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Systematic review of early risk factors for life-course-persistent, adolescence-limited, and late-onset offenders in prospective longitudinal studies

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Abstract

This paper builds on our previous systematic review of prospective longitudinal studies and examines the early risk factors associated with life-course persistent offending (LCP), adolescence-limited (AL) and late-onset (LO) offending. Out of the 55 prospective longitudinal studies which theoretically could possess the relevant information, only four provided information about risk factors associated with the different offending types. An additional three provided data so that relevant analyses could be conducted. The results suggested that there was little evidence that specific early risk factors were associated with specific offending types. There was also limited evidence that specific risk factors predicted specific offending types when criminal career duration was included in the definitions of LCP, AL, and LO offending. However, LCP offenders tended to have a greater number of risk factors, and the magnitude of these was somewhat greater than for AL offenders, who in turn tended to have more risk factors (and of a greater magnitude) than LO offenders. LCP and AL offenders may differ more in degree (in the number and magnitude of risk factors) than in kind (in the specific risk factors that are predictive). Importantly, as the potential criminal career duration was increased in defining the offending types, those with longer careers tended to have more risk factors, but, LCP and AL offenders were not predicted by different risk factors. Much more research is needed on risk factors for offending types defined according to criminal career durations.

Keywords

Life-course-persistent offenders; Adolescence-limited-offenders; Late-onset offenders; Prospective longitudinal studies; Risk factors

1. Introduction

This article is a companion paper to the preceding article by Jolliffe, Farrington, Piquero, MacLeod, and Van de Weijer (2017), which describes a systematic review of information in prospective longitudinal studies about the prevalence of life-course-persistent (LCP), adolescence-limited (AL), and late-onset (LO) offenders. The main aim in the present article is to present a systematic review of early risk factors for these types of offenders.¹ The main

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focus is on individual (e.g., high impulsivity, low school achievement), family (e.g., poor child rearing, parental separation), and social (e.g., low family income, bad neighborhood) risk factors.

There have been other recent relevant reviews. Fairchild, Van Goozen, Calder, and Goodyer (2013) conducted a review of research relating to Moffitt's (1993) taxonomic theory from 1993 to 2013. This review was particularly focussed on martialling evidence about the neuropsychological deficits proposed to underlie the onset of antisocial behavior as a child compared to the onset in adolescence. The age of onset is a key factor separating LCP from AL offenders (according to Moffitt, 1993). A total of 61 studies were identified which compared factors associated with childhood-onset and adolescence-onset forms of antisocial behavior. The results were in line with theoretical expectation, in that there was evidence that childhood-onset antisocial behavior was related to the combination of individual vulnerability and environmental disadvantage. However, in contrast to the theoretical expectation, severe antisocial behavior which emerged in adolescence rarely discontinued at the end of adolescence, and also many neuropsychological risk factors were also evident amongst those whose antisocial behavior began in adolescence.

Assink et al. (2015) conducted a multi-level meta-analysis to examine the effect of several risk factor domains on LCP compared to AL offending. A total of 55 studies were included, and over 1000 effect sizes for risk factors were classified into 14 risk domains. The results suggested that behavioral risk factors (e.g., criminal history, aggressive behavior, drug/alcohol use) most strongly distinguished LCP from AL offenders, while relatively small differences were found for family, neurocognitive, and attitude domains. Physical health, demographic features (e.g., gender, ethnicity) and neighborhood variables did not distinguish LCP from AL offenders. The authors concluded that the differences between AL and LCP offenders may be quantitative, in terms of the number of risk factors, rather than qualitative, in terms of the specific types of risk factors.

Both the research of Fairchild et al. (2013) and Assink et al. (2015) provide tests of key aspects of Moffitt's (1993) theory, which are much needed, particularly for assessing quantitative hypotheses (e.g., Farrington, MacLeod, & Piquero, 2016; MacLeod, Grove, & Farrington, 2012). However, in these contributions LCP and AL offending were defined in ways that limit the knowledge generated about LCP offending. Fairchild et al. (2013) focussed on the childhood versus adolescent onset of antisocial behavior, as the difference in onset is proposed to be a key distinction between LCP and AL offenders. In their review, Assink et al. (2015) included studies which operationalized LCP and AL in many different ways, including life-course persistent versus adolescence-limited, persisters versus desisters, early-onset versus late-onset, and chronic versus late-onset. Neither review focused on criminal career duration in differentiating between LCP and AL offenders.

