

Age of crime onset and psychopathic traits in female juvenile
delinquents

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Abstract

The aim of the present study was to analyze the role of psychopathic traits in the age of crime onset of female juvenile delinquents. Using a sample of 132 young females from the Juvenile Detention Centers of the Portuguese Ministry of Justice and from schools in the Lisbon region, a group of early crime onset ($n = 44$), a group of late crime onset ($n = 44$), and a non-delinquent school group ($n = 44$) were formed. Results showed that early crime onset participants score higher on psychopathy measures, on self-reported delinquency and on crime seriousness than late crime onset participants and school participants. Psychopathic-traits scores were significantly associated with age of crime onset, age at first trouble with the law, and frequency and seriousness of crime.

Key words: Female juvenile delinquency; Psychopathic-traits; Crime-onset

The timing of the onset of antisocial behavior is one of the most critical pieces of information in understanding maladaptive behaviors, substance use, alcoholism, delinquency, and criminal justice system involvement. Antisocial behaviors that emerge during early and middle childhood are often harbingers of sustained antisocial behavior that persist through adolescence and endure into adulthood (DeLisi, Beaver, Wright, & Vaughn, 2008; Vaughn & Howard, 2005). Females under age 18 comprise one of the fastest growing segments of the juvenile-justice population, with their arrests accounting for 27% of total arrests during 1999. Furthermore, delinquency cases involving adolescent females increased by 83% between 1988 and 1997 (American Bar Association & National Bar Association, as cited in Leve & Chamberlain, 2004; Porter, 2000). In recent years, violence among young females has increased both in terms of number offences committed as well as the severity of these offences (Cauffmann, Lexcen, Goldweber, Shulman, & Grisso, 2007; Thomas, 2005).

Theoretical and empirical models describing the development of antisocial behavior in young adolescent girls have been scarce. Risk factors have been identified predominantly for males (Wong, Slotboom, & Bijleveld, 2010). Not much is known about the precursors, etiological factors and correlates of female delinquency. This dearth of knowledge about developmental trajectories is partly due to the lower base rate of criminal activity among females relative to males, particularly at a young age. The relative lack of research on girls may also be a function of a lack of consensus on how to define and assess female antisocial behavior, with somewhat divergent approaches being taken within the fields of psychiatry, psychology and criminology (Hipwell et al., 2002).

Research has indicated that there are several common pathways leading to antisocial and aggressive behavior (Frick, 2012). Researchers who embrace the age of onset subtyping approach have identified two main groups of offenders: the early starters (Patterson,

DeBaryshe, & Ramsey, 1989) or life-course-persistent offenders (Loeber & Stouthamer-Loeber, 1998; Moffitt, 1993), who commit their first transgression early and persist in offending throughout the lifespan; the late starters (Patterson, DeBaryshe, & Ramsey, 1989), adolescence-limited offenders (Moffitt, 1993), or limited duration offenders (Loeber & Stouthamer-Loeber, 1998). Operational definitions of early onset of delinquent behavior generally tend to involve delinquency beginning before age 11 or 12 (Parker & Morton, 2009). DSM-IV-TR (American Psychiatric Association, 2000), taking into account that these age-of-onset distinctions have important implications, presents two subtypes of Conduct Disorder (CD) based on age of onset: childhood-onset type characterized by onset prior to age 10, and an adolescent-onset type characterized by onset after age 10.

Psychopathic traits are associated with a variety of adverse outcomes in adolescence and adulthood. The psychopathy construct is characterized by a constellation of interpersonal (e.g., manipulation, deceit, egocentricity), affective (e.g., lack of empathy, remorse, or guilt), behavioral (e.g., irresponsibility, impulsivity), and antisocial (e.g., poor anger control, serious criminal behavior) traits (Hare, 2003, 2006). The construct is now well validated among adult males, and to a lesser extent, among adult females (Bolt, Hare, Vitale, & Newman, 2004; Hare, 2003; Jackson, Rogers, Neumann, & Lambert, 2002). There is however a controversial discussion about the feasibility of its downward extension to children and adolescents (Seagrave & Grisso, 2002; Sevecke, Lehmkuhl, & Krischer, 2009; Sevecke & Kosson, 2010). The many investigations that have now been dedicated to adolescent psychopathy suggest support for the existence of similar correlates as seen in adult samples. For example, youth with higher psychopathic traits are generally more prone to use excessive and disproportioned violence in their crimes (Fritz, Wiklund, Kuposov, Klinteberg, & Ruchkin, 2008; Lindberg, Laajasalo, Holi, Putkonen, Weizmann-Henelius, & Häkkänen-Nyholm, 2009), and start engaging in criminal activities earlier in life, come into

contact with the justice system earlier in life, and have higher frequency of delinquent behaviors (Pechorro, Gonçalves, Marôco, Gama, Neves, & Nunes, in press).

