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Published

2015

Journal Title

Australian and New Zealand Journal of Criminology

Version

Accepted Manuscript (AM)

DOI

[10.1177/0004865815589828](https://doi.org/10.1177/0004865815589828)

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The impact of snares on the continuity of adolescent onset antisocial behaviour:

A test of Moffitt's developmental taxonomy

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Abstract

Moffitt's dual typology of 'life-course persistent' and 'adolescence limited' offending has received extensive empirical attention, but the extent to which the antisocial behaviour of adolescence limited offenders is constrained to adolescence is relatively under-examined. Using data from the Australian Mater-University Study of Pregnancy and its Outcomes (MUSP), we explore Moffitt's concept of *snares*, or those factors that may lead to an adolescent persisting in antisocial behaviour such as drug addiction, educational failure, and contact with the justice system. The MUSP is a longitudinal study of mother-child dyads from the pre-natal stage to 21 years of age. Findings show that one third of individuals identified as having an adolescent onset of antisocial behaviour, persisted with this antisocial behaviour as young adults. This continuity can, in part, be explained by snares and the research suggests that reducing exposure to snares may lead to less antisocial behaviour in adulthood.

Keywords: snares; adolescence limited; Moffitt; antisocial behaviour

Acknowledgments: This is a project supported by grant 27/04-05 from the Australian Criminology Research Council. The views expressed are the responsibility of the authors and are not necessarily those of the Council. The MUSP has been funded by the Australian National Health and Medical Research Council and the Australian Research Council. Thanks to the following people for their assistance with and feedback on this paper: Terrie Moffitt, Alex Piquero, Li Eriksson, Helen Punter, Greg Shuttlewood, Belinda Hewitt, and Michele Haynes.

The impact of snares on the continuity of adolescent onset antisocial behaviour:

A test of Moffitt's developmental taxonomy

Researchers working within the criminal career tradition have long been concerned with the core concepts of onset, persistence, and desistence in relation to offending across the life-course (Piquero, Farrington, & Blumstein, 2003). Moffitt's developmental taxonomy has been particularly influential in explaining why some individuals persist with antisocial behaviour across the life-course (life-course persistent offenders) while the offending of others is constrained to the period of adolescence (adolescence limited offenders). Despite previous empirical testing of adolescence limited antisocial behaviour (Galambos, Barker, & Tilton-Weaver, 2003; Piquero & Brezina, 2001), there has been relatively little research examining individuals who have an adolescent onset of antisocial behaviour and then persist with this behaviour into adulthood (notable exceptions include Haynie, Weiss, & Piquero, 2008; Hussong, Curran, Moffitt, Caspi, & Carrig, 2004; Malone, Taylor, Marmorstein, McGue, & Iacono, 2004; Marmorstein & Iacono, 2005).

Within Moffitt's model, continuity of antisocial behaviour for those with an adolescent onset is not expected as these individuals are categorised as belonging to the 'adolescence limited' group. As the name suggests, the behaviour of adolescents in this group is characterised by discontinuity, having never been antisocial during their childhood and being unlikely to remain antisocial into their adulthood (Moffitt, 1993, p. 685). To demonstrate this short-term antisocial behaviour, Moffitt (1993, p. 676) argues that the huge peak in the rate of offences in adolescence is due to an increase in prevalence of offenders rather than an increase in the rate of offending (Farrington, 1986).

Moffitt proposes that the decreasing age of biological maturity (an earlier onset of puberty), and increasing age of social maturity is responsible for an adolescent onset of

antisocial behaviour. She argues that a 'maturity gap' is the result of these changes, with adolescents becoming "chronological hostages of a time warp between biological age and social age" (Moffitt, 1994, p. 31). Consequently, adolescents trapped in the maturity gap are denied access to mature status, whereas the life-course persistent antisocial adolescents will be perceived as having attained maturity.

The life-course persistent individuals will possibly have their own small business in the underground economy, have fathered or mothered children and appear to be free of their family of origin (Moffitt, 1994, p. 28). The mechanism then, through which previously non-antisocial adolescents become antisocial, is through a process of social mimicry. The life-course persistent individuals are viewed as having access to a precious resource—mature status—and the adolescent onset individuals mimic their behaviours in an attempt to achieve this status.

According to the theory, once adolescent onset individuals have reached a stage where they can access legitimate forms of responsibility, for example through marriage or entering the workforce, their antisocial behaviour will cease; hence the name 'adolescence limited'. For them, the cost of antisocial behaviour becomes too high and they will revert back to the prosocial behaviour skills learned early in life. However, there is some evidence to suggest that this adolescence onset group of individuals also has high levels of internalising problems and life stress that may inhibit this (Aguilar, Sroufe, Egeland, & Carlson, 2000). In contrast, Moffitt argues that individuals in the life-course persistent group, who have never learned prosocial behaviour skills, will use opportunities such as marriage or employment as new opportunities for antisocial behaviour (for example, domestic violence and theft from work).

More importantly for the current research, Moffitt argues that there are a small number of adolescent onset individuals who became trapped in a 'snare' such as a drug

addiction, imprisonment, teenage parenthood and/or interrupted education which increases the likelihood of maintaining antisocial behaviour across the life course (Moffitt, 1993, p. 61). It is these snares and their impact on the continuity of adolescent onset antisocial behaviour that are the focus of the current paper. Specifically, we consider a wide range of snares including neighborhood disorder, early school leaving, unemployment, rape, early parenthood, court attendance, traffic fines and charges, and substance use disorder. It is hypothesised that experiencing these snares will reduce the likelihood that adolescent onset antisocial behaviour will be constrained to the adolescent period.