In order to study true life-course persistent offending, or offending that continues across much of the life-course, it is essential to include only prospective longitudinal studies that

¹A recent issue of the *Journal of Criminal Justice*, edited by Ttofi, Farrington, Piquero, and DeLisi (2016), was devoted to protective factors against offending and violence in several prospective longitudinal studies.

allow for an accurate distinction between offending terminating in adolescence and offending that continues well into adulthood. As noted in Jolliffe et al. (2017) criminal career duration is under-researched (e.g., Blumstein, Farrington, & Moitra, 1985; Piquero, Farrington, & Blumstein, 2003).

2. Method

The inclusion/exclusion criteria were²:

1. The study must have been based on a general community sample of at least 300 individuals.
2. The study must have started collecting information in childhood or early adolescence (up to age 13) and have follow-up information about offending up to at least age 30.
3. The study must contain measures of self-reported or official offending.
4. Only longitudinal studies in which the findings were reported in English were included.

2.1. Search strategy for longitudinal studies

Searching was conducted from December 2013 until June 2016 and was based on the authors' existing knowledge of the major prospective longitudinal studies (e.g., Farrington & Welsh, 2007; Farrington, Piquero, & Jennings, 2013). In addition, leading researchers in the area were contacted and asked for their assistance, and the citations of recent key reviews were searched. Based on this approach, 55 prospective longitudinal studies were identified, all of which started up to age 13.

Of these studies, 14 provided information about the offending types, and an additional seven provided data that could be analyzed. The 14 studies were as follows: Dunedin Multidisciplinary Health and Development Study (Moffitt, Caspi, Harrington, & Milne, 2002), Kauai Longitudinal Study (Werner & Smith, 1992), Montreal Two-Samples Longitudinal Studies (LeBlanc & Frechette, 1989), National Collaborative Perinatal Project (Denno, 1990), Columbia County Study (Dubow, Huesmann, Boxer, & Smith, 2014), Racine Cohort Study (Eggleston & Laub, 2002), Philadelphia Birth Cohort Study (Wolfgang, Thornberry, & Figlio, 1987), Second Philadelphia Birth Cohort Study (Tracy & Kempf-Leonard, 1996), Cambridge-Somerville Study (McCord, 1978), Orebro Project (Bergman & Andershed, 2009), US National Youth Survey (Wiecko, 2012), Canadian Criminal Records Survey (Carrington, Matarazzo, & De Souza, 2005), Stockholm Project Metropolitan (Nilsson & Estrada, 2009), and Jyvaskyla Longitudinal Study of Personality and Social Development (Pulkkinen, Lyyra, & Kokko, 2009). The previous article reports how these studies defined the three offending types.

As previously mentioned, there is an overarching limitation that should be born in mind when considering definitions of offending types. All of these studies defined persistent and

²The justifications for these inclusion/exclusion criteria can be found in Jolliffe et al., 2017.

LCP offenders as those who committed an offense as a young person (usually up to age 17) and again as an adult (usually from age 18 up to the most recent follow-up of the study). While this definition might make intuitive sense, as it reflects the continuity of committing offenses as a 'youth' and as an 'adult', according to most criminal justice systems, this definition is much too inclusive. Using the 'youth' plus 'adult' offense as 'persistent' means that those who committed numerous offenses between the ages of 10 and 30 would be included in the same category as those who only committed two offenses at ages 17 and 18. This limitation should also be considered when examining the relationships between the risk factors and offending types presented below. In order to study true LCP offending, or offending that continues across much of the life-course, it is essential to define LCP offending based on offending for a minimum length of time, or a minimum criminal career duration. This would allow for a much more confident classification of LCP compared with AL offenders.

The seven studies that provided data that could be analyzed were: Pittsburgh Youth Study (Jennings, Loeber, Pardini, Piquero, & Farrington, 2016), Cambridge Study in Delinquent Development (Farrington et al., 2013), 1953 Birth Cohort (MacLeod et al., 2012), 1958 Birth Cohort (MacLeod et al., 2012), Seattle Social Development Study (Hawkins et al., 2003; Herrenkohl et al., 2000) and two generations (G3 and G4) of the Dutch TransFive Study (van de Weijer, 2014). The same definitions of LCP, AL, and LO offenders were used in these studies:

1. LCP offenders – first offense up to age 20 and then at least another offense at age 30+.
2. AL offenders – first offense up to age 20 and last offense before age 30.³
3. LO offenders – first offense after age 20.

These definitions are mutually exclusive and exhaustive. They were used because, along with non-offenders, they include all possible individuals in a cohort. In addition, they set a minimum career duration of at least 10 years for LCP offenders. These definitions provide a much more homogeneous classification than the simple 'youth' plus 'adult' offense definition for LCP offending adopted in the 14 studies located in the literature. Other definitions of LCP, AL, and LO offending in these studies are explored later.

