helmond et al., 2015). Most important, and in line with the results by Paciello and colleagues (2008), when examining aggressive behavior as an outcome, our findings indicated that CDs trajectories were differently associated with later aggressive behavior. More specifically, the group with high and stable CDs over time showed significantly higher levels of later aggressive behavior compared with the group with initial low and moderate CDs that decrease over time, controlling for early aggressive behavior, age and gender. As also reported by Paciello et al. (2008), this result confirms that a crystallization of disengaging mechanisms and self-serving distortions legitimizes and reinforces the recourse to aggressive and violent behaviors (Arsenio & Lemerise, 2004; Bandura et al., 1996).

In summary, the longitudinal findings of the present study indicated that: (a) most adolescents exhibited declining levels of self-serving cognitive distortions over time; (b) adolescents who exhibited initially higher levels of cognitive distortions showed also a tendency to remain stable over time; they were typically boys, with low effortful control and high frequency of being exposed to community violence; (c) adolescents who showed low levels of early aggression were more likely to do not recourse to cognitive distortions; there were no differences in early aggressive behavior between adolescents that showed moderate and high initial level of cognitive distortions; (d) adolescents who were more likely to later engage in aggressive behavior were those who showed initial high and stable recourse to CDs over time.

However, these results need to be considered in light of several limitations. First, the use of self-report measures, that amplify the risk of social desirability bias. Second, some caution is need in generalizing the results because of the specific cultural context where the research was carried on. Third, although we controlled for the possible confounding effects of age, further studies could examine CDs trajectories in different age cohorts.

Further research on both internal mechanisms and relevant environmental variables that could influence individual behaviors at several levels is necessary, both for expanding knowledge about the development and persistence of aggressive and violent outcomes and in order to design appropriate interventions aimed at preventing maladjustment in adolescence.

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CHAPTER V

Study 4

Chapter V

Exposure to community violence and emotional responses in a sample of Italian adolescents: An experimental pilot test of the desensitization hypothesis

Research concerning the effects of exposure to violence has provided great support to a cumulative effects model, according to which well-being declines when experiences of violence exposure accumulate over time (Lynch, 2003). Within this framework, for example, findings have consistently shown considerable and close associations between exposure to community violence and aggressive behavior. One of the theoretical perspectives that explains this link is social learning theory, according to which children learn and adopt pro-violent beliefs, attitudes and behaviors from the aggressive models in their environments (Bradshaw, Ghandor, Rodgers, & Garbarino, 2009; Huesmann & Kirwil, 2007). On the other hand, youth growing up in violent neighborhoods may interpret violence meaning that the world is unsafe and that he or she is unworthy of protection, and this interpretation may lead to develop negative self-perceptions, feelings of helplessness and symptoms of anxiety and depression (Mrug, Loosier, & Windle, 2008). However, the associations between community violence and internalizing symptoms appear to be weaker compared to links with aggression and seem less consistent across studies (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Methodological issues have been proposed in account for explaining these inconsistent findings, such as the overlap between community violence and other forms of violence (e.g., marital violence, child abuse) (Margolin & Gordis, 2000). From a theoretical perspective, the occurrence of an emotional desensitization process (Huesmann & Kirwil, 2007; McCart et al. 2007; Mrug et al. 2008) has been

hypothesized, as described by the pathological adaptation model (Ng-Mak, Salzinger, Feldman, & Stueve, 2002). In accordance with the latter, levels of internalizing symptoms (e.g., anxiety and depression) may increase as exposure to community violence increase over time, but only to a point; when the experience of community violence becomes chronic and achieves highest levels, indeed, youth begin to react with emotional numbing, evidenced by a decline of internalizing symptoms but strong associations with aggressive behavior, indicating a greater acceptance of the use of violence as a normative problem solving strategy (Ng-Mak, Salzinger, Feldman, & Stueve, 2004).

Following this line of research, the current pilot study aimed to test the desensitization hypothesis by examining adolescents' emotional responses to arousing violent or non-violent clips as a function of their experience of violence within the community; more specifically, we investigated how these emotional reactions were related to subsequent aggressive behavior, exploring possible gender-related differences and examining the moderating role of the specific clip content (violent *vs.* non-violent).

What does “desensitization” stand for?

Theoretically, desensitization to violence represents a form of habituation, a well-established type of non-associative learning that results in diminished response to a stimulus after repeated exposure (Rankin et al., 2009). The first use of the term "desensitization" referred to a therapeutic tool in cognitive behavioral therapies termed "systematic desensitization". Wolpe (1961) described the systematic desensitization as a procedure that, through the presentation of anxiety evoking stimuli in order of intensity, allows individuals to undergo adaption and lower their level of anxiety or fear in response to those specific stimuli. The final purpose was to eliminate emotional excitement against real threats or phobic objects.

Desensitization to violence has been primarily studied with respect to violent movies and video games. The hypothesis was that desensitization represents the key mechanism linking repeated exposure to violent media contents and later aggressive behavior (Huesmann, 1988; Huesmann & Kirwil, 2007). Indeed, despite fear is a spontaneous and probably innate response of humans in reaction to violence, repeated exposure to media violence makes violent stimuli losing their capacity to elicit negative emotions the more often they are presented (Anderson & Dill, 2000), then disinhibiting the individual tendency to behave aggressively. More specifically, according to Carnagey, Anderson and Bushman (2007), desensitization can occur both as an intentional event (as Wolpe argued) and unintentional (resulting from stimuli such as real life or mass media). They listed the variety of meanings that have been given to the term “desensitization”: (i) increase in aggressive behavior, (ii) decrease in physiological arousal to violence, (iii) emotional numbing as a reaction to violence, (iv) a reduction of interest in helping victims of violence, (v) decrease in sympathy for victims of violence (vi) decrease of the perceived guilt coming from a perpetrator of violence. They considered that it is a process that modifies (by reducing) the individual excitation (arousal) in response to a violent stimulus, increasing the belief that violence is normal and diminishing negative attitudes towards violence as well as the sense of personal responsibility.