Although there is growing evidence corroborating the utility of the psychopathy construct in adolescent males, very few studies have specifically addressed psychopathy in female youths. There is however some evidence that psychopathy is expressed differently in girls and women (Charles, Acheson, Mathias, Furr, & Dougherty, 2012). A close examination of the studies that have investigated the role of psychopathic traits in female youths reveals that relatively small sample sizes of adjudicated girls are included. They have only constituted approximately 11% to 22% of the total sample (Frick, 1998, Frick, O'Brien, Wootton, & McBurnett, 1994). We can conclude that, while psychopathic personality traits can be detected in female samples, it is still unclear if psychopathy in girls has the same structure and behavioral correlates as psychopathy in boys. For example, Vincent, Vitacco, Grisso, and Corrado (2003), tried to identify subtypes of offenders based on the Psychopathy Checklist - Youth Version (PCL:YV), but although their sample consisted of 441 adolescents (326 boys, 115 girls), all girls were excluded from analysis due to the limited evidence for the validity of the PCL:YV in girls. Other studies have compared the prevalence of psychopathic traits between male and female juvenile offenders. For example, Pechorro, Vieira, Poiares, Vieira, Marôco, Neves, and Nunes (2013) concluded that female juvenile offenders show less CU traits, more emotional symptoms, more pro-social behaviors, less self-reported delinquent behavior, and lower crime seriousness.

Frick and colleagues (1999) have proposed a developmental trajectory to psychopathy, especially among youth with early onset conduct problems (Moffitt, 1993; Moffitt & Caspi, 2001). These authors suggested that the antisocial behavior of youth scoring high on callous-unemotional (CU) traits is qualitatively different from that of children or adolescents who exhibit conduct problems but not CU traits. In a series of

studies, he has demonstrated that antisocial and aggressive behaviors of children who score high on CU traits are less strongly related to adversity factors, such as poor parenting or low intelligence, and more strongly related to thrill and adventure seeking (Frick, Kimonis, Dandreaux, & Farrel, 2003), a reward-dominant response style, and deficits in processing negative emotional stimuli (Kimonis, Frick, Fazekas, & Loney, 2006; Loney, Frick, Clements, Ellis, & Kerlinet, 2003).

Silverthorn and Frick (1999), after reviewing the limited available research on antisocial girls, suggested that a childhood-onset pathway and an adolescent-onset pathway cannot be applied to girls without some important modifications. These authors proposed that antisocial girls show a third developmental pathway which they labeled delayed-onset pathway. Their model assumes that many of the pathogenic mechanisms that may contribute to the development of antisocial behavior in girls, such as cognitive and neuropsychological deficits, a dysfunctional family environment, and/or the presence of a CU interpersonal style, could be present in childhood, but they do not lead to severe and overt antisocial behavior until adolescence. They proposed that the delayed-onset pathway for girls is analogous to the childhood-onset pathway in boys and that there is no analogous pathway in girls to the adolescent-onset pathway in boys.

According to Salekin (2006), it remains unclear how the phenomenon of psychopathy can be neatly accommodated within Moffitt's (1993) dual subtype scheme. Whereas it has been suggested that the early onset persistent offenders may be the prototype of young persons with psychopathic-like traits, there is evidence that these individuals do not fit neatly into this offender subgroup. According to Vincent et al. (2003), from a cluster analysis of the distinctive facets of the construct of psychopathy (i.e., affective, interpersonal, and behavioral), there may be more than the two distinctive juvenile offender subtypes.

Moffitt, Caspi, Harrington, and Milne (2002) reported comparisons on outcomes of males who participated in the Dunedin longitudinal study. The childhood-onset delinquents at age 26 years were the most elevated on psychopathic personality traits, mental-health problems, substance dependence, numbers of children, financial problems, work problems, and drug-related and violent crime, including violence against women and children. The adolescent-onset delinquents at 26 years were less extreme but elevated on impulsive personality traits, mental-health problems, substance dependence, financial problems, and property offenses. The findings supported the theory of life-course-persistent and adolescence-limited antisocial behavior in males.

Others authors have suggested that the presence of a callous/unemotional (CU) interpersonal style may be an important marker along with the presence of impulsivity/hyperactivity and conduct problems. Specifically, it is this combination that according to Lynam (1996, 1998) forms a unique subgroup of fledgling psychopaths, i.e., tomorrow's antisocial adults can be found among today's antisocial children. Barry et al. (2000) have also shown the presence CU traits as designating this group of young persons with psychopathic-like traits. The importance of CU traits in developmental pathways to severe antisocial behavior in children was demonstrated by Frick, Kimonis, Dandreaux, and Farrel (2003). Their findings revealed that the presence of CU traits in non-referred children may designate a distinct, behaviorally dysregulated group of children with conduct problems that may have unique processes underlying their dysregulation that make them more similar to adults with psychopathy.

Differential relationships between CU traits and adjustment in boys ($n = 116$) and girls ($n = 118$) at risk for antisocial behavior were examined by Charles et al. (2012). Boys were generally rated higher on measures of CU traits, but these traits were more prominently related to adjustment problems among girls. These authors suggest that

expression of psychopathic traits may have more negative effects on adjustment for girls than boys, and that CU traits may be impacting adjustment in girls by impairing interpersonal relationships.