Three of the seven studies included both official records and self-reports of offending. However, it was not possible to obtain the appropriate self-reported offending data for the Pittsburgh Youth Study. In addition, only four individuals were classified as LCP when the definition of LCP offenders was applied to official offending in the Seattle Social Development Project. For this reason, only self-reports were used to classify offenders in this study. The data from the 1953 and 1958 birth cohorts and from two generations of the TransFive studies did not provide predictors of the offender types.

³This definition of 'adolescence' might appear somewhat extended, but this was based on evidence about the age at which young adults reach maturation (Farrington, Loeber, & Howell, 2012; Losel, Bottoms, & Farrington, 2012), and also a personal communication from Professor Terrie Moffitt, who noted that later ages of leaving home and later marriages were now extending the period of 'adolescence'.

3. Results

3.1. Risk factors for offending types in 14 studies

Only four of the 14 studies examined risk or protective factors associated with the offending types.⁴ These were as follows, along with their definitions of LCP, AL and LO offenders:

- Orebro Project (Bergman & Andershed, 2009)
 LCP = Registered for a crime from 11 to 20 and again after 20 (up to 35).
 AL = Registered for a crime from 11 to 20, but not after (up to 35).
 LO = Registered for a crime, but only after 20 (up to 35).
- Columbia County Study (Dubow et al., 2014);
 LCP = An arrest and/or self-report of being in trouble with the law before age 21, and at least one further arrest and/or self-report of being in trouble with the law from age 21 up to 48.
 AL = An arrest and/or self-report of being in trouble with the law before age 21, and no further arrests and/or self-reports of being in trouble with the law from age 21 up to age 48.
 LO = No arrest or self-report of being in trouble with the law before age 21, but arrest or report of being in trouble with the law from age 21 (up to 48).
- Dunedin Multidisciplinary Health and Development Study (Moffitt et al., 2002);
 LCP = Males with extreme antisocial behavior from childhood (age 3 up to age 14) and adolescence (from age 15–18).
 AL = Males with extreme antisocial behavior in childhood (age 3 up to age 14), but not in adolescence (age 15–18).
 LO = not studied.
- Jyvaskyla Longitudinal Study of Personality and Social Development (Pulkkinen et al., 2009);
 LCP = Males with official and/or self-reported offenses up to age 21 and again from age 22 (up to age 46).
 AL = Males with official and/or self-reported offenses up to age 21, but none from 22 (up to age 46).
 LO = Males with official and/or self-reported offenses but only after age 21 (up to 46).

⁴None of the studies classified offenders into types based on self-reports and official records separately. Also, the Racine Cohort Study (Eggleston & Laub, 2002) did include an exploration of the risk factors associated with continuity or discontinuity of offending but not the offending types. The second Philadelphia Birth Cohort Study (Tracy & Kempf-Leonard, 1996) possessed only behavioral risk factors (type of previous offense, frequency of juvenile offending) in its prediction of the offending types, and these were not included in this review (see below).

Tables 1, 2 and 3 show the risk factors that were statistically significantly ($p < 0.05$) associated with the different offending types (e.g., LCP, AL and LO), compared to nonoffenders for males⁵ and Table 4 shows the factors that were associated with male LCP offending compared to male AL offending in the four studies. Not all studies provided information about all comparisons. The tables only include explanatory risk factors and do not include behavioral risk factors such as conduct disorder or drug taking. This is because these factors overlap considerably with offending behavior, likely because they reflect the same underlying construct. When trying to explain a behavioral difference such as that between continued offending and desisting from offending, the use of behavioral factors could be considered tautological. Explanatory risk factors, or those that could form part of a causal chain to explain the type of offending (e.g., low intelligence, high impulsivity) may provide insight into how best to intervene to prevent continued offending (Farrington & Welsh, 2007).

Table 1 shows the personality/individual, family and socio-demographic features that significantly differentiated LCP offenders from nonoffenders in the three studies where information was available. LCP offenders were characterized by: poor school performance, low verbal ability, hyperactivity, low anxiety, and emotional lability. The family backgrounds of LCP offenders had high conflict, young mothers, single parent families, and large families. LCP offenders came from lower SES backgrounds and tended to have witnessed and been the victim of family violence. None of the individual risk factors measured at age 8 in Dubow et al. (2014) significantly predicted LCP offending.

Table 2 shows the risk factors that significantly differentiated AL offenders from nonoffenders. AL offenders were characterized by poor school performance, high hyperactivity, low constructiveness, low anxiety, and high social activity. The family backgrounds of AL offenders included harsh parenting, high parental conflict, single-parent families, and large families. AL offenders also tended to come from lower SES backgrounds and tended to have witnessed or been the victim of family violence.