There is extensive research confirming the desensitization hypothesis in the media violence literature. Cline, Croft, and Courier, (1973), for example, found that television violence may lead to the reduction of awareness and concern for violence, increasing aggression and attitude of indifference towards the victims. In addition, in their study they found that those most exposed to violent television programs had a lower excitation response (arousal) to violent stimuli. Anderson et al. (2010) in a meta-analysis focusing on media violence in children or young people reported that the

prolonged exposure to violence made individuals to consider much easier getting involved in violent acts as well as reducing empathy and helping behaviors towards victims of violence. Similarly, Bushman and Anderson (2009) found that people exposed to media violence become "comfortably numb" to the pain and suffering of others and are consequently less helpful.

Fanti, Vanman, Henrich and Avraamides (2009) also conducted a research on desensitization depending on repeated exposure to media violence; an interesting and new aspect they pointed out as compared with other studies was that repeated exposure was related with reports of enjoyment of violence portrayed in the media scenes. Huesmann and Kirwil (2007) called this process "sensitization". They argued that, for some individuals, watching violence is enjoyable, and, whereas it may provoke anger, it does not produce anxious arousal. Instead, the reaction of enjoyment would otherwise be inhibited by anxious arousal. Then, the more such individuals watch violence, the more they like watching it, and this could be considered an indirect evidence of desensitization of "negative feelings" about violence. The results by Krahé and colleagues (2011) supported this hypothesis, showing that media violence exposure predicted faster accessibility of aggressive cognitions, partly mediated by higher pleasant arousal.

Desensitization in response to real-life violence

Despite the evidence for emotional desensitization to media violence, it is not clear if desensitization does occur with the same degree in response to real-life violence.

According to Bryant-Davis (2005), when people live in places with high crime rates, desensitization becomes quite common. As an example, she reported that a participant who had been hit by bullets said that he did not know if he qualified to be the subject of the investigation because receiving a shot was something normal. As reported by Gaylord-Harden, Cunningham, and Zelenik (2011) based on previous

studies by Garbarino (1999) and Ng-Mak (2002, 2004), such “emotional insensitivity” that affects young people exposed to violence could be considered an index of a pathological adaptation to the violence: Youth “adapt” to violence through adjustment to pain and loss, seeing violence as normal. According to Funk, Baldacci, Pasold and Baumgardner (2004) desensitization to violence is a process that can occur as a result of repeated exposure to real-life violence, as well as from the exposure to violence in the media. Two components should be considered: “Emotional” desensitization is evident when there is numbness or dulling of the emotional reactions to the events that normally generate a strong response; “Cognitive” desensitization is evident when the belief that violence is rare and difficult becomes the belief that violence is trivial and inevitable. Emotional and cognitive desensitization reduces the likelihood that violent behavior can be censored, as suggested by Su and colleagues (Su, Mrug, & Windle, 2010), finding that being constantly exposed to violence can be emotionally and cognitively desensitizing, diminishing restrictions to act aggressively. To date, several studies of adolescents’ exposure to community violence have investigated the desensitization hypothesis by testing quadratic relationships between self-reported exposure to violence and internalizing symptoms, rather than linear associations, or physiological measures. Studies using self-report measures found negative quadratic relationships between exposure to community violence and internalizing symptoms, especially in terms of depressive symptoms (Gaylord-Harden et al., 2011; Ng-Mak et al. 2004; Mrug et al. 2008), anxiety-depression (Kennedy & Ceballo, 2016) and empathic concern (Mrug, Madan, Cook, & Wright, 2015). Mrug, Madan and Windle (2016), for example, supported the hypothesis that youth exposed to high levels of violence experience less emotional distress than those exposed to moderate levels of violence. The results by Kennedy and Ceballo (2016), nonetheless, suggest that at moderate levels of violence exposure, youth experience more internalizing problems that over time inhibit violent

behavior, as indicated by the significant indirect effect linking violence exposure with higher internalizing problems and lower violent behavior. However, youth exposed to high levels of violence experience fewer cognitive, emotional and somatic symptoms of internalizing distress than those exposed to moderate levels of violence, likely due to habituation to the distressing nature of violence; neither age nor gender moderated the associations between CVE and maladjustment. In their experimental study, Mrug, Madan, Cook and Wright (2015) found that cognitive and emotional empathy increased from low to medium levels of exposure to violence, but declined at higher levels. On the other hand, the studies using physiological indices of arousal reported that youth exposed to chronic community violence experienced physiological desensitization in terms of lower resting heart rates and basal cortisol levels (Aiyer, Heinze, Miller, Stoddard, & Zimmerman, 2014; Scarpa, Tanaka, & Haden, 2008). The same result was found by Cooley-Quille, Boyd, Frantz and Walsh (2001) by assessing youth psychophysiological reactions after viewing a montage of community violence film clips.