Neighborhood disorder: Social disorganisation within a neighborhood affects rates of criminal victimisation and offending (Sampson & Groves, 1989). For those who begin to engage in antisocial behaviour in adolescence, living in a neighborhood characterised by disorder could ensnare an individual into future antisocial behaviour and reduce the likelihood of the theoretically expected aging out of antisocial behaviour. The effect of neighborhood disadvantage on problem behaviour has been shown to be mediated by informal social control (Elliott et al., 1996). Collective informal social control has been demonstrated to be an inhibitor of adolescent delinquency (Sampson, 1997). In the absence of informal social control, in a neighborhood characterised by disorder, those with adolescent onset antisocial behaviour are also more likely to have delinquent peers. It has been found that the close friends of antisocial boys tend to live in the same neighborhood and they meet in unsupervised and unstructured activities (Dishion, Andrews, & Crosby, 1995) whereas those who abstain from antisocial behaviour spend less time with delinquent peers (Barnes, Beaver, & Piquero, 2011). In addition, antisocial adolescent girls living in disordered neighborhoods are more likely to have relationships with non-conventional peers, who they meet outside of school, are at different life stages, and have no work or educational focus (Pawlby, Mills, Taylor, & Quinton, 1997). These delinquent friends are also ‘sticky’—once

acquired they are not quickly lost (Warr, 1993), further ensnaring an individual in antisocial patterns of behaviour.

Early school leaving: Early school leaving is a predictor of later offending, including violent offending (Farrington, 1989). Individuals who engage in high levels of antisocial behaviour during adolescence are more likely to be early school leavers through either choosing not to attend school or being excluded through school suspensions and expulsion. Persistent absence from school, coupled with commitment to delinquent street-based peers has been shown to escalate offending (Webster, MacDonald, & Simpson, 2006). School absences moderate the relationship between low self-control and criminal outcomes (Henry, Caspi, Moffitt, Harrington, & Silva, 1999). In addition, early school leaving can preclude engagement in further training and education due to displacement by those who have completed school (Lamb, Dwyer, & Wyn, 2000; Lamb & Rumberger, 1999). Early school leaving therefore often results in employment in lower paid occupations, intermittent employment, or unemployment (McMillan & Rothman, 2005). Early school leaving is also directly and indirectly related to self-reported delinquency in late adolescence and early adulthood (Hagan, 1993; Jarjoura, 1993). An examination of early school leavers in England revealed that approximately two thirds of the sample were involved in crime and that 44 per cent of the sample started offending after school exclusion (accompanied with increasing antisocial values and association with antisocial peers) (Berridge, Brodie, Pitts, Porteous, & Tarling, 2001). Through limiting options for employment and escalating delinquency, early school leaving could operate as a snare for those individuals who had an onset of antisocial behaviour in adolescence.

Unemployment: It has been argued that the experience of employment instability results in subsequent weakening of relationships with society and thus the adoption of antisocial values (Sampson & Laub, 1993). Unemployment has been found to have an

independent effect on offending when controlling for a range of risk factors. For example, in a New Zealand cohort, longer periods of unemployment were associated with increasing rates of conviction (Fergusson, Lynskey, & Horwood, 1997). A similar pattern was observed by Ouimet and Le Blanc (1997) who examined a cohort of men who, as boys, were placed on probation or into custody. Those who did not have consistent employment were more likely to be engaged in ongoing criminal activity. It has also been found that antisocial youth may also behave in ways that result in frequent dismissals and a poor employment record (Rutter, Giller, & Hagell, 1998).

Rape during adolescence: There is limited research examining the impact that being raped during adolescence has on later antisocial behaviour. The most informative research comes from examinations of the impact of maltreatment (including sexual, emotional and physical maltreatment) on later outcomes. Previous research using the MUSP data has shown that childhood sexual abuse in conjunction with neglect and/or emotional abuse, and/or physical abuse leads to elevated adolescent externalising behaviour (Mills et al., 2013). Data from the Rochester Youth Development Survey show that when controlling for a range of socio-demographic factors and prior antisocial behaviour, substantiated experiences of sexual, emotional and physical maltreatment were related to higher levels of young adult antisocial behaviour (Smith, Ireland, & Thornberry, 2005). Retrospective reports of child sexual abuse in the US National Co-morbidity Survey showed that for women, being raped repeatedly by someone who was known to them, was associated with a higher prevalence of psychiatric disorders (Molnar, Buka, & Kessler, 2001) which are in turn associated with antisocial behaviour. Longitudinal data from the US also show that maltreatment that starts in late childhood is predictive of externalising behavioural problems in adulthood (Kaplow & Widom, 2007). In addition, a study of French adolescents aged over sixteen found that both males and females who reported being previously raped had elevated rates of behaviour

problems when compared to a matched group (Inserm, Darves-Bornoz, Ledoux, Manfredi, & Hassler, 1997).