Table 3 shows the risk factors that significantly differentiated LO offenders from nonoffenders. LO offenders were characterized by low math and verbal ability, high hyperactivity, and high social activity. LO offenders were more likely to have received harsh parenting and were more likely to have witnessed or been the victim of family violence. Some of the factors that were associated with LCP offending (compared to nonoffending) were also associated with AL and LO offending (e.g., low math ability, witnessing aggression, victim of aggression), but LO offending had a smaller overall number of significant risk factors.

Table 4 shows the comparisons that were available in the four studies which directly compared risk factors for LCP and AL offenders. The results suggested that LCP offenders tended to be more extreme in terms of their personality (e.g., high hyperactivity, high depression, low scores on neuropsychological measures) and family background (e.g., single

⁵Only very limited information about female LCP offending was available in Bergman and Andershed (2009) and in Moffitt et al. (2002).

parent family, low identification with parents, inconsistent discipline). Only the project of Moffitt et al. (2001, 2002) found that LCP offenders had lower SES than AL offenders.

From these research findings it was not possible to identify specific risk factors or combinations of risk factors that were associated with particular offending types. There did, however, appear to be some relative ordering in that a greater number of risk factors differentiated LCP from nonoffenders (17), compared with AL from nonoffenders (15), or LO from nonoffenders (5). This is similar to much previous research which has suggested that it is difficult to prospectively identify offending ‘types’ and that the total number of risk factors, the magnitudes of risk factors, and the range of domains of risk factors (e.g., individual, family, neighborhood) might be more important for identifying the intensity or type of criminal involvement than any one specific risk factor (Assink et al., 2015; Fairchild et al., 2013; Loeber, Farrington, Stouthamer-Loeber, & White, 2008).

No information about risk factors was available for the 1953 and 1958 national birth cohorts or the two generations of the TransFive cohorts, but we analyzed data from the other three studies: Pittsburgh Youth Study (Jennings et al., 2016), Cambridge Study in Delinquent Development (Farrington et al., 2013), and Seattle Social Development Project (Herrenkohl et al., 2000). The preceding article presents more detailed information about these studies.

3.2. Pittsburgh youth study

Table 5 shows the odds ratios for relationships between key risk factors and the three offender types based on 2 by 2 cross tabulations. The risk factors were measured at age 12 or earlier. All risk factors that were measured as continuous variables were dichotomized into the most extreme 25% compared to the remainder, as this makes it easy to compare the relative strength of the relationships between each variable and the offending type (Farrington & Loeber, 2000). Odds ratios are a measure of effect centered around 1, and as a rule of thumb an odds ratio of 2 or greater (or 0.5 or less) or a doubling of the effect, is considered a potentially important relationship (Cohen, 1996). Therefore, it can be seen that the risk score at screening was strongly associated with both LCP (OR = 4.5) and AL offending (OR = 3.6), but not with LO offending (OR = 1.7). The risk score at screening did not differentiate LCP from AL offenders (OR = 1.3).

The risk factors that had the strongest associations with LCP offending (compared to nonoffending) were lack of guilt (OR = 11.1), having been abused as a child (OR = 9.7) and old for the grade (OR = 5.9), while lack of guilt (OR = 6.1), hyperactivity (OR = 6.0) and old for the grade were particularly associated with AL offending (compared to nonoffending). The same factors (child abuse, lack of guilt, hyperactivity, and old for grade) were associated with LO offending (compared to nonoffending), but these odds ratios were lower than for either LCP or AL offending. Only four variables significantly discriminated between LCP and AL offending. LCP offenders were significantly more likely to lack guilt (OR = 1.8), and experience parental stress (OR = 1.9), poor parental communication (OR = 1.8) and a small house (OR = 2.3), compared to AL offenders.

3.3. Cambridge study in delinquent development

Table 6 shows that the risk factors⁶ most strongly related to LCP offending (compared to nonoffending) in the CSDD were having a convicted parent (OR = 5.2), poor parental supervision (OR = 5.1), and a disrupted family (OR = 4.4). AL offending (compared to nonoffending) was most strongly associated with high daring (OR = 3.5), living in poor housing (OR = 3.4), and having a convicted parent (OR = 3.3). LO offending was most strongly associated with a disrupted family (OR = 2.7), poor housing (OR = 2.6), and high dishonesty (OR = 2.6). When the factors associated with LCP and AL offending were directly compared, only two were found to be statistically significant; LCP offenders were significantly more likely to have poor parental supervision (OR = 2.3) and, unexpectedly, were significantly less likely to be living in poor housing (OR = 0.5).