Desensitization and Moderating Effects of Gender

The literature has well established that boys are exposed to more community violence than girls (Jaycox et al., 2002; Selner-O'Hagan, Kindlon, Buka, Randenbush, & Earls, 1998; Schwab-Stone et al., 1999). However, research on the moderating role of gender in the relation between community violence and psychological outcomes has been mixed. Although some findings suggest that exposure to community violence is more strongly associated with aggression among boys than among girls (e.g., Bacchini, Miranda, & Affuso, 2011), many other studies indicate that the link does not vary by gender (Fowler et al., 2009; Salzinger, Rosario, Feldman, & Ng-Mak, 2008; Scwab-Stone et al., 1999). Similarly, while many findings indicate that girls are more likely than boys to develop internalizing symptoms in response to community violence

(Bacchini et al., 2011; Fowler et al., 2009; Zinzow et al., 2009), other evidence contradicts the existence of gender differences (Kliewer, Lepore, Oskin, & Johnson, 1998; Salzinger et al., 2008; Schwab-Stone et al., 1999). In addition to the differential linear impact of community violence exposure on males and females, gender may moderate desensitization to community violence as well. Although researchers have investigated the moderating effects of gender on biological markers of adaptation to CVE, with males evincing more attenuated stress responses than females (Aiyer et al., 2014; Kliewer et al., 2006), existing work examining behavioral desensitization is limited. A study by Gaylord and colleagues (2011), for example, found that boys showed a stronger quadratic association between community violence and depression, whereas girls showed a more constant, linear relation.

Aims and hypotheses of the current study

The current study was designed to test the role of desensitization in the relation between community violence and aggressive behavior in a pilot sample of Italian adolescents. We examined the desensitization hypothesis by using an experimental approach along with implicit measures of affectivity and aggression. To the best of our knowledge, there is only one experimental study that systematically examined the desensitization hypothesis as a consequence of community violence exposure, specifically by looking at the decreasing of post-traumatic symptoms, empathy and blood pressure in young adults (range 18-22 years old; Mrug et al., 2015); self-report and blood pressure measures as indicators of desensitization were assessed after adolescents watched violent clips. The results of the study showed that youth exposed to higher levels of real-life violence displayed some signs of emotional desensitization involving lower empathy, and for males also decreasing distress to repeated scenes of violence.

Based on the literature reviewed, the current study sought to address one major and one minor research questions. First, using implicit measures, we looked at the adolescent altered emotional reactions to violent and non-violent (but equally arousing) clips as an outcome of habitual community violence exposure, by examining “desensitization” both directly, in terms of decrease in negative (unpleasant) affect, and indirectly, as indicated by possible manifestation of positive (pleasant) affectivity; thus, we used these altered emotional reactions as a predictor of later aggressive behavior. Furthermore, given boys’ higher propensity for externalizing symptoms and girls’ increased risk for internalizing symptoms, we specifically hypothesized that boys may be more likely than girls to become emotionally desensitized to community violence and adapt externalizing behavior. As a minor goal, we examined whether the possible desensitization effects were video clip content-specific (violent vs. non-violent but arousing). As suggested by Huesmann and Kirwil (2007), indeed, a single response to a repeating single stimulus (i.e., violent stimulus) should be interpreted as “emotional habituation” rather than “emotional desensitization”, where the emotional response is associated to a repeating complex set of stimuli and in a broader context (e.g., violent and non-violent but arousing stimuli). Based on findings relating desensitization to media violence, we controlled the analysis from the confounding effects of media violence.

METHOD

Sample and procedure

Participants were 101 high school students (64 males) living in the metropolitan area of Naples. The age ranged from 15 to 19 years ($M = 16.55$, $SD = .87$). Informed consent procedures consisted of approval by the school, the parents and the adolescents. Data were collected through computerized assessments during which research assistants were present in order to monitor the data collection and answer questions.

The assessment took place through two time-point:

Time 1 (2016, December): participants completed self-report questionnaires and were asked to complete a computerized task measuring implicit affectivity;

Time 2 (2017, May): each participant was assigned to watch either a violent or a non-violent film clips. The clips were previously selected on the results of a smaller pilot study (see Manipulation check section). The presentation order of the clip scenes was counterbalanced to eliminate any potential order effects. Each clip was approximately 6 min in duration.

At the end of each clip, all participants answered questions about their affective reactions. Once watching the film clip, they completed the same implicit measure of affectivity they were asked to complete at T1 plus a task assessing implicit aggressiveness. At the end of the session, participants watched an enjoying video clip to dispel any negative effects of the arousing videos.

Measures

Self-report measures

Exposure to community violence. Exposure to community violence was self-reported using two adapted scales for the local context (Bacchini et al., 2011) of the Community Experience Questionnaire by Schwartz and Proctor (2000). Each scale included six items, and adolescents were asked to report the frequency (1 = never to 5 = more than five times) of their being the victim or witness of violence in the neighborhood during the last year. A sample item of being victimized was, “How many times have you been chased by gangs, other kids, or adults?”; a sample item for witnessing community violence was, “How many times have you seen somebody get robbed?” All respondent had at least 80% non-missing values. $\alpha = .76$, $\omega_h = .78$

Exposure to media violence. The measure of media violence was assessed by using an ad hoc scale. Participants were asked to indicate the frequency (1 = never to 5 = more

than five times) with which, during the previous year, they played games, watched films or navigated internet sites containing scenes of violence (3 items in total; $\alpha = .76$, $\omega = .78$).