Early parenthood: There is a continuing concern within countries such as Australia, the United Kingdom and the United States, over the number of teenagers giving birth. Much of the apprehension centers on the socio-economic impact of such births in light of the disruption to ongoing extended education and career development of women in these nations. Comparisons between industrialised nations of the number of births per 1000 in 15 to 19 years olds in the Organisation for Economic Cooperation and Development (OECD) revealed that many advanced countries such as Australia, the United Kingdom and the United States are in the higher range (UNICEF, 2001). While complex societal forces have reduced the rate of teenage pregnancy over thirty years, concerns for teenage pregnancy extend beyond socio-economic disadvantage. Younger mothers in the UK were found to experience higher levels of household poverty, less employment, and tended to live in deprived neighborhoods (Moffitt & The E-Risk Study Team, 2002). However, of particular relevance to the current research, this study also showed that young mothers had more substance abuse related problems and exhibited higher rates of antisocial behaviour (Moffitt & The E-Risk Study Team, 2002). A review of trends in the United States noted non-marital teenage births are often correlated with early school drop-out prior to the pregnancy, as well as early drug and alcohol use (Coley & Chase-Lansdale, 1998). However, a number of studies have not replicated the negative sequelae noted above; once background factors are adequately controlled for teenage pregnancy of itself has limited negative impact (Geronimus, 2003) and a recent study of adolescents transitioning to adulthood has shown that early parenthood led to earlier entry into declining trajectories of antisocial behaviour (Martin, Blozis, Boeninger, Masarik, & Conger, 2014). While many of the studies note that antisocial behaviour can be a risk factor leading to teenage pregnancy there is no research indicating teenage pregnancy

can itself lead to antisocial behaviour. However, pregnancy and subsequent parenting responsibilities may alter the trajectories of those who are antisocial by interfering with the normative aging-out of antisocial behaviour that would be expected within the context of Moffitt's theory.

Court attendance: Official labeling by the criminal justice system can negatively impact on future life chances, such as education and employment, which in turn can reduce opportunities for a conventional life (Sampson & Laub, 1993). The effects of labeling increase the probability of offending in young adulthood after intervention by agents of the criminal justice system during adolescence (Bernburg & Krohn, 2003) and also increase likelihood of high-school drop-out after court attendance (Sweeten, 2006). The introduction of cautioning in the UK resulted in an increase of juveniles' official processing in the criminal justice system and did not divert adolescents from court appearances (Farrington & Bennett, 1981). However, since then, more sophisticated diversionary schemes have been introduced and there is a broad range of evidence from around Australia which demonstrates that court attendance is more likely to lead to recidivism when compared to various diversionary initiatives. For example, juveniles diverted from court in New South Wales, Australia were 15-20 per cent less likely to reoffend, when controlling for prior offending, age and indigenous status (Luke & Lind, 2002). Young people in Queensland, Australia who were brought before the court rather than cautioned were found to be more likely to have further contact with the juvenile justice system even when controlling for age and outcome of first contact and gender (Dennison, Stewart, & Hurren, 2006). Similar findings come from the Northern Territory, Australia where juveniles who appeared in court were more likely to reappear in court than those who were diverted (Cunningham, 2007; Wilczynski, Wallace,

Nicholson, & Rintoul, 2004). A meta-analytic study of restorative justice programs¹ has shown that this form of diversion reduces recidivism (Latimer, Dowden, & Muise, 2005). Collectively this evidence suggests that a court appearance could operate as a snare for a young person who has an adolescent onset of antisocial behaviour.

Traffic fines and charges: Many young drivers appear to escape detection for traffic infringements. For example, Australian data show that while 49.4 per cent of young drivers report driving 10 to 25 km/h over the limit during their last 10 trips, 69 per cent reported never having been caught for speeding (Smart et al., 2005). Deterrence theory suggests that contact with police should reduce subsequent deviant behaviour. However, there is currently a lack of data from which to assess whether police contact for issuing traffic fines influences antisocial trajectories. A Dutch study of conviction histories across the life span found that among sporadic offenders, traffic fines contributed to a greater proportion of total offences compared to higher frequency offenders (Blokland, Nagin, & Nieuwebeerta, 2005), suggesting that traffic fines do not inevitably increase rates of other forms of offending. Multiple fines may reflect a natural consequence of high risk driving behaviour rather than an amplification of antisocial behaviour. In contrast, some argue that offenders' reactions to police encounters lead to an amplification of deviant behaviour (Wilkins, 1967), and offending behaviour has been found to escalate among young males subsequent to police contact (Keane, Gillis, & Hagan, 1989). It is plausible that police contact arising from the issuing of traffic offences may reinforce pre-existing negative attitudes towards police, thus promoting rather than deterring antisocial behaviour.

Substance Use: Adolescent drug use plays an important role in ensnaring individuals in an antisocial lifestyle. A study of students followed from adolescence to young adulthood found that, with the exception of alcohol abuse, heavy early and late teenage substance use

¹ While not all restorative justice programs involve juveniles and diversion from court, the large majority do.

led to adult impairments in multiple domains, such as personal relationships, and physical and mental health (Newcomb & Bentler, 1988). Data from New Zealand show that adolescent cannabis use increases the likelihood of relationship and employment difficulties, depression and suicide ideation, continued illicit substance use, and commission of property and violent offences (Fergusson & Horwood, 1997; Fergusson, Horwood, & Swain-Campbell, 2002).

Numerous studies confirm this positive relationship between substance use and antisocial or criminal behaviour (Dawkins, 1997; Goldstein, Brownstein, & Ryan, 1992; Menard & Mihalic, 2001; White, Loeber, Stouthamer-Loeber, & Farrington, 1999). However, extant research is conflicting about whether alcohol (Dawkins, 1997; Menard & Mihalic, 2001; White et al., 1999), inhalants, or illicit drugs (Menard & Mihalic, 2001; 1990; White et al., 1999) confer the greatest risk of antisocial behaviour. It is possible that polydrug use or drug use continuing into adulthood may be more important predictors of adult criminal behaviour (Ouimet and Le Blanc, (1997)). Heavy alcohol use has been explored as a snare in a number of studies that have found adolescents who engage in heavy drinking desist more slowly from dating aggression (Reyes, Foshee, Bauer, & Ennett, 2011), other forms of antisocial behaviour (Hussong et al., 2004), and offending (Higgins, Bush, Marcum, Ricketts, & Kirchner, 2010) and are also more likely to have higher numbers of convictions in adulthood (Craig, Morris, Piquero, & Farrington, 2015).