3.4. Seattle social development project (SSDP)

The results for comparison of the risk factors⁷ for LCP offending in the SSDP (Table 7) suggest that LCP offending was significantly associated with high levels of depression and impulsivity and that the families of LCP offenders tended to be single-parent families characterized by poor family management and parental smoking. There was some evidence that the parents of LCP offenders were more likely to use marijuana (OR = 3.7) and to be involved in criminal behavior (OR = 3.2), but these findings were not significant. LCP offenders were less likely to be of Asian ethnicity and were more likely to have grown up in disorganized neighborhoods.

Interestingly, most of the factors that were associated with LCP offending were also associated with AL offending, but these relationships were somewhat less strong for AL offenders. For example, high impulsivity was associated with LCP offending with an OR = 4.5 and also with AL offending with an OR = 2.5. Because of the small number of LCP offenders it was not possible to directly compare the characteristics that differentiated LCP from AL, offending. Neither individual/personality nor socio-demographic features were significantly associated with LO offending. LO offending was only found to be significantly related to parental cigarette use and parental marijuana use.

3.5. Alternative definitions of LCP, AL and LO offending

As mentioned, there are no agreed definitions of LCP, AL, and LO offending types, and other definitions might result in different conclusions being drawn about risk factors for the different offending types. To explore the effects of the definitions selected for this research, a number of additional definitions were used in the CSDD.

The first set of revised definitions imposed a longer criminal career duration on LCP offenders, a shorter criminal career duration on AL offenders, and had LO offending starting earlier.

1. LCP offenders – first offense up to age 16 and then at least another offense at age 40+.

⁶The risk factors were all measured when the boys were age 8–10.

⁷The risk factors were all measured when the children were aged 10–12.

2. AL offenders – first offense up to age 16 and last offense up to age 24.
3. LO offenders – first offense at 17 or later (note: the minimum age for adult court was 17 for these males).

Compared to the original definitions, these definitions had the effect of causing an earlier age of onset and a later age of the last offense for LCP offenders, and an earlier age of onset and an earlier last offense for AL offenders. For LO offenders this definition caused an earlier age of onset than the previous definition (Jolliffe et al., 2017).

Using these revised definitions, Table 8 shows that the three risk factors most strongly related to LCP offending (compared to nonoffending), were having a convicted parent (OR = 8.2), high daring and coming from a disrupted family (both ORs = 4.9). Of these two (a convicted parent, a disrupted family) were the same as those found using the original offending 'type' definitions. However, the OR values in Table 8 were generally greater than in Table 6. For AL offending the most strongly associated factor was parental disharmony (OR = 4.4), but high daring (OR = 3.8) and a convicted parent (OR = 3.4) were also strongly associated with the original definitions. For LO offending, low junior attainment, poor housing (both ORs = 2.8), and poor parental supervision (OR = 2.1), were also strongly associated with the original definitions. When the factors associated with LCP and AL offending were directly compared, two different variables were found to be statistically significant; LCP offenders were significantly more likely to have low popularity (OR = 3.3) and were more likely to come from a lower social class family (OR = 3.6).

It was felt that exploration of additional definitions of LCP and AL offending using the CSDD would be desirable. These were:

1. AL16 – first offense up to 16, last offense up to 20.
2. LCP40 – first offense up to 20, last offense at 40+.
3. AL40 – first offense up to 20, last offense up to 39.
4. LCP30 – first offense up to 16, last offense at 30+.
5. AL30 – first offense up to 16, last offense up to 29.

Compared to the original definitions, this second set of definitions explores a range of longer and shorter criminal careers for both LCP and AL offenders. Table 9 shows the odds ratios of the comparisons for the new definitions of LCP and AL offending. Compared to the original definition of AL (Table 6) there were a smaller number of risk factors that were statistically significant when AL16 offenders were compared to nonoffenders, and on balance the odds ratios were smaller in magnitude than in the original analysis.

When the original definition of LCP offending was compared to nonoffenders, the only variables that did not differ significantly were psychomotor impulsivity, high nervousness, and poor housing. Using the second definition, four additional variables did not differentiate LCP offenders from nonoffenders. These were low verbal IQ (LCP30), low non-verbal IQ, low social class, and a high delinquency-rate school (LCP40).

It is important to note that the LCP-AL comparisons in Table 9 are limited by small numbers, meaning that even strong effects (measured by odds ratios) might not be statistically significant. When the original definitions of LCP and AL offending were compared (Table 6), only poor parental supervision (OR = 2.3) and poor housing (OR = 0.5) were found to be significantly different. When LCP40 was compared to AL40, no significant differences were found but the odds ratios for poor parental supervision (OR = 2.1) and poor housing (OR = 0.5) were similar. When LCP30 was compared to AL30, there was evidence that those who were LCP were significantly more likely to have a convicted parent (OR = 2.5). In addition there was evidence that they were more likely to have low social class families (OR = 2.6), low popularity (OR = 2.2), poor parental supervision (OR = 2.2) and they were less likely to have poor housing (OR = 0.5).