Self-report of affective responses. Self-report measures of affectivity were collected for explorative purposes. Immediately after each clip ended, participants were asked to rate how anxious, excited or impassive they had felt while watching the clip. Responses were made on a 4-point scale ranging from 1 (not at all) to 4 (very much).

Implicit measures

Positive and negative affect. Participants completed the Implicit Positive and Negative Affect Task (IPANAT; Quirin et al., 2016) at T1 and T2, after viewing the film clips. The IPANAT is an indirect procedure for the assessment of affect, i.e., unlike direct measures, it does not rely on people's ratings of their affective experiences.

Participants were asked to assess the extent to which six nonsense words (SAFME, VIKES, TUNBA, TALEP, BELNI, & SUKOV), which originate from an artificial language, express or convey various feelings. Specifically, they reported the extent to which they felt happy, cheerful, energetic, helpless, tense, and inhibited on a rating scale from 1 (not at all) to 4 (completely). Then, we composed Positive and Negative Affect's scales computing average scores for positive adjectives and negative adjectives, respectively ((T1: Positive Affect, $\alpha = .89$, $\omega = .89$; Negative affect, $\alpha = .83$, $\omega = .83$; T2: Positive Affect, $\alpha = .76$, $\omega = .78$; Negative affect, $\alpha = .82$, $\omega = .83$).

Aggression. Aggression was measured using the modified Taylor Competitive Reaction Time Task (CRTT: Anderson & Dill, 2000; Epstein & Taylor, 1967). Participants were told that they will compete against another participant by quickly reacting to stimuli (by clicking a computer mouse) over the course of several trials ($N = 24$). Before each experimental trial, the participant had the opportunity to set both the intensity and the duration of the noise blast that would be delivered to the opponent if the participant won

that trial. Intensity was set on a scale from 0 to 10 (100 dB), and duration was set on a scale from 1 (1 s) to 10 (2 s), with a 0-s option. Each participant received noise blasts set by the ostensible opponent on trials that the participant lost. All participants won 12 trials. An example of the trial sequence is shown in figure 1.

Wins and losses were preset and randomized. Given other research to suggest that the duration measure may have poor validity (Ferguson, Smith, Miller-Stratton, Fritz, & Heinrich, 2008), the duration measure was dropped from further analysis and the measure of aggression used here was the average score of intensity of the noise blasts that participants set for their ostensible opponent across all trials ($\alpha = .94$, $\omega = .94$).

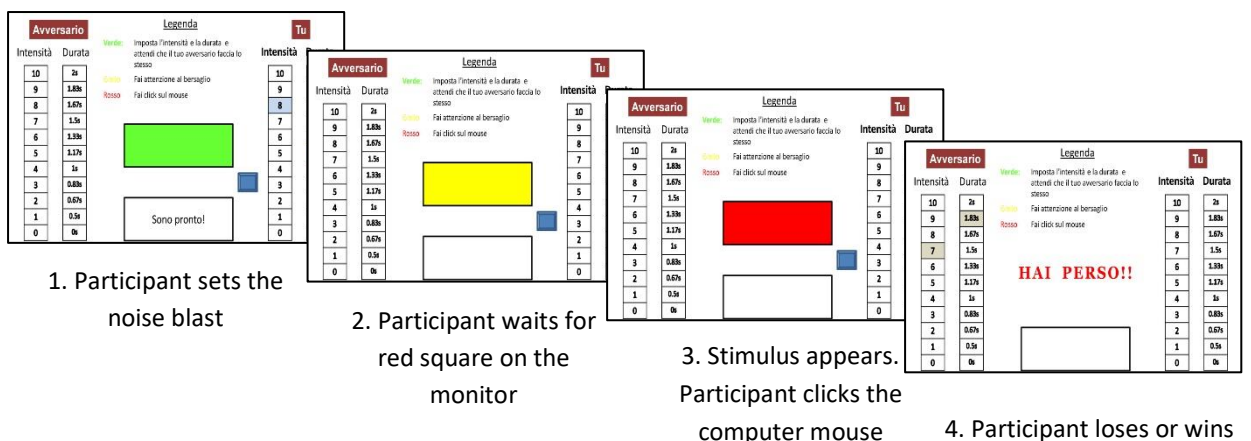


Figure 1. An example of the trial sequence in which the participant loses.

Attrition

Participants that completed questionnaires and the IPANAT at T1 were 101. Seventy-four of T1 participants completed the IPANAT and the CRTT at T2. Five adolescents were excluded from the analyses due to impaired cognitive functioning, as indicated by their teachers; 14 students' CRTT data were evaluated as non-reliable because they set the same intensity or duration for more than 80% of trials. The final sample consisted of 55 adolescents (33 Males). A comparison of participants who were included in the analyses with those who dropped out after T1 showed no significant

differences between the two groups on all measures of violence exposure, multivariate $F(4, 96) = 1.34, p = .26$, all univariate effects $p > .05$. Therefore, there was no indication that the final sample of participants was different from the initial, larger sample. As the measure of exposures to community violence was positively skewed and asymmetric (values were 1.4 and 1.53, respectively), the scale was normalized by square root transformations prior to subsequent analyses.