There is some evidence that CU traits are most important for designating a distinct subgroup of antisocial youth (Caputo, Frick, & Brodsky, 1999; Christian, Frick, Hill, Tyler, & Frazer, 1997), but most definitions of psychopathy include several other dimensions, including impulsivity/irresponsibility and narcissism/grandiosity (Cooke, Michie, & Hart, 2006). Young people with more severe manifestations of these traits reportedly commit a disproportionate amount of crime, appear unperturbed when confronted with the destructive nature of their behavior, and are more likely to re-offend or resist efforts at rehabilitation (Blair, Colledge, Murray & Mitchell, 2001; Forth & Burke, 1998; Salekin, Rogers, & Ustad, 2001). Children and adolescents who display these hallmarks of psychopathic-like traits are also at particular risk of developing proactive aggression (Christian, Frick, Hill, Tyler, & Frazer, 1997).

Forth, Hart, and Hare (1990) were the first to introduce the measurement of psychopathy in youth using a specially adapted version of the Psychopathy Checklist (PCL-R; Hare, 1991) which ultimately led to the Psychopathy Checklist: Youth Version (PCL:YV; Forth, Kosson, & Hare, 2003). Other authors followed the lead and developed their own versions of instruments intended to measure child and adolescent psychopathy. Frick and Hare (1994/2001) developed the Antisocial Process Screening Device (APSD). Lynam (1998) developed the Child Psychopathy Scale (CPS), which was later modified by Spain, Douglas, Poythress, and Epstein (mCPS; 2004). Andershed, Kerr, Stattin, and Levander (2002) developed the Youth Psychopathic Traits Inventory (YPI). Other less used measures were also developed (e.g., Psychopathy Content Scale - PCS; Murrie & Cornell, 2002).

Findings for age of onset of criminal conduct and its association with psychopathy scores have been mixed. For example, Vincent et al. (2003) reported that male young offenders scoring high on the PCL:YV (Forth et al., 2003) received their first convictions at significantly younger ages than those scoring lower. Brandt, Kennedy, Patrick, and Curtin (1997) using modified PCL-R scores reported a significant correlation with age of first arrest. Furthermore, Salekin, Brannen, Zalot, Leistico, and Neumann (2006) found a negative association between age of onset of antisocial behavior and PCL:YV scores, although the association was not statistically significant. Kosson, Cyterski, Steuerwald, Neumann, and Walker-Matthews (2002), however, did not find a significant correlation with age at first trouble with the law and PCL:YV scores.

Adolescents with psychopathic traits tend to engage in more frequent offences and are more versatile in their offending. Campbell, Porter, and Santor (2004) found that PCL:YV scores were positively related with self-reported delinquency, aggressive behavior, and versatility of criminal history, although not related to official records for nonviolent and violent convictions. In a study of male adolescent probationers, Kosson et al. (2002) found the PCL:YV scores correlated $r = .27$, $r = .35$, and $r = .42$ with previous violent, nonviolent, and total charges. As well, Murrie, Cornell, Kaplan, McConville, and Levy-Elkon (2004) found that the PCL:YV correlated both with adjudicated violent offense ($r_{pb} = .24$) and with un-adjudicated violent offense ($r_{pb} = .30$). Also, Vincent et al. (2003) reported that youth scoring higher on the PCL:YV have significantly more nonviolent and violent convictions than youth scoring lower.

With respect to self-report psychopathy scales (Lilienfeld & Fowler, 2006), Skeem and Cauffman (2003) coded the institutional files of 160 male adolescent offenders for age of first contact with the police, and type and number of prior offenses. The YPI (Andershed et al., 2002) was not related to age at first contact ($r = .11$), number of offenses ($r = -.09$), or

number of person-related offenses ($r = .12$). In contrast, other researchers have reported an association between self-report psychopathy scales and criminal conduct. For example, Poythress and colleagues (2006) examined the association between indices of criminal conduct and the YPI, and the self-report APSD (Frick & Hare, 2001 Muñoz & Frick, 2007) in a sample of 165 male and female youth in a juvenile detention program. A self-report delinquency scale assessed whether the youth had committed 23 different delinquent behaviors in the past year and the age of onset of these behaviors. Both the YPI and the APSD were moderately correlated with indices of past-year offending (both scales correlated at $r = .44$). The earliest age of onset for any delinquent behavior was correlated ($r = -.29$ for the APSD, and $r = -.28$ for the YPI total scores). In addition, Murrie et al. (2004) reported that APSD ($r_{pb} = .22$) and MACI-PCS ($r_{pb} = .18$) scores were associated with whether the youth had been adjudicated for a violent offense.