Current focus

Existing research shows that some individuals, who have an adolescent onset of antisocial behaviour, continue with this behaviour into adulthood. Moffitt (1993) argues that these individuals become ensnared in their antisocial patterns of behaviour and this paper aims to explore a number of these including: neighborhood disorder, early school leaving, unemployment, rape, early parenthood, court attendance, traffic fines, and substance use. Collectively, the extant research described above points to the way in which experiencing these snares might contribute to continued antisocial behaviour. The focus of the current research is to firstly examine whether these factors differ between those who continue with adolescent onset antisocial behaviour into adulthood and those who do not continue. Secondly, the cumulative impact of experiencing multiple snares is explored and finally all the factors are considered simultaneously to identify which factors have the strongest predictive power in explaining continuing antisocial behaviour. The results of these analyses will inform Moffitt's theoretical model of antisocial behaviour and contribute to better understanding why some individuals do not age out of adolescent onset antisocial behaviour.

METHODS AND MATERIALS

Participants

Data for this paper are derived from the Mater University Study of Pregnancy and its Outcomes (MUSP). MUSP is a birth cohort study of women enrolled in the study at the Mater Misericordiae Hospital in Brisbane, Australia, between 1981 and 1983. Baseline data were collected at the first antenatal visit from 7223 consecutive women who gave birth to live singleton babies and were followed up at 3-5 days, 6 months, and 5, 14 and 21 years after the birth. This sample is slightly more disadvantaged than the broader population from which the sample was drawn (Najman et al., 2005). Informed consent from the mother was obtained at

all phases of data collection and from the young adult at the 21 year follow-up. Ethics committees from the Mater Hospital and the University of Queensland approved each phase of the study. The current study is based on 3173 young adults who completed the Young Adult Self-report (YASR) at the 21-year follow-up and for whom data were available on antisocial behaviour at 5 and 14 years. More detailed information on the study has been published elsewhere (Keeping et al., 1989; Najman et al., 2005).

Instruments

Measurement of outcome

At the 21-year phase of the study, the young adult's symptoms of antisocial behaviour during the last six months were measured using the YASR version of the Child Behavior Checklist (CBCL) (Achenbach, 1997). The YASR is a questionnaire for subjects aged 18-30 years, which contains 114 problem behaviour items that can be scored on eight sub-scales, including externalising behaviour (which incorporates the delinquency, aggression, and intrusive sub-scales) and is used in the current study. The 28-item antisocial behaviour sub-scale had an internal consistency (Cronbach's alpha) of 0.80. We used a cut-off of one standard deviation above the mean, above which young adults were classified as having extreme antisocial behaviour.

Measurement of child and adolescent antisocial behaviour

Child antisocial behaviour at the 5-year follow-up was assessed using selected externalising items from the parent-reported Child Behavior Checklist (CBCL) (Achenbach, 1991b; Achenbach & Edelbrock, 1983) which asked about child behaviour in the previous six months. At the 14-year follow up, adolescent antisocial behaviour during the previous six months was assessed using the externalising sub-scale of the Youth Self Report (YSR) version of the CBCL (Achenbach, 1991a, 1991b). Using these measures of antisocial

behaviour at ages 5 and 14, we replicated Moffitt and colleagues' (1996) typological groupings by identifying children whose scores were greater than one standard deviation above the mean. Categories of key interest to the current study were: (1) Childhood limited antisocial behaviour: individuals who exhibited 'extreme' antisocial behaviour in childhood but who were no longer the most antisocial in adolescence; (2) Adolescence onset antisocial behaviour: those who exhibited 'extreme' antisocial behaviour in adolescence but not childhood; (3) Life-course Persistent antisocial behaviour: those who exhibited 'extreme' antisocial behaviour in both childhood and adolescence; and (4) Unclassified group: those who were not in the 'extreme' range of antisocial behaviour in childhood or in adolescence. In the current study, we examine the impact of snare variables on the persistence of adolescence onset antisocial behaviour. So, to phrase it differently, we are interested in the individuals who, based on the 5 and 14 year data, were categorised into the adolescence onset group but did not meet with the theoretical expectation of aging out of this antisocial behaviour in adulthood (age 21).

Measurement of snare variables

Neighborhood disorder: At the 14-year follow-up, the mothers were asked to indicate the degree to which a range of problems (such as unemployment, vandalism/graffiti, violence in the street, drug abuse, alcohol abuse, house burglaries, car stealing, reckless driving, school truancy) existed in their neighborhood (Cronbach's alpha = 0.93). At the 21-year follow-up, young adults were asked similar questions (Cronbach's alpha = 0.89). At each follow-up, the participants' reported level of neighborhood disorder was divided into: (a) no/low level of disorder and (b) high level of disorder. Using the 14 and 21-year neighborhood disorder variables, we subsequently created a combined variable that has four categories: (a) no/low disorder both at 14 and 21 years, (b) high disorder at 14 but not 21 years, (c) high disorder at 21 but not 14 years, and (d) high disorder at both 14 and 21 years.

Early school leaving: Early school leaving was determined by the highest level of education that an individual had achieved. Options ranged from primary school to university. Participants were then categorised into two groups, with those who had not completed high school designated as early school leavers².