Data analysis

Analyses were carried out in IBM SPSS statistics version 21 (2012) and Mplus version 7.2 (Muthen & Muthen, 2012). Gender and clip content differences for self-reported arousal and exposure to community violence, implicit affectivity and aggression were detected by performing univariate analyses of variance. The hypothesized models (Figure 2) were tested using a moderated mediation analysis based on Hayes's approach (2015). Specifically, we hypothesized that decreased implicit negative or/and increased positive affect positively mediated the relationship between community violence and aggression, and that these indirect effects were conditional on adolescent gender (male vs. female) in combination with clips content (violent vs. non-violent). All the effects were controlled for baseline estimations of implicit affectivity and media violence scores. Bootstrapping procedures were used to test the moderated mediation models: Ten thousand bootstrap samples were used to calculate the 95% bias-corrected confidence intervals of the conditional indirect effects. Confidence intervals that do not contain zero indicate a significant indirect effect via the specific mediator.

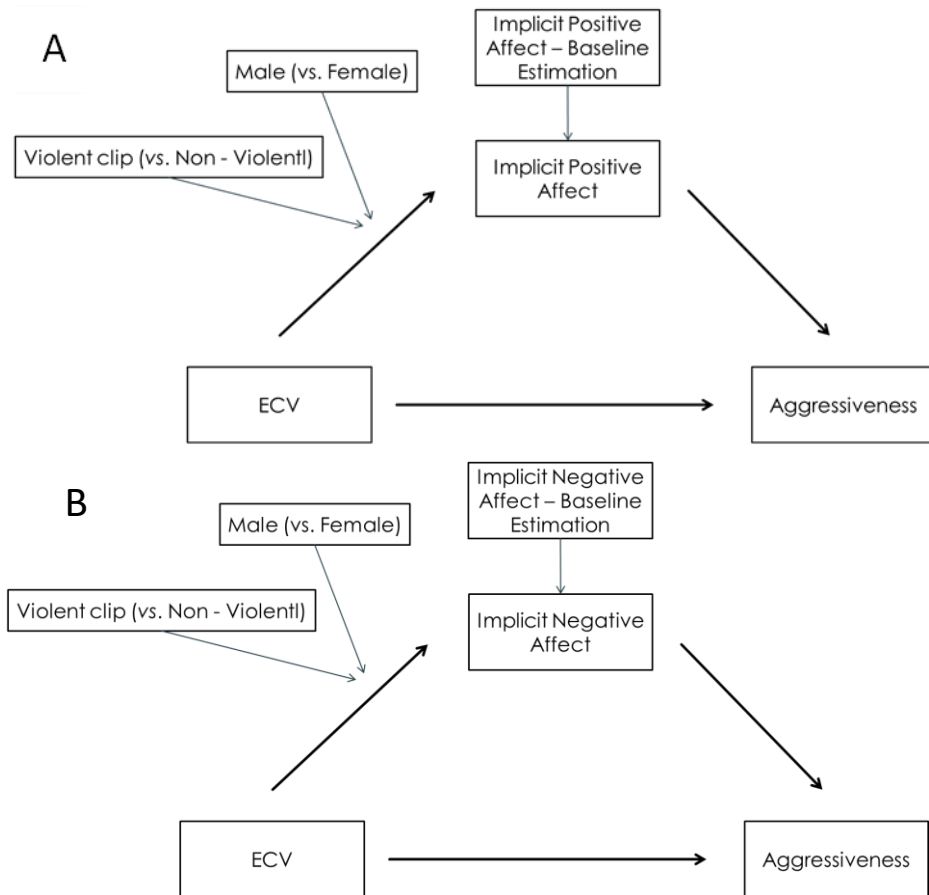


Figure 2. The hypothesized models. ECV, Exposure to community violence. Media violence was used as a covariate in all models.

RESULTS

Manipulation Check

In a preliminary phase of the study, 33 adolescents (23 males; $M_{\text{age}} = 15.42$, $SD = .68$) were asked to rate on a five-point scale (1=not at all; 5=completely) a set of 9 clips, indicating the grade of violence showed into the clips, how much they felt engaged or impassive by watching those scenes. Then, four clip scenes were selected. Two clips were extracted from “A Bronx Tale” (1993, Robert De Niro) for the violent film clip; one scene from “Unstoppable” (2010, Tony Scott) and one from “Cast Away” (2000, Robert Zemeckis) composed the non-violent clip. We also took care that

adolescents were not familiar with all selected video clips. The violent film clip was clearly distinct from the non-violent film clip with respect to violent contents, $t(32) = -8.50, p < .001$, but not for arousal (highly relevant in both cases), $t(32) = 1.26, p > .05$, and emotionality, $t(32) = .24, p = .81$.

Preliminary analyses

Bivariate correlations by gender between all study variables are shown in Table 1. Noteworthy, the measure of exposure to community violence was negatively correlated with self-reported anxiety and excitation after watching clips in females, whilst a positive correlation was found with implicit positive affect in males.

Table 1. Correlations by gender

	1	2	3	4	5	6	7	8	9
1. ECV	1	-.47*	-.51*	.20	-.16	.04	.07	-	.04
2. Feeling excited	.09	1	.89***	-	.06	.13	.30	.14	-
3. Feeling anxious	.07	.52**	1	-	.03	.14	.36	.04	.03
4. Feeling Impassive	-.19	-.18	-.16	1	.04	-.15	-.16	-	-
5. CRTT	.09	.18	.40	.16	1	.24	.18	.21	-
6. IPA T1	.35*	-.06	-.05	.13	.05	1	.36	.06	.17
7. INA T1	.23	.11	.16	-.28	.04	.42*	1	.14	.28
8. IPA T2	.51**	.25	.38*	-.03	.60**	.58***	.45**	1	-
9. INA T2	-.11	.21	.21	-.19	.00	.27	.51***	.21	1

Note. Females are above the diagonal. ECV = Exposure to community violence; CRTT = Competitive Reaction Time Task; IPA = Implicit Positive Affect; INA = Implicit Negative Affect. * $p < .05$. ** $p < .01$. *** $p < .001$

One-way analyses of variance revealed some significant gender differences only on affective responses and behavioral aggressiveness after watching videos.