Muñoz and Frick (2007) investigated the association between self-report APSD scores and antisocial behaviors in a community sample of 91 young adolescents. Parental and youth self-report APSD scores, self-reported delinquency, parent-rated conduct problems, and occurrence of police contacts were studied annually across 3 years. Within each of these time periods, self-report APSD was related to self-reported delinquency ($r = .58$, $r = .42$, and $r = .38$) and police contacts ($r_{pb} = .25$, $r_{pb} = .34$, and $r_{pb} = .29$). Parental APSD was related to parent-reported conduct problems ($r = .25$, $r = .34$, and $r = .55$) but not to the occurrence of police contacts ($r_{pb} = .11$, $r_{pb} = .08$, and $r_{pb} = .16$). With respect to predictive validity, self-report APSD scores at Time 1 predicted self-reported delinquency and violence at Time 3 ($r = .50$, and $r = .43$), and parent-reported conduct problems and aggression ($r = .62$, and $r = .47$).

The investigation of age of criminal onset and juvenile psychopathy is considered an important area of study, but there is a lack of research on this topic, especially in European

samples and especially regarding to females. To our knowledge this is the first study examining age of criminal onset and juvenile psychopathic traits in Portuguese female adolescents. By examining a sample of adolescent females from Portuguese juvenile detention centers and schools we hope to demonstrate that the age of crime onset is significantly related to psychopathic personality traits, self-reported delinquency, and crime seriousness. The present study was designed to test two hypotheses: a) early crime onset participants will have higher average scores on the psychopathy measures, on self-reported delinquency and on crime seriousness than late crime onset participants and school participants; and b) psychopathic-traits scores are significantly associated with age of crime onset, age at first trouble with the law and frequency and seriousness of crime.

Method

Participants

The final sample consisted of 132 female participants recruited from a forensic context and a school context. It was subdivided to form the early crime onset group ($n = 44$; $M = 15.45$ years; $SD = 1.17$ years; range = 14 - 18 years), the late crime onset group ($n = 44$; $M = 15.86$ years; $SD = 1.23$ years; range = 13 - 18 years), and the school group ($n = 44$; $M = 15.77$ years; $SD = 1.26$ years; range = 13 - 18 years). The criterion used to form the early crime onset and the late crime onset groups (early onset ≤ 12 years; late onset > 13 years) was based on both official records and the self-reported age of crime onset.

Table 1 shows data regarding the frequency of participants per group.

[Insert Table 1]

Instruments

The Antisocial Process Screening Device - Self-report (APSD-SR; Caputo, Frick, & Brosky, 1999; Frick & Hare, 2001; Muñoz & Frick, 2007) is a multi-dimensional 20-item measure designed to assess psychopathic traits in adolescents modeled after the Psychopathy Checklist - Revised (PCL-R; Hare, 2003). Each item is scored on a 3-point ordinal scale (Never = 0, Sometimes = 1, Often = 2). Higher scores mean an increased presence of the traits in question. The total score, as well as each dimension's score, is obtained by adding the respective items. Some studies (e.g., Frick et al., 1994) reported two main factors: callous/unemotional traits (CU, tapping interpersonal and affective

dimensions of psychopathy, such as lack of guilt and absence of empathy) and an impulsivity/conduct problems factor (I-CP, tapping behavioral aspects of conduct problems and impulse control problems). Other studies (e.g., Frick, Barry, & Bodin, 2000) reported three main factors: callous/unemotional traits factor (CU) and an I-CP factor which is subdivided into two further factors, namely narcissism (Nar) and impulsivity (Imp). Higher scores indicate an increased presence of the characteristics associated with each factor. The Portuguese validation of the APSD self-report (Pechorro, 2011; Pechorro, Marôco, Poiares, & Vieira, 2013) that was used demonstrated psychometric properties that justify its use with Portuguese youths in terms of factor structure, internal consistency, temporal stability, convergent and divergent validity, and concurrent validity. The internal consistency for the present study ($N = 132$), estimated by Cronbach's alpha, was as follows: APSD-SR total = .82; I-CP = .84; CU = .55. The result regarding the CU dimension was low, but still acceptable for exploratory research purposes (DeVellis, 1991).

The Child and Adolescent Taxon Scale (CATS; Harris, Rice, & Quinsey, 1994; Quinsey, Harris, Rice, & Cormier, 2006) is an actuarial rating scale developed from variables related to childhood and adolescent antisocial and aggressive characteristics (e.g., childhood aggression problem, arrested below the age of 16). This scale has eight items scored either No (0) or Yes (1). The total score is obtained by adding the items. Higher scores mean higher psychopathic characteristics. Because CATS is an actuarial scale, no internal consistency reliability was estimated. Correlation with APSD-SR for the present study was $r = .54$ ($p < .001$). Inter-rater reliability was estimated using Intraclass Correlation Coefficient ($ICC = .97$; $p < .001$).

The Adapted Self-Reported Delinquency Scale (ASRDS; Carroll, Durkin, Houghton, & Hattie, 1996; Carroll, Houghton, Durkin, & Hattie, 2009) is a self-report

measure consisting of 38 items, which assesses adolescent involvement in illegal and antisocial activities. The ASRDS score can be obtained by adding the items from a 3-point ordinal scale (Never = 0, Sometimes = 1, Often = 2), where higher scores signify greater involvement in criminal activities. The ASRDS version validated for the Portuguese population (Pechorro, 2011) was used. ASRDS Internal consistency for the present study, estimated by Cronbach's alpha, was .94.

The Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) short composite (MCSDS-SF) version was designed by Ballard (1992) from the original Marlowe-Crowne scale. It is recognized as a composite sub-scale and is currently probably the most used of all the subscales that have been derived from the original MCSDS. A Portuguese version of the MCSDS-SF, especially translated and adapted for adolescents, was used (Pechorro, 2011). Higher scores mean higher social desirability. Internal consistency for the present study, using a 12 items version of the MCSDS-SF scored either No (0) or Yes (1), estimated by Kuder-Richardson coefficient was .60. Such a result is low, but still acceptable for exploratory research purposes (DeVellis, 1991).

The Index of Crime Seriousness (ICS; Wolfgang, Figlio, Tracey, & Singer, 1985, as cited in White et al., 1994) was used to determine the delinquency seriousness classification of official reports. Level 1 consisted of minor delinquency committed at home, such as stealing minor amounts of money from mother's purse. Level 2 consisted of minor delinquency outside the home including shoplifting something worth less than i5, vandalism and minor fraud (e.g., not paying bus fare). Level 3 consisted of moderately serious delinquency such as any theft over i5, gang fighting, carrying weapons, and joyriding. Level 4 consisted of serious delinquency such as car theft and breaking and entering. Level 5 consisted of having performed at least two of each of the behaviors in the

previous level. Higher levels mean higher crime seriousness. Inter-rater reliability for the present study was estimated using Kendall's tau-b ($\tau = .94; p < .001$).

In addition, a questionnaire was constructed to describe the socio-demographic and criminal characteristics of the participants and to analyze the possible moderating effect of these variables. This questionnaire includes questions about participants' age, nationality, ethnic group, rural *versus* urban origin, level of schooling completed, socio-economic status, parents' marital status, nationality, number of siblings/half-siblings, taking of psychiatric drugs, age of first transgression, age of first problem with the law, and age of first incarceration in a Juvenile Detention Center. Socio-economic status was measured by a combination of the parents' level of education and profession, appropriate to the Portuguese reality (Simões, 1994). Age of first problem with the law was defined as the age of the first intervention by the police (e.g., age of first arrest by the police, age of first crime charge).

Procedures

The age range for female youth participation in the study was previously set between 12 and 20 years since this is the age range when young people are amenable to interventions under the Portuguese judicial system's Educational Guardianship Act (*Lei Tutelar-Educativa*). Even though girls are not often admitted to the Portuguese Juvenile Detention Center (*Centros Educativos*), we chose to use only female participants due to the relative scarcity of studies done internationally. The questionnaires were individually applied to the youths by the first author of this study. The author who did the diagnosis of DSM-IV-TR Conduct Disorder (CD; American Psychiatric Association, 2000) did not

know the subsequent grouping of the participants into early or late onset groups. Each questionnaire was preceded by an informed consent form, in which participants were informed of the voluntary and confidential nature of participation in the study. Parental informed consent was not needed due to the fact that the participants were under the Portuguese judicial system Educational Guardianship Act.

Collection of questionnaires in the forensic context was carried out individually after obtaining authorization from the General Directorate of Reintegration and Prison Services - Ministry of Justice (*Direção-Geral de Reinserção e Serviços Prisionais - Ministério da Justiça*). All the detainees from the six existing Juvenile Detention Centers managed by the Portuguese Ministry of Justice were informed about the nature of the study and asked to participate. The participation rate was around 92%. Not all detainees agreed or were able to participate. Reasons included refusal to participate (6%), inability to participate due to not understanding the language (1%) and inability to participate due to security issues (1%). The first author of this study clarified any questions that arose regarding participation. No incentives to encourage participation were given. All questionnaires of those who participated were appropriately completed. Since there was a very high participation rate, corresponding to the large majority of the Portuguese juvenile inmate population detained at that moment in time, there was little or no selection bias present.

The collection of questionnaires in the school context took place after having obtained permission from the Directorate General of Education - Ministry of Education (*Direção-Geral de Educação - Ministério da Educação*) and from the parents of the participants. Twelve elementary/secondary schools from the greater Lisbon areas were randomly selected, of which four agreed to participate. Reasons for non-participation

included the systematic absence of a response to collaboration requests made, alleged internal school organization issues that made collaboration impossible, as well as the refusal to collaborate due to the forensic content of the questionnaire. The schools that accepted to participate requested that participation of each student should be previously authorized by written consent, signed by their parent/guardian. In the end, about 17% of participants were excluded due to not belonging to the age range established or to reasons such as returning incomplete, blank or illegible questionnaires.

Questionnaire data which were considered valid (e.g., appropriately completed by participants within the selected age range) was analyzed using SPSS v20 (IBM SPSS, 2011). Following data entry, 10% of questionnaires were randomly selected to evaluate the quality of their entry. The quality was considered very good as practically no entry errors were detected. Then the early crime onset and the late crime onset groups were formed (early onset ≤ 12 years; late onset > 13 years). For the purposes of this study the criterion used to form these groups was based both on official records and the self-reported age of crime onset. Youths who reported to have committed a criminal offense or who were first formally charged with an offense at or before the age of 12 were considered early onset delinquents, while youths who reported to have committed a criminal offense or were first charged with an offense at age 13 or after were considered late onset delinquents.