3.6. Alternative definitions of LCP, and AL offending in the SSDP and PYS

The SSDP and the PYS had a more limited age range than the CSDD so only two additional definitions were explored. These were:

1. AL20 - having a first and last offense up to age 20,
2. LCP30 - having a first offense up to age 17 and a last offense at 30 + .

However, when the new definition of LCP offending was applied, this resulted in no change in the composition of the LCP group in the SSDP and only one fewer individual in the PYS. As a result, only the new definitions of AL will be explored.

Table 10 shows the variables that were associated with the revised definition of AL offending (AL20) in the SSDP and those of the original definition of AL (Table 7), compared to nonoffenders. The results show that, with the AL20 definition, there were fewer statistically significant differences. High impulsivity, parent marijuana use, African American ethnicity, and high neighborhood disorganization were originally statistically significant, but were not significant with the revised definition. This is perhaps not surprising, as the original definition would have included more persistent offenders. Because of the small number of LCP offenders it was not possible to compare them with the new version of AL offending.

The revised version of AL (AL20) was also applied to the PYS data. This new definition resulted in a reduction in the number of AL offenders, from 36.2% originally to 12.5%. This was because there were a considerable number of offenders who started their offending before age 20 but continued into their early to mid-twenties.

Table 11 shows the risk factors when the new definition of AL was compared to nonoffenders and when the new definition of AL offenders was compared to LCP offenders. Overall, compared to the original definitions (Table 6) there were fewer variables that were statistically significantly related to the new definition of AL offending. Variables that no longer statistically significantly differentiated AL offenders from nonoffenders were: having a bad relationship with the primary caregiver, parental stress, living with a non-biological family relative, poor parental communication, the family on welfare, a small house, and a poorly educated mother. Only having an unemployed mother was statistically significantly

associated with the new definition of AL offending but not the original version. This difference likely reflects the fact that the revised version of AL offending sets a shorter possible criminal career and so includes fewer persistent offenders.

This would also explain why there are slightly more significant differences when the revised version of AL offending was compared to LCP offending. Compared to the original comparison of AL and LCP offending, LCP offenders were more likely to be living with a non-biological relative, to come from a family on welfare and to have a poorly educated mother. All other comparisons were similar to the original comparison.

The results of adopting several different definitions of offending types suggested that, as the definitions of AL and LCP offending were altered to decrease the potential criminal career duration, the number of risk factors that differentiated the offending type from nonoffenders decreased, and the magnitude of the risk factors that differentiated the offending types from nonoffenders decreased. Increasing the potential criminal career duration of the definition of the offending types had the reverse effect (i.e., an increase in the number of risk factors and an increase in the magnitude of the risk factors).

When the risk factors for the different definitions of AL and LCP were compared, the results suggested that, the more similar the definitions were in terms of criminal career durations, the fewer differences were observed. Similar to previous research, this suggests that differences between these offender types might be better conceptualized as quantitative as opposed to qualitative, or as differences in degree rather than differences in kind.

3.7. Summary of risk factors in the SSDP, PYS and CSDD

Table 12 shows the odds ratios for the three risk factors that were most strongly associated with the offending types in each of the three studies. For example, parent cigarette use (OR = 6.8) was the factor that was most strongly related to LCP offending (compared to non-offending) in the SSDP. In the PYS the most strongly related factor was lack of guilt (OR = 11.1) and in the CSDD having a convicted parent was most strongly related (OR = 5.2). There was considerable overlap of factors across offending types. For example, parent cigarette use was significantly associated with all offending types in the SSDP, and this was also the case with old for the grade and lack of guilt in the PYS. Generally, the associations were strongest for LCP offending, followed by AL and then LO offending. In addition, the factors that were identified tended to be individual (e.g., old for grade/low academic achievement, hyperactivity) or family (e.g., convicted parent, child abuse), rather than socio-demographic (as only poor housing was found to significantly differentiate LO offenders from non-offenders in the CSDD).

The risk factors that were most strongly associated with LCP compared to AL offenders in the PYS were living in a small house (OR = 2.3), high parental stress (OR = 1.9), lack of guilt (OR = 1.8) and poor parental communication (OR = 1.8). For the CSDD, they were low social class (OR = 3.6), low popularity (OR = 3.3) and having a convicted parent (OR = 2.5). While some of these variables were also found to differentiate LCP from nonoffenders (e.g., convicted parent in the CSDD, lack of guilt in the PYS), most were unique to this comparison. Interestingly, the factors that most strongly differentiated LCP from AL

offenders tended to be social (e.g. small house, low social class) or parental, rather than individual factors.