With respect to self-reported measures of affectivity, as shown in Table 2, females scored higher on anxiety and lower on impassiveness than males did. Furthermore,

adolescents who watched non-violent clips scored significantly higher on positive affect, anxiety and implicit aggressiveness after viewing the clips (T2).

Table 2. One-way Anova.

	Female	Male	F	Non-violent Clip	Violent clip	F
<i>Implicit measures</i>						
Implicit Positive Affect T1	2.06 (.45)	2.41 (.66)	3.43†			
Implicit Negative Affect T1	1.98 (.50)	1.94 (.57)	.66 n.s.			
Implicit Positive Affect T2	2.12 (.41)	2.45 (.70)	3.09†	2.57 (.64)	2.14 (.54)	4.54*
Implicit Negative Affect T2	1.93 (.52)	1.67 (.43)	3.44†	1.85 (.47)	1.73 (.49)	.78 n.s.
Competitive Reaction Time Task – Aggressiveness	5.52 (2.09)	5.93 (1.71)	.14 n.s.	6.49 (4.51)	5.06 (1.91)	6.07*
<i>Self-reported measures</i>						
Community Violence Exposure	1.58 (.39)	1.61 (.48)	.23 n.s.	1.60 (.45)	1.60 (.45)	.06 n.s.
Anxious	2.56 (1.05)	2.21 (.87)	5.52*	2.98 (.73)	1.91 (.84)	26.68***
Excited	2.36 (.92)	2.16 (.77)	2.88†	2.50 (.85)	2.05 (.78)	7.32**
Impassive	1.42 (.62)	2.06 (.72)	12.81***	1.76 (.69)	1.83 (.79)	1.36 n.s.

Note. *p < .05. **p < .01. ***p < .001. †p < .10

Moderated-mediation Path Analysis

Results of the moderated-mediation path analysis showed a non-satisfactory model fit for models including negative affect as mediator. For the sake of simplicity, we only present here the results concerning positive affect. Table 3 showed the results of the analyses evaluating if the indirect effects of community violence on implicit aggression through implicit positive affect were conditioned by gender and clips contents, controlling for prior implicit measure of affectivity (baseline) and media violence.

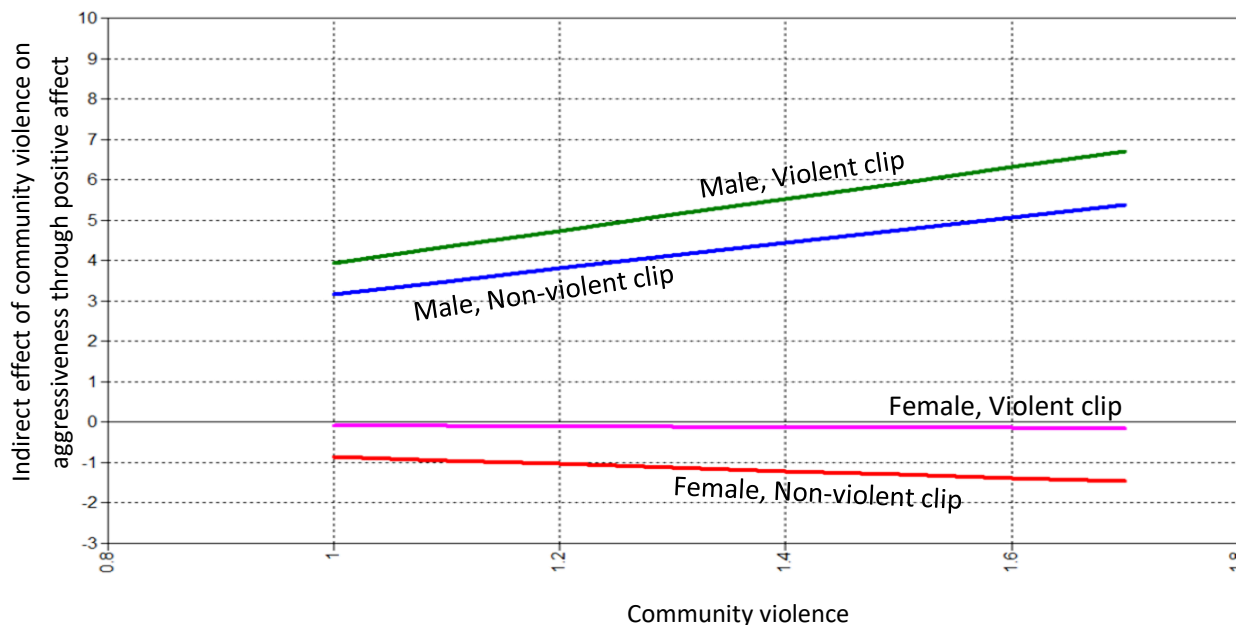
Based on model fit criteria, the model fit the data well, $\chi^2 (df.=6) = 2.85, p = .83$; RMSEA = .00, CFI = 1.00; SRMR = .03. As shown in Table 3, only the interaction between community violence and gender on positive affect was significant ($b = 2.44, p = .003$). The 95% bootstrap confidence interval for the indices of moderated mediation - 4.03 and .08 for gender and clip contents, respectively - were from 1.32 to 8.47 and from -2.05 to 6.66, respectively. As the confidence interval for gender did not include zero, we concluded that the indirect effect of community violence on aggressiveness through positive affect was moderated by gender; the conditional indirect effect was significant for males in combination with violent clip (indirect effect = 3.94, $p = .014$; 95% CI [1.47-8.27]). All the conditional indirect effects are plotted in Figure 3.