MANOVA was used to analyze the multiple dependent variables together. Because homogeneity of variance/covariance assumption was not met (Box's $M = 233.983$; $p < .001$) and group sizes were identical, the appropriate multivariate statistic was used. Univariate ANOVAs were used to compare groups when the assumptions of normality (skewness and kurtosis between -2 and 2) and homogeneity of variance were validated. Welch's ANOVA was used when the assumptions of normality were validated but the

group variances revealed heteroscedasticity. For the post hoc multiple comparisons Tukey HSD was used when the assumptions of normality and homoscedasticity were validated, while Games-Howell test was used when group's variances revealed heteroscedasticity. Kruskal-Wallis test was used when the variables were ordinal or when the data clearly violated both the assumption of normality and homogeneity of variance (Tabachnick & Fidell, 2007). For the post hoc multiple comparisons Mann-Whitney tests were used. The Chi-square test was used to compare nominal variables. Point biserial correlations were used to analyze the association between nominal dichotomous variables and scale variables. Spearman Rho was used to analyze associations between ordinal variables. Pearson r was used to analyze correlations between scale variables. Results were considered significant if $p < .05$, and marginally significant if $p < .1$ (Aron, Coups, & Aron, 2013).

Effect size and power calculations were made (as described in Marôco, 2011), and the following values were obtained: APSD-SR I-CP (effect size $\eta_p^2 = .37$; power = 1), APSD-SR CU ($\eta_p^2 = .28$; power = 1), CATS ($\eta_p^2 = .85$; power = 1), ASRDS ($\eta_p^2 = .50$; power = 1), ICS ($\eta^2 = .50$; power = .95), and MCSDS-SF ($\eta_p^2 = .09$; power = .87). Most of these effect sizes values can be considered medium [.05; .25] to large [.25; .50], and the power values are considered good [.08; 1] (Marôco, 2011; Tabachnick & Fidell, 2007).

Results

In the initial phase of data treatment, variables of the socio-demographic questionnaire between the three groups were analyzed. No statistically significant differences were found between the three groups regarding age ($F = 1.365; p = .259$), socioeconomic status ($\chi^2_{KW} = 1.411; p = .507$), ethnicity ($\chi^2 = 3.462; p = .218$), rural *versus* urban origin ($\chi^2 = 2.015; p = 1.0$), and taking of psychiatric drugs ($\chi^2 = 3.667; p = .210$). Results showed statistically significant differences between the groups regarding level of schooling completed ($F = 83.480; p < .001$); Tukey HSD post hoc tests revealed statistically significant differences between the school group and the early onset group ($p < .001$) and between the school group and the late onset group ($p < .001$). Number of siblings/half-siblings also differed significantly between groups ($F = 10.721; p < .001$); statistically significant differences occurred between the school group and the early onset group ($p < .001$) and between the early onset group and the late onset group ($p < .01$). Parents' marital status also differed between groups ($\chi^2 = 32.896; p < .001$), namely between the school group and the early onset group ($\chi^2 = 8.055; p < .05$), between the school group and the late onset group ($\chi^2 = 28.376; p < .001$) and between the early onset group and the late onset group ($\chi^2 = 10.430; p < .05$). Finally, the groups also differed in their nationality ($\chi^2 = 18.146; p < .01$), namely between the school group and the early onset group ($\chi^2 = 10.448; p < .01$). The analysis of these variables demonstrated that the early onset group contained participants with lower level of schooling completed, whose parents were more often divorced/separated or deceased, who had more siblings/half-siblings, and more foreign nationals.

The results of the criminal variables between the early onset and the late onset groups were then analyzed. Results showed statistically significant differences between the

groups regarding age of onset of criminal activities ($F = 161.111$; $p < .001$), age of first problem with the law ($F_W = 63.945$; $p < .001$), and age of first detention in a Juvenile Detention Center ($F = 11.401$; $p < .001$). Significant differences between the two groups were also found regarding DSM-IV-TR's (American Psychiatric Association, 2002) Conduct Disorder diagnosis ($\chi^2 = 8.494$; $p < .01$). The analysis of these variables between the early onset group and the late onset group revealed that the participants from the early onset group had their first problems with the law earlier in life, were younger when they were first incarcerated in a Juvenile Detention Center, and had proportionately more conduct disorder diagnosis (95.5% versus 72.7%).

A MANOVA was conducted to assess if there were differences between the three groups (early crime onset group, late crime onset group, and school group) on a linear combination of dependent variables. The APSD-SR total score was not included as a dependent variable in this analysis due to perfect multicollinearity problems (Leech, Barrett & Morgan, 2008; Marôco, 2011). There were statistically significant differences in the dependent variables in at least two of the groups (Pillai's Trace = 1.249; $F = 34.678$; $p < .001$; $\eta_p^2 = .625$; power = 1). Follow-up univariate ANOVAs showed that statistically significant differences were found when comparing the three groups regarding the psychopathy measures (see Table 2).