Unemployment: Young adults were also asked whether they had a ‘paid job’ at the time the survey was conducted. Responses were grouped into two categories: (a) having paid job (76.6%) and (b) no paid job (23.4%). Participants also indicated whether they were attending any educational institution with response options of: (a) no, (b) yes (full-time or part-time). Using these two latter variables, we created a composite variable that divided the participants into three groups: (a) those who had a paid job and were attending an educational institution; (b) those who had either paid job or attending an educational institution, and (c) those who had neither. The final category is considered as the snare.

Rape during adolescence: We also asked participants at age 21 whether they had ever been raped and if so, the age at which the first rape occurred. Individuals were categorised into two groups: (a) never raped or raped before 14 years; and (b) raped after 14 years³. Rape has long established been gendered experience (Brownmiller, 1975) and data in this study show 10.4 per cent of females report being raped and 1.4 per cent of males.

Early parenthood: Young adults were also asked whether they had any children. Responses were categorised as: (a) yes (9.8%) and (b) no (90.2%). Of the 9.8% of participants who had children, approximately three quarters were female.

² The majority of this cohort resided in Queensland, Australia. For this cohort, schooling was compulsory to age 15. Most young people in Queensland complete high school at the end of the calendar year in which they turn 17.

³ The focus of this research is an interest in exploring the factors that have ensnared an individual in the antisocial behaviour they exhibited at 14 years of age. Therefore this variable was categorised to identify only those experiences of rape that have happened since age 14. Based on research examining reporting behaviours (Felson & Paré, 2005) it is likely that this variable is under-reporting the true extent of rape experiences, therefore any effects found using this variable will underestimate the true impact of this experience.

Court attendance: At the 21-year follow-up participants were also asked whether they had ever been required to attend court as a defendant. The answers were dichotomised into 'yes' and 'no' categories. Some 16.1 per cent had been required to appear in court as defendants.

Traffic fines: A set of 11 self-reported items was used to assess life-time traffic charges and fines of the young adult. Items included: speeding, driving an unsafe or unroadworthy vehicle; ignoring red traffic lights; ignoring a police signal, order, or direction; ignoring a stop or give way sign; failing to give way, other than by ignoring a traffic sign; failing to keep left; failing to wear a helmet, seat belt or restraint; improper turns; and ignoring traffic lane arrows in roundabout. Using each individual's total number of the items, participants were categorised into three groups: 1 = not a driver or driver without any charge (50.1%); 2 = one or two charges/fines (45.2%); and 3 = three or more charges/fines (4.7%).

Substance use: At the 21-year phase of the study, the computerised version of the Composite International Diagnostic Interview (CIDI-Auto) (World Health Organisation, 1992) was used to assess a life-time diagnosis of both substance abuse and dependence, according to DSM-IV diagnostic criteria (American Psychiatric Association, 1994). Substances included in the study were nicotine and alcohol, as well as cannabis, amphetamines, heroine, cocaine, hallucinogens, and other illicit drugs. Participants who, at age 21, met the DSM-IV criteria for dependence or abuse of any of the substances were categorised as having had substance use disorders. Using each individual's number of life-time substance use disorders, we categorised the young adults into three groups: (a) no substance use disorders; (b) one substance use disorder; and (c) two and more substance use disorders.

Statistical analysis

A univariate logistic regression was employed to estimate the proportion and risk (odds ratio (OR) and 95 per cent confidence intervals (95% CI) of young adult antisocial behaviour for each category of child and adolescent antisocial behaviour (with the reference category being those who did not exhibit extreme antisocial behaviour in childhood or adolescence: Unclassified group) (Table 1).

To compare the prevalence of snares required the creation of two groups: those who had an adolescent onset of antisocial behaviour that was constrained to adolescence (adolescence limited) and those who continued with their antisocial behaviour into young adulthood (adolescent onset persistent). Figure 1 provides a comparison between these two groups in relation to the proportion of individuals who experienced each snare. To further examine differences between those who persist with antisocial behaviour into young adulthood and those who desist, the number of snares experienced was also examined (Table 2) by calculating the proportion of participants who experienced no snares, through to the proportion that experienced all eight snares. The final stage of analysis was to develop a series of multivariate regression models (Table 3) where the snares variables were progressively entered to predict adolescent onset persistent antisocial behaviour. Given that the examination of an interaction term provided no statistical evidence that the association differed between the sexes, results are presented for the overall sample.

To determine whether loss to follow-up at 21 years affected the validity of our findings, we undertook a sensitivity analysis using inverse probability weights reflecting the chances of having missing outcome data (Hogan, Roy, & Korkontzelou, 2004). We began by constructing a logistic regression model examining the association of all other covariates used in our primary analyses with having complete data or not. The regression coefficients from

this model were then used to determine probability weights for the covariates in the main analyses. The results from subsequent analyses including inverse probability weighting based on these factors, did not differ from the unweighted analyses presented here. This suggests that our results were not substantially affected by selection bias.

RESULTS

Of 3173 participants who provided information about antisocial behaviour at 5, 14, and 21 years, 75.3 per cent (72.0% males and 78.2% females) did not meet criteria for antisocial behaviour at 5 or 14 years (Unclassified group). Some 11.8 per cent of children (13.9% males and 10.0% females) met the criteria for antisocial behaviour at 5 years but not at 14 years (childhood limited; $n=376$), 10.0 per cent (10.7% males and 9.3% females) were not antisocial at 5 years but met the criteria at 14 years (adolescent onset; $n=317$), and 2.9 per cent of children (3.4% males and 2.5% females) were classified as having extreme antisocial behaviour at both 5 and 14 years (life-course persistent; $n=92$).