4. Conclusions

This systematic review of prospective longitudinal studies found that there has been a surprising lack of attention to criminal career duration in research on LCP, AL, and LO offending types. This is perhaps not surprising considering the limited research on criminal career duration generally (e.g., Kazemian & Farrington, 2006), but this lack of knowledge has important implications for attempts to predict, and ultimately prevent, more serious, and longer-term forms of offending.

Examining the risk factors for the different offending types suggested that there was a considerable amount of overlap both across the three studies, and also across the offending types. For example, impulsivity/hyperactivity was associated for all studies and offending types except LCP in the PYS. All offending groups were typified by lack of guilt, low intelligence/low school success, and high impulsivity/hyperactivity. The families of these children were characterized by single parent families whose members were antisocial (in drug use and offending), and who used poor supervision and management. These children also tended to have low SES, live in poor neighborhoods, attend delinquent schools, and live in poor housing.

When the risk factors for LCP and AL offending were directly compared in the PYS and CSDD, only a small number of significant differences were found. LCP offenders were more likely to lack guilt, report parental stress, have poor parental communication and poor parental supervision compared with AL offenders. LCP offenders in the PYS also had smaller houses, but those in the CSDD had significantly better housing than AL offenders. It may be that family risk factors are more strongly associated with LCP offending and socio-demographic risk factors are more associated with AL offending. With the exception of lack of guilt, there was no evidence that individual factors distinguished between the two offending types. The two groups may differ more in degree than in kind.

While specific risk factors did not seem to differentiate LCP, AL, and LO offending, there was an indication that the different offending types were associated with different strengths of association, and with the number of key risk factors. The odds ratios comparing factors between LCP offenders and nonoffenders were consistently larger than those between AL and nonoffenders, and the LO and nonoffender comparisons produced the lowest magnitude and lowest number of significant odds ratios. Interestingly, when criminal career duration was increased in defining LCP and AL offenders, and these offender types were compared to nonoffenders, a similar profile of risk factors was identified, but the magnitudes of the odds ratios were stronger. Similarly, when the criminal careers of AL and LCP offenders were made more similar in terms of duration, the differences between these two offending types, in terms of the magnitude and number of risk factors, decreased. This provides further evidence of the importance of criminal career duration for defining 'types' of offenders and the risk factors that might predict them.

Combining the findings from the literature and the analyses of the data, this research suggests that it may be difficult to prospectively identify who will go on to become an LCP offender and who will have a significantly shorter career and become an AL offender, as few specific risk factors significantly differentiated LCP from AL offenders. It should, however, be pointed out that these conclusions are limited by the data that we had available. Moffitt could perhaps argue that we would have found more differences between LCP and AL offenders if other variables (e.g., low birth weight, perinatal problems) had been analyzed. Further research on this topic is greatly needed.

Given that there was considerable overlap of risk factors between AL and LCP offenders, it would seem appropriate to address the risk factors of both types of potential offenders with evidence-based interventions (e.g., Farrington & Welsh, 2007; Social Research Unit Dartington, 2012). Many of the risk factors identified in this research as being associated with the offending 'types' have been associated with general offending in other studies, and a number of successful interventions have been designed to address many of these risk factors including low academic achievement, hyperactivity, and lack of empathy (for reviews see Farrington & Welsh, 2007; Piquero, Jennings, & Farrington, 2010; Piquero, Jennings, Farrington, Diamond, & Gonzalez, 2016). These interventions have generally been demonstrated to be cost-effective methods of preventing offending, and it would be expected that they could have a positive influence by shortening criminal careers regardless of the 'type' of offender.

In conclusion, this study provides the most comprehensive review of the risk factors associated with LCP, AL, and LO offending based on prospective longitudinal studies. However, much more research is needed using these types of studies to investigate LCP offenders in particular and to examine the extent to which their criminal careers can be predicted. This review has highlighted the prospective longitudinal studies which possess the data to further inform questions about LCP, AL, and LO offending. Re-analyses of these existing studies would be desirable, as the duration of the criminal career, which naturally separates LCP, AL and LO offenders, has been neglected in almost all previous research in this area. The current study located 55 prospective longitudinal studies, which in theory possessed the relevant information to classify 'real' LCP offending, but apart from the analyses conducted in this paper none explored LCP offending by studying criminal career duration. It would require relatively limited resources to follow-up a number of individuals in longitudinal studies using criminal records and investigate the childhood and adolescent predictors of LCP, AL, and LO offending. This would be highly desirable for theory and policy.