[Insert Table 2]

Table 2 shows the significant differences found regarding the APSD-SR I-CP, APSD-SR CU and CATS. Post hoc Games-Howell tests regarding the APSD-SR I-CP

showed significant differences between the early onset group and the late onset group ($p < .001$), between the early onset group and the school group ($p < .001$) and between the late onset group and the school group ($p < .01$). Post hoc Tukey HSD regarding the APSD-SR CU showed significant differences between the early onset group and the late onset group ($p < .001$), and between the early onset group and the school group ($p < .001$). Post hoc Games-Howell tests regarding the CATS, showed significant differences between the early onset group and the school group ($p < .001$) and between the late onset group and the school group ($p < .001$).

After comparing the three groups regarding the ASRDS, ICS and MCSDS-SF, statistically significant differences were found as depicted in Table 3.

[Insert Table 3]

Post hoc Games-Howell tests regarding the ASRDS showed significant differences between the early onset group and the late onset group ($p = .02$), between the early onset group and the school group ($p < .001$) and between the late onset group and the school group ($p < .001$). Post hoc Mann-Whitney tests regarding the ICS showed significant differences between the early onset group and the late onset group ($p < .001$), between the early onset group and the school group ($p < .001$) and between the late onset group and the school group ($p < .001$). Post hoc Games-Howell tests regarding the MCSDS-SF showed significant differences between the early onset group and the late onset group ($p = .008$), and between the early onset group and the school group ($p = .007$).

The correlation of the APSD-SR total score with the other measures and variables was also tested. Statistically significant correlations were found, namely with: CATS ($r = .54; p < .001$), ASRDS ($r = .62; p < .001$), ICS ($r_s = .67; p < .001$), MCSDS-SF ($r = -.29; p < .001$), DSM-IV-TR's Conduct Disorder diagnosis ($r_{pb} = .63; p < .001$), age of crime onset ($r = -.50; p < .001$), age of first problem with the law ($r = -.34; p < .001$), and age of first incarceration in a juvenile detention center ($r = -.19; p = .08$).

Discussion

The relation between age of criminal onset and female juvenile psychopathy is an important area of study that has not been sufficiently investigated. The aim of this study was to analyze the role of psychopathic traits in the age of crime onset of female juvenile delinquents. We hypothesized that early crime onset participants would have higher average scores on the psychopathy measures, on self-reported delinquency and on crime seriousness than late crime onset participants and school participants, and that psychopathic-traits scores would be significantly associated with age of crime onset, age at first trouble with the law, and frequency and seriousness of crime.

Analysis of the socio-demographic variables allowed us to conclude that the early onset group contained participants with lower level of schooling completed, whose parents were more often divorced/separated or deceased, who had more siblings/half-siblings, and more foreign nationals. Analysis of the criminal variables between the early onset group and the late onset group revealed that the participants from the early onset group had their first problems with the law (contacts with the police and the courts) earlier in life, and were also younger when they were first incarcerated in a Juvenile Detention Center. Also, proportionately more participants of the early onset group (95.5% *versus* 72.7%) were diagnosed with conduct disorder (DSM-IV-TR; American Psychiatric Association, 2000).

In comparisons between the three groups regarding the psychopathy measures (namely APSD-SR I-CP, APSD-SR CU, and CATS) the early onset group tended to obtain the highest scores followed by the late onset group. This evidence reinforces the literature that supports the consistent association of psychopathic-like traits with early crime onset in both males and females. Like Moffitt et al. (2002) we found that earlier age of crime onset is generally accompanied by higher psychopathy traits. We are not stating that higher

psychopathic traits trigger earlier age of onset, but these two variables may be reinforcing each other alongside other variables like negative life events, substance abuse, inadequate parenting, low attachment to school or having delinquent friends (Wong et al., 2010), to produce life course persistent female offenders.

In comparisons regarding self-reported delinquency and crime seriousness the early onset group also obtained the highest scores, followed by the late onset group. These results support those obtained by Tolan and Thomas (1995) in their longitudinal study and are consistent with the review conducted by Krohn, Thornberry, Rivera, and Le Blanc (2001), in which these authors found that early onset offenders were forty times more likely than late onset offenders to become habitual criminals and committed between 40% and 700% more criminal acts. Not only the early onset participants commit crimes more frequently, but they also commit more serious ones. These minors show the most severe antisocial behavior among the incarcerated youths.

In comparisons regarding social desirability it may seem like the results are counter-intuitive, as higher scores for social desirability could be expected in female youths with early onset and higher psychopathic traits (so as to try to portray more positive images of themselves). One should have in mind that some caution is advised in interpreting these values due to the low Kuder-Richardson coefficient. Lilienfield and Fowler (2006) had already showed that psychopaths frequently report the presence of socially devalued characteristics, such as antisocial behaviors, hostility and weak impulse control, reliably. Quite frequently it is considered that psychopaths are supposedly more adept than non-psychopaths at manipulating their questionnaire answers, but there is no solid and consistent empirical evidence that supports such a claim. Only a few specific clinical observations and studies (e.g., Ray et al., in press) have demonstrated that psychopaths

could have scores similar to those of students because they can in some degree manipulate social desirability measures.