Table 1 shows the risk of young adult's antisocial behaviour as a function of Moffitt's (2006) typologies of antisocial behaviour. All three categories of childhood and adolescent antisocial behaviour are significantly associated with increased odds of young adult antisocial behaviour, when the Unclassified individuals were used as a reference group. While there was a statistically significant association between childhood limited group and young adult antisocial behaviour, those who were antisocial at 14 years (and not 5), or who met the criteria at both 5 and 14 years were substantially more likely to continue this behaviour at 21 years, with the strongest association being for life-course persistent group (OR = 8.2; 95% CI: 5.3, 12.5). Adjustment for a selected group of covariates did not alter the overall nature of these associations.

Table 1 about here

The main focus of this study was to examine whether persistence in antisocial behaviour in adulthood, for some individuals in the adolescence onset group, is due, in part, to exposure to snare variables. The snare variables considered in this study were: neighborhood disorder; early school leaving; unemployment; rape during adolescence; early child bearing; court attendance; traffic charges; and life-time history of substance use disorders. Figure 1 provides a comparison between individuals who continued with antisocial behaviour into young adulthood (adolescent onset persistent; $n = 106$) and those whose antisocial behaviour was constrained to adolescence (adolescence limited; $n = 211$) for each of the snare variables in this study. Greater proportions of the adolescent onset persistent group experienced each of the snares; however, it is notable that the proportion who experienced traffic fines was equally high. The prevalence of substance use disorders was also high for both groups. Significant differences between the two groups were observed for court attendance and rape ($p < .001$); substance use disorder and unemployment ($p < .01$); and neighborhood disorder ($p < .05$).

Figure 1 about here

Table 2 presents an examination of the number of snares experienced by individuals in the adolescence onset persistent and adolescence limited groups. Those who persist with antisocial behaviour into young adulthood are more likely to have experienced a higher number of snares. Only 22.6 per cent of the adolescent onset persistent group experienced one or no snares in contrast with 42.6 per cent in the adolescence limited group. It is interesting to note that 7.5 per cent of the individuals who persisted with antisocial behaviour did not experience any of the measured snares and that none of the participants in the study reported experiencing all eight of the snare variables.

Table 2 about here

The multivariate examination predicting continued antisocial behaviour using snare variables revealed that the strongest snare variables are neighborhood disorder, rape during adolescence, and court attendance. This is not surprising given the differences found between the two groups on each of these snare variables (see Figure 1).

Table 3 about here

DISCUSSION

Moffitt's developmental taxonomy has received extensive empirical attention, but an area of research that has not been subject to much empirical scrutiny concerns the hypothesis that certain ensnaring events may propel those with an adolescent onset of antisocial behaviour into continued antisocial behaviour as they exit adolescence and enter early adulthood. This study used longitudinal data from the Mater University Study of Pregnancy and its Outcomes (MUSP) to investigate the snares hypothesis. Several key findings emerged from our investigation.

In general, the findings of this research demonstrate that factors conceptualised as snares predict the continuity of adolescent onset antisocial behaviour. While the initial analyses of all typological groupings showed that levels of continuity in antisocial behaviour were highest in the life-course persistent group, considerable continuity could also be observed for the adolescence onset group. The age-graded expectation for the adolescence onset group is that their levels of antisocial behaviour would be constrained to adolescence; that is, they would return to more normative levels in young adulthood (Moffitt et al., 1996). However this study found high levels of continuity in antisocial behaviour. One possible explanation for this could be a protracted adolescence or 'emerging adulthood' (Arnett, 2000) that is precipitated by social changes such as longer time spent studying and living in the family home. However, data from the Dunedin study also show an adolescent onset group that

demonstrated persistent antisocial behaviour after the adolescent period up to age 32 (Moffitt, Caspi, Harrington, & Milne, 2002; Odgers et al., 2008). This suggests that there is an adolescent onset group of individuals who persist with antisocial behaviour into adulthood. Therefore, to explain this lengthy continuity, arguments of a protracted adolescence are not sufficient. This is where Moffitt's (1993) concept of snares to explain the continuity of adolescent onset antisocial behaviour is useful.

Cumulative impact of snares

Examination of the snare variables measured in this research showed that higher proportions of individuals in the adolescent onset persistent group experienced each of the snare variables when compared with the adolescence limited group (Figure 1). Risk factor research predicting antisocial behaviour has shown that in the presence of multiple risk factors, the likelihood of adverse outcomes is increased (Appleyard, Egeland, van Dulmen, & Alan Sroufe, 2005; Gerard & Buehler, 2004a, 2004b; Loeber, Slot, & Stouthamer-Loeber, 2008; van der Laan, Veenstra, Bogaerts, Verhulst, & Ormel, 2010). A similar pattern has been observed in this study. Those who persisted with antisocial behaviour up to age 21 were more likely to have experienced a higher number of snares. This suggests that the more snares that one experiences, the more likely the individual is to become ensnared in antisocial behaviour. This provides further support for Moffitt's argument that those individuals whose adolescent onset antisocial behaviour continues into adulthood occurs as a result of being ensnared. Despite this it is important to note that a small proportion of individuals who persisted with adolescent onset antisocial behaviour did not experience any of the snares. This suggests that there are unmeasured snares or other factors and/or mechanisms contributing to the persistence of adolescent onset antisocial behaviour.

Snares related to persistent adolescent onset antisocial behaviour

In the current study, the variables which significantly explained variance in the multivariate logistic regression models were neighborhood disorder, rape during adolescence, and court attendance. An adolescent onset of antisocial behavior is argued to be the result of a maturity gap and social mimicry of antisocial behavior of peers who are viewed as having access to adult social status. For those who begin engaging in antisocial behaviour in adolescence, residing in disordered neighborhoods may ensnare them into continued patterns of antisocial behaviour through either continued social mimicry or simply more opportunities to engage in antisocial behaviour. Experimental studies have shown that those who observe others breaking social norms or rules in disordered neighbourhoods are more likely to do so themselves (Keizer, Lindenberg, & Steg, 2008).