Table 3. Indirect effects of ECV on Implicit aggressiveness through Implicit positive affect conditional on gender and clip content.

Predictors	Implicit Positive Affect			Aggressiveness		
	B	SE	95% CI	B	SE	95% CI
IPA T1 (Baseline)	.42***	.13	.17; .68			
Media violence	-.02	.06	-.14; .09	.58***	.21	.22; 1.03
ECV	-.52	1.30	-3.86; 1.48	-3.59	2.07	-7.46; .59
Male (vs. female)	-2.99**	1.04	-4.98; -.88			
Violent clip (vs. Non-violent clip)	-.81	1.47	-4.56; 1.62			
ECV x Gender	2.44**	.83	.74; 4.01			
ECV x Clip content	.47	1.18	-1.38; 3.6			
IPA T2				1.65***	.47	.80; 2.65

*p < .05. **p < .01. ***p < .001. †p < .10.

Figure 3. Indirect effects of ECV on Implicit aggressiveness through Implicit positive affect conditional on gender and clip content.



DISCUSSION

The present pilot study was designed to be a preliminary investigation of emotional desensitization as a consequence of community violence exposure, and its mediating role in the relationship between violence exposure and aggressive behavior.

There are several noteworthy aspects that characterize this study. First, the investigation

of the desensitization phenomenon both in the sense of (1) a decrease in negative affect and (2) an increase in pleasant affect. Second, we were interested in examining whether desensitization was a gender-specific mechanism linking to subsequent aggressive behavior, specifically hypothesizing that males were more likely to become desensitized to violence exposure. Furthermore, we tested whether the desensitization response was related to the specific violent stimulus (e.g., violent clip) or, instead, it was extended to a broad range of stimuli that usually elicit strong emotional reactions (e.g., non-violent but arousing clips).

In support of our hypotheses and in line with previous research reviewed in the introduction, the findings provide some support for the desensitization hypothesis. When we preliminarily examined self-reports of emotional reactions to the films, we found that males showed, in general, less anxiety and more impassiveness in response to clips with respect to females. Overall, this result seems to indicate a general desensitization of negative affect that would occur especially in males, and it is consistent with previous evidence based on correlational studies indicating that boys are more likely than girls to become emotionally desensitized to community violence exposure, especially given girls' increased risk for internalizing symptoms and boys' higher propensity for externalizing symptoms (Kennedy & Ceballo, 2016). Gaylord and colleagues (2011) for example, found that boys showed a stronger quadratic association between community violence and depression, whilst girls showed a more constant, linear relation; Mrug et al. (2015), similarly, found that exposure to higher levels of real-life violence was associated with diminishing (*vs.* increasing) emotional distress when viewing violent videos for males rather than for females. However, we found only marginal significant differences when comparing implicit negative affect in males and females, with males consistently scoring lower than females. Also of interest, even if

marginal, males scored higher on implicit positive affect (both in baseline, T1, and post-test, T2, estimations).

The moderated-mediation analysis provided a further support for this partial result, also offering interesting suggestions about desensitization as an outcome of community violence exposure and a predictor of aggressive behavior. Specifically, the results indicated that there was no significant link between exposure to community violence, implicit negative affect and aggressive behavior, both in males and females; instead, community violence exposure was linked to the increase of positive affect in males, and this link predicted implicit aggressive behavior. That is, the more males habitually were exposed to community violence, the more they showed pleasant affectivity that was, in turn, related to increasing aggressive behavior. These findings, despite their partiality, seem to suggest that community violence is linked to a sensitization of positive affect, in line with some other studies coming from the media violence literature (Huesmann & Kirwil, 2007; Krahe et al., 2011). Furthermore, this effect was independent from the effect of media violence.

Finally, we are not able to state if the desensitization process is stimuli's content-specific or not. Our results suggest that the indirect effect of community violence on aggressive behavior through implicit positive affect is significantly related to watching the violent clip. However, we did not find a moderating effect of the clip content in the relationship between community violence and positive affect, and the slope tendency for males and females watching non-violent clips seems to be not relevantly different from the slope tendency for males and females watching violent clips (see Figure 3). According to Huesmann and Kirwil (2007), understanding this aspect is fundamental to differentiate “emotional habituation” from “emotional desensitization”, where the former indicates a single response to a repeating single stimulus (i.e., violent stimulus), whereas the latter is the emotional response to a

repeating complex set of stimuli over a long run and in a broader context (i.e., violent and non-violent but arousing stimuli). Future studies with a bigger sample size are needed to better clarify these findings.