Findings for the association of psychopathic traits with age of criminal onset and first trouble with the law were statistically significant, but only marginally significant for the age of first incarceration in a juvenile detention center. Our findings corroborate previous studies (e.g., Brandt et al., 1997; Salekin et al., 2006; Vincent et al., 2003). Findings regarding the association of psychopathic traits with the frequency of delinquent behaviors and seriousness of crimes showed strong correlations in line with previous studies (e.g., Brandt et al., 1997; Campbell et al., 2004), implying that young females with higher psychopathic traits display the most severe antisocial behavior.

Our investigation clearly supports a relation between psychopathy scores and criminal conduct in young females. However, we must highlight that not all minors who show severe antisocial behavior together with the diagnosis of conduct disorder should be considered to be potential psychopaths, such a classification should be reserved for a distinct subgroup after suitable assessment (Lynam, 1996). We must stress the importance of the psychopathy construct for the early identification of young people at potential high risk and for the rigorous assessment of young people who have already come into contact with the judicial system, thus promoting an empirically grounded basis to guide interventions.

Our study contributes to the research on age of crime onset and juvenile psychopathic traits in female European samples. This is the first study examining age of crime onset in a female sample of Portuguese youths. Also, we hope to promote the investigation of psychopathic traits the Portuguese ethnic/cultural reality, which may help to identify unique etiological pathways in the development of antisocial behavior (Kotler &

McMahon, 2005). To design specific interventions for young persons at various points of their criminal trajectory, we need to fully understand how the early onset life-course persistent and the late onset adolescent-limited offenders are different. Understanding the unique developmental patterns of each group may allow interventions to be designed that prevent or alter an individual's progression along the trajectory, whether it is their by choice or circumstance.

It is necessary to point out several limitations of our study. First, the use of self-report measures on psychopathy was a limitation. Second, the low internal consistency of some scales and dimensions (e.g., MCSDS-SF, APSD-SR CU) were limitations in terms of reliability of measurement. Third, the fact that our study was cross-sectional limited the certainty about the differences in age of onset that were found. It is recommended that future research in this area should use rating scales (e.g., PCL:YV), measures that show better internal consistency, and longitudinal research methodology that allows the study of the participants over time regarding the stability of the traits.

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Table 1

Frequency of participants by age of onset group

	Early Onset	Late Onset	School Group	<i>N</i>
Forensic sample	44	44	0	88
School sample	0	0	44	44
Total sample	44	44	44	132

Table 2

Descriptive statistics and ANOVA tests for the psychopathy measures by age of onset group

	Early Onset	Late Onset	School Group	<i>F</i> and <i>p</i> value*
APSD-SR I-CP				$F_w = 28.909$
<i>M</i> (<i>SD</i>)	12.55 (5.78)	7.18 (3.19)	4.98 (3.20)	$p < .001$
APSD-SR CU				$F = 25.234$
<i>M</i> (<i>SD</i>)	5.09 (2.13)	3 (1.73)	2.55 (1.45)	$p < .001$
CATS				$F_w = 564.499$
<i>M</i> (<i>SD</i>)	6.41 (1.55)	6.11 (1.26)	.36 (.61)	$p < .001$

Note. APSD = Antisocial Process Screening Device - Self-Report; I-CP = Impulsivity-Conduct Problems dimension; CU = Callous-Unemotional dimension; CATS = Child and Adolescent Taxon Scale.

*ANOVA; F_w = Welch's ANOVA; *M* = Mean; *SD* = Standard-deviation.

Table 3

Descriptive statistics, ANOVA and Kruskal-Wallis tests for the delinquency, criminal, and social desirability measures by age of onset group

	Early Onset	Late Onset	School Group	<i>F</i> or χ^2_{KW} and <i>p</i> value*
ASRDS				$F_W = 102.054$
<i>M</i> (<i>SD</i>)	25.82 (12.11)	19.52 (9.14)	4.60 (3.52)	$p < .001$
ICS				$\chi^2_{KW} = 65.930$
<i>MR</i> (<i>IR</i>)	94.02 (2)	73.42 (1)	32.06 (0)	$p < .001$
MCSDS-SF				$F_W = 6.863$
<i>M</i> (<i>SD</i>)	17.57 (1.78)	18.82 (2.05)	19.02 (2.50)	$p < .01$

Note. ASRDS = Adapted Self-Report Delinquency Scale; ICS = Index of Crime Seriousness; MCSDS-SF = Marlowe-Crowne Social Desirability Scale - Short Form.

*ANOVA or Kruskal-Wallis Test; F_W = Welch's ANOVA; χ^2_{KW} = Kruskal-Wallis; *M* = Mean; *SD* = Standard-deviation; *MR* = Mean Rank; *IR* = Interquartile Range

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