Also in this study, experiencing rape during adolescence predicted the continuity of adolescent onset antisocial behaviour. This snare was experienced more frequently by females in the MUSP sample although also by a small number of males. Existing research has found that the experience of sexual assault is grossly under-reported to authorities, self-report surveys record the most incidents (Johnson, 2012) so this study is a good estimate. Furthermore, there is a growing body of research that has shown that the pathway to offending for females is much more likely to be characterised by experiences of sexual abuse (Chesney-Lind, 1997; Owen & Bloom, 1995; Pollock, 1998; Steffensmeier & Allen, 1998). The findings of this study, in the context of this extant research, point to the importance of procedures that reduce the likelihood of both males and females experiencing sexual violence and support for those who do. Doing so may lead to a decreased likelihood of continuity of antisocial behaviour beyond adolescence.

In this research court attendance (our measure for contact with the criminal justice system) is conceptualised as a factor that may lead to an individual becoming ensnared in

adolescent onset antisocial behaviour. This suggests that beyond just being a proxy measure for high level antisocial behaviour, contact with the criminal justice courts may ensnare those who experience it into continued antisocial behaviour. Court diversion on the other hand, has been demonstrated to reduce recidivism (Cunningham, 2007; Dennison et al., 2006; Luke & Lind, 2002; Wilczynski et al., 2004).

Rethinking adolescence

While the argument of a protracted adolescence does not fully account for the findings observed in this research, it cannot be dismissed entirely. There is growing literature on early adulthood as a key phase of personality development (Benson et al. 2004). Increasingly in Western societies young people are more likely to extend their education and training well into their mid-20s. This protracted period of training often delays the acquiring of adult roles such as marriage, employment and income management as well as the establishment of a peer group of individuals engaging in adult roles. The disappearance of employment opportunities for unskilled young people in countries such as Australia, the United Kingdom and the United States, particularly in the context of global economic strain, may result in vulnerable antisocial youth having an extended period of failed socialisation with the subsequent maintenance of crime related behaviour.

Implications for theory

Moffitt (1993) argues that the majority of people who begin engaging in antisocial behaviour during adolescence will age out of these patterns when they reach adulthood. To account for the exceptions to this theoretical expectation, Moffitt proposed that these individuals become trapped in antisocial patterns of behaviour as the result of experiencing a snare. The current research supports the snare hypothesis; those who continue with adolescent onset antisocial

behaviour into adulthood do experience more snares. While the theory acknowledges these alternative pathways, the majority of empirical testing has focused on LCP and AL. This research highlights the importance of examining these alternative pathways; not all those individuals with an adolescent onset of antisocial behaviour will desist by the time that they reach adulthood. The negative repercussions of adolescent antisocial behaviour and other experiences during adolescence may ensnare individuals into antisocial behaviour patterns that extend into adulthood.

Future research

The current research suggests that many of those who continue with adolescent onset antisocial behaviour into adulthood, experience a range of snares. One alternative explanation for the observed continuity of adolescent onset antisocial behaviour into adulthood is that these individuals are experiencing a protracted adolescence that is extending into their early twenties. The data examined here are from prospective longitudinal follow-ups to age 21. Future research should examine those individuals who appear to be ensnared in adolescent onset antisocial behaviour during early adulthood with longer follow-up data to test whether these patterns have continued into later adulthood. It may also be that those people who continue into adulthood differ from those who desist in others ways. Future research could explore this further with a matched sample design. Although the associations between the variables examined here did not vary by gender, further replication is needed to see if this is found in other studies. It would also be interesting to explore which combinations of snare variables lead to a greater likelihood of continuity. Finally, while the MUSP has a broad range of social variables that may operate as snares, it does not have official records of offending. Future research should combine these social data and official records to see if

snares operate in a similar or different manner for official offending when compared to self-reported antisocial behaviour.