In sum, the results of the current study, even if preliminary, suggest that community violence exposure increases the pleasure while watching arousing violent or not violent scenes, specifically in males rather than females, which in turn increases the engagement in aggressive behaviors. Most of the articles in literature are experimental designs that are limited to desensitization to violence as a result of media violence exposure; however, we highlight the necessary to conduct studies investigating the impact of such desensitization generated by real situations of violence and the importance of investments in scientific research for prevention and intervention.

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GENERAL CONCLUSION

The present dissertation has tried to offer some empirical evidence about the psychological and behavioral correlates of community violence exposure, with a special attention to the mechanisms linking violence exposure and aggressive behavior in adolescence. When dealing with exposure to violence, an important methodological consideration needs to be raised: are witnessing and victimization two distinct experiences, one independent from the other? Our study 1 sought to address this question by investigating the factor structure of the measure of exposure to community violence using a bifactor modeling approach. Results showed that the bifactor model composed by one general factor of co-occurring witnessing and victimization plus two specific or “pure” factors of witnessing and victimization was the best-fitting model; however, we found that only a small proportion of variance could be attributed to the specific factor of victim, whereas a larger proportion was explained by the general factor of community violence. Otherwise stated, our results indicated that a pure factor of victimization did not exist over and above the general factor, at least in our sample, but instead victimization was more likely to co-occur with violence witnessing. The experience of witnessing, on the other hand, seemed to account for unique variance in its own separate set of domain-related items, although only marginally. Based on these preliminary findings, we decided to use a composite score of violence exposure, as a witness and a victim, in the following studies presented in the current dissertation.

In Study 2 we investigated the cross-lagged associations between self-regulation abilities, community violence exposure and aggressive behavior, in the attempt to test and confirm a temperament-based theory of crime and aggressive behavior, including the involvement in violent contexts (DeLisi & Vaughn, 2014). Among the others, we highlight here two important results coming from this study: one concerns the significant role of exposure to community violence in predicting self-regulation, which

is usually underscored in the literature; the other refers to the association between effortful control and community violence, which is only mediated by aggressive behavior, thus corroborating criminological research showing that young people with low self-control are more likely to engage in delinquent behavior, to associate with other delinquent youth, and then to become direct victims of violence and to put themselves in situations where violence is likely (Pratt & Cullen, 2000; Schreck, Stewart, & Fisher, 2006).

In Study 3 and 4 we tried to expand our knowledge on the desensitization mechanism that would link repeated exposure to violence with aggressive behavior. We considered both hypothesized components of the desensitization process: cognitive and emotional (Funk, Baldacci, Pasold, & Baumgardner, 2004). The central goal of Study 3 was to provide evidence that a process of cognitive desensitization, indicated by high levels of cognitive distortions over time, occurs in response to repeated experiences of violence. Specifically, we integrated the investigation of exposure to community violence and effortful control abilities as explaining factors of specific longitudinal trajectories of moral cognitive distortions as theorized by Gibbs and colleagues (1996), and examined how trajectories of moral cognitive distortions were associated with aggressive behavior. To date, a great number of studies have examined single indicators of the alteration of youths' cognitive processes through their experience of violence, but the relevance of our results is in that they extend prior findings by addressing this issue from a moral perspective. Specifically, based on this study's findings, we can speculate that growing up in a violent neighborhood undermines the normative process of moral development, causing delays that finally consolidate into self-serving cognitive distortions (Gibbs, 2004). Furthermore, we found that low effortful control predicted high and stable cognitive distortions over time, indicating that the persistence of thinking errors during adolescence depends not only on the influence of the

environment in reinforcing schema of self-serving cognitive distortions, but also on an individual failure to take into account action-relevant information about action alternatives, or to adjust misguided goal-directed emotions (Wikström & Treiber, 2009). When examining aggressive behavior as an outcome, our findings indicated that the group with high and stable cognitive distortions over time showed significantly higher levels of later aggressive behavior compared with the group with initial low and moderate cognitive distortions that decrease over time, controlling for early aggressive behavior, age and gender. This result confirms that a crystallization of disengaging mechanisms and self-serving distortions legitimizes and reinforces the recourse to aggressive and violent behaviors (Arsenio & Lemerise, 2004; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996).

Study 4 was thought to be a pilot investigation of the desensitization hypothesis from an emotional perspective. Differently from the other studies presented in the current dissertation, this study sought to test the desensitization mechanism through an experimental design and the use of implicit measures of affectivity and behavioral aggression, which are extremely useful for overcoming limitations associated with explicit self-reports, in general and in the specific case of experimental designs (for example, explicit requests for reports of one's emotional state may activate analytic and reflective processes that alter emotional experience; see Quirin, Kazén, & Kuhl, 2009). The moderated-mediation analysis showed that community violence exposure was linked to the increase of positive (and not to the decrease of negative) affect in males (and not in females), and that this link predicted implicit aggressive behavior. That is, the more males habitually were exposed to community violence, the more they showed pleasant affectivity that was, in turn, related to increasing aggressive behavior. However, given the small sample size, we acknowledge that these results must be interpreted with particular caution, but if confirmed, they would represent a relevant

step forward in the comprehension of the desensitization process in response to community violence exposure.

In sum, although findings from the current dissertation contribute to partially cover some gaps in the literature on community violence, we recognize that future studies are needed to confirm the generalizability of these results: The extension of the same research questions to other samples, the use of more objective measures (as well as the assessment through other-report measures), or the inclusion of other focal variables, such as being exposed to violence in other life contexts, could be considered, for example, in order to overcome the main limitations affecting the studies here presented.

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