Conclusion

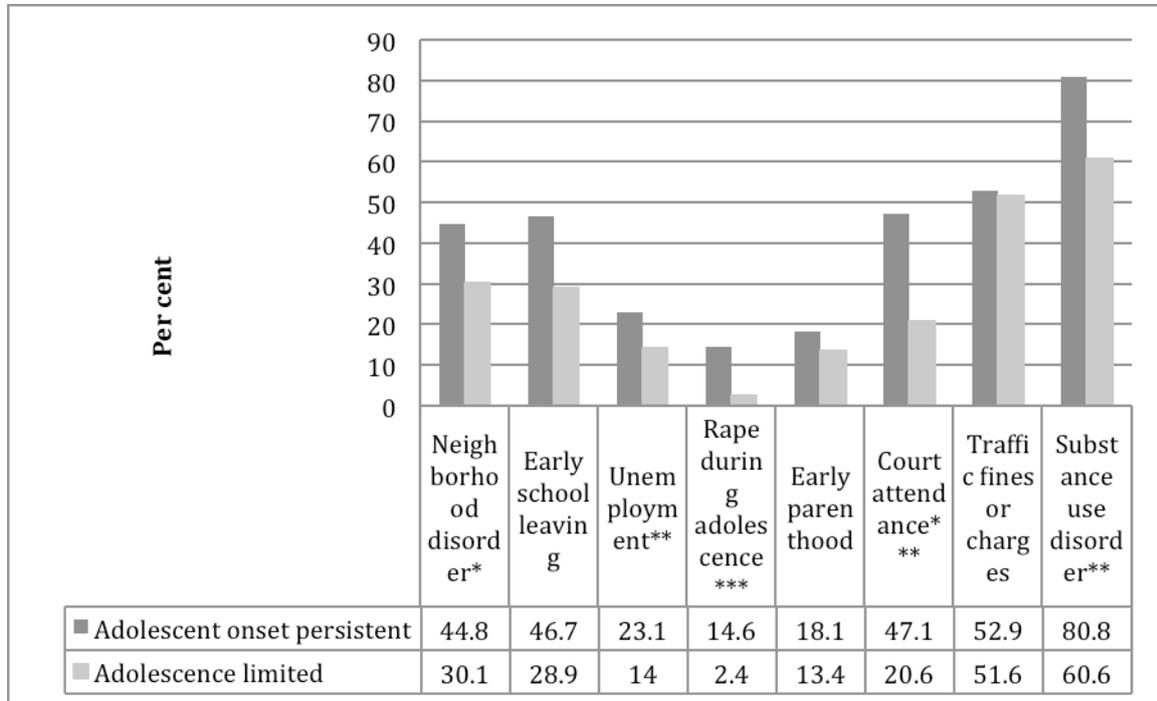
The aim of this paper was to examine the impact of snares, as theorised by Moffitt (1993) on the continuity of adolescent onset antisocial behaviour, into adulthood. The analyses presented here support the proposition that snares contribute to the explanation of continuity of adolescent onset antisocial behaviour into adulthood. These individuals reported significantly higher levels of experiencing rape, attending court, unemployment, substance use, and neighborhood disorder. When examined simultaneously in the multivariate logistic regression models, experiencing rape, court attendance and neighborhood disorder significantly predicted the continuation of adolescent onset antisocial behaviour into adulthood. While this research contributes to a better understanding of the way that snares can lead to ongoing antisocial behaviour, it also highlights the need for future research that examines the continuity of adolescent onset antisocial behaviour to later stages of adulthood.

Table 1: Proportion (%) and univariate risk of young adult antisocial behaviour by typologies of childhood and adolescence antisocial behaviour (n = 3173)

Typologies (based on antisocial behaviour at 5 & 14 years)	N	Young adult (age 21) ASB		
		(%) ¹	OR (95% CI)	Mean (SD) ²
Unclassified	2388	10.5	1.0	8.5 (6.1)
Childhood limited	376	15.2	1.5 (1.1-2.1)	9.6 (6.5)
Adolescent onset ³	317	33.4	4.3 (3.3-5.6)	13.8 (7.7)
Life-course persistent	92	48.9	8.2 (5.3-12.5)	17.0 (8.6)

Notes: ¹ the percentage with young adult antisocial behaviour within each category; ² mean symptoms and standard deviation (SD) of young adult antisocial behaviour within each category; ³ the 'adolescent onset' individuals are the focus of this paper and in subsequent analyses are divided into 'adolescence limited' and 'adolescent onset persistent'.

Figure 1: Comparison of snares variables for the adolescence-limited and adolescent onset persistent group



Notes: This figure includes only those in the adolescent onset typology (Table1) and compares those who, at age 21 continued with their adolescent onset antisocial behaviour (adolescent onset persistent) and those who desisted by age 21 (adolescence limited). Those designated as unemployed were also not enrolled as students. The 'early parenthood' category also includes males and females if they have parented a child by age 21; * $p < .01$; ** $p < .05$; *** $p < .001$

Table 2: The number of snares experienced by adolescence limited individuals who persist with and desist from antisocial behaviour by 21 years of age

Number of snares experienced	0	1	2	3	4	5	6	7	8	Total
Adolescent onset persistent group (n=106)	7.5	15.1	17.0	20.8	20.8	10.4	6.6	1.9	0.0	100.0
Adolescence limited group (n=211)	11.8	30.8	24.2	18.0	8.1	5.7	1.4	0.0	0.0	100.0

p value < .001

Table 3: Logistic Regression Models Predicting Adolescent onset Persistent Antisocial Behaviour¹

Snare Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Full model	
	B	Wald														
Neighborhood problems	0.48***	15.03	0.44***	12.16	0.43**	11.16	0.41**	10.02	0.41**	9.95	0.42**	9.41	0.42**	9.36	0.22	1.80
Early school leaving			0.63*	6.18	0.61*	5.32	0.71*	6.56	0.73*	6.67	0.44	2.11	0.45	2.09	0.40	1.10
Unemployment & not a student					0.12	0.32	0.04	0.03	0.07	0.10	0.02	0.01	0.01	0.00	-0.10	0.10
Rape during adolescence							1.97***	12.84	1.99***	12.96	2.27***	15.61	2.33***	16.21	2.34**	9.97
Early parenthood									-0.23	0.37	-0.63	2.31	-0.58	1.92	-0.26	0.27
Court attendance											1.32***	19.25	1.20***	14.44	1.26**	8.72
Traffic fine or charges													0.23	0.90	0.17	0.38
Substance use disorder															0.24	1.01
Constant	-1.49	37.27	-2.29	30.52	-2.47	21.60	-4.54	32.35	-4.61	31.75	-6.14	43.62	-6.39	42.07	-6.05	27.65
Model χ^2 (df)	15.36*** (1)		21.51*** (2)		21.44*** (3)		36.27*** (4)		35.92*** (5)		56.62*** (6)		56.64*** (7)		38.39*** (8)	

Note: ¹ Reference category is adolescence limited group (antisocial behaviour at age 14 but not age 21). *p<.05; **p<.01; ***p<.001

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