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Table 1

Factors associated with LCP offending compared to nonoffending.

	Orebro Project, Bergman and Andershed (2009)	Columbia County Study, Dubow et al. (2014)	Jyvaskyla Longitudinal Study, Pulkkinen et al. (2009)
Personality/individual	Age 13: Low school achievement, Low math ability, Low verbal ability, High hyperactivity	Age 8: None sig. Age 19: None sig.	Age 8: Low school success. Age 14: Low school success, Low carefulness, Low anxiety, High emotional lability, Low emotional stability.
Family	Age 15–16: High parental conflict, Single-parent family	Age 8: Young mother, Large family size Age 19: Low identification with parent.	N/A
Socio-demographic	Age 13: Low SES	Age 19: Witnessed aggression, Been victim of aggression	N/A

N/A – no comparisons undertaken.

Table 2

Factors associated with AL offending compared to nonoffending.

	Orebro Project, Bergman and Andershed (2009)	Columbia County Study, Dubow et al. (2014)	Jyvaskyla Longitudinal Study Pulkkinen et al. (2009)
Personality/individual	Age 13: Low school achievement, Low math ability, Low verbal ability, High hyperactivity	Age 8: None sig. Age 19: None sig.	Age 8: Low school success, low constructiveness Age 14: Low anxiety, Greater social activity
Family	Age 15–16: Harsh parenting, High parental conflict, Single parent family	Age 8: Large family size Age 19: None sig.	N/A
Socio-demographic	Age 13: Low SES	Age 19: Witnessed aggression, Been victim of aggression	N/A

N/A – no comparisons undertaken.

Table 3

Factors associated with LO offending compared to nonoffending.

	Orebro Project, Bergman and Andershed (2009)	Columbia County Study, Dubow et al. (2014)	Jyvaskyla Longitudinal Study Pulkkinen et al. (2009)
Personality/individual	Age 13: Low math ability, Low verbal ability, High hyperactivity	Age 8: None sig. Age 19: None sig.	Age 8: None Sig. Age 14: Greater social activity
Family	Age 15–16: Harsh parenting.	Age 8: None Sig.	N/A
Socio-demographic	Age 13: None sig.	Age 19: Witnessed aggression, Been victim of aggression	N/A

N/A – no comparisons undertaken.

Table 4

Factors associated with LCP Offending compared to AL offending.

	Orebro Project, Bergman and Andershed (2009)	Columbia County Study, Dubow et al. (2014)	Dunedin Longitudinal Study, Moffitt, Caspi, Rutter, and Silva (2001)	Jyvaskyla Longitudinal Study Pulkkinen et al. (2009)
Personality/individual	Age 13: High hyperactivity	Age 8: None sig. Age 19: High depression	Age 2–3: Difficult to manage, Undercontrolled temperament, Peer rejection Age 5: Low IQ, Hyperactive Age 7, 9, 11: Low IQ, Low reading level, Hyperactive, Peer rejection Age 13: Low neuropsychological memory	Age 8: Disobedience, Low compliance, Greater social activity Age 14: Emotional lability
Family	Age 15–16: Single parent family	Age 8: None sig. Age 19: Low identification with parents	Age 3: Young mother, Poor parent child- interaction Age 7–11: Inconsistent discipline, High conflict, Poor maternal mental health. Age 0–11: Caregiver changes, Single parent family	N/A
Socio-demographic	Age 13: None sig.	Age 19: None Sig.	Age 0–15: Low SES	N/A

N/A – no comparisons undertaken.

Table 5

Risk factors (age 10–12) for offending types in the PYS.

	LCP OR	AL OR	LO OR	LCP vs AL OR
Personality/individual				
Risk score at screening	4.5 *	3.6 *	1.7	1.3
Depressed mood	1.2	1.5	1.0	0.8
Withdrawn/shy	1.3	1.1	1.0	1.2
Callous/unemotional	3.1 *	4.5 *	3.0 *	0.7
Lack of guilt	11.1 *	6.1 *	4.4 *	1.8 *
Low school motivation	5.2 *	4.9 *	2.4 *	1.0
Low academic achievement	5.0 *	4.8 *	2.6 *	1.0
Old for grade	3.8 *	3.7 *	3.1 *	1.0
Hyperactivity	4.3 *	6.0 *	4.3 *	0.7
Low intelligence	5.9 *	5.5 *	4.4 *	1.1
Family				
Child abuse	9.7 *	5.3 *	4.6 *	1.8
Mother's smoking	2.2 *	1.3	0.7	1.7
Mother's drinking	1.9	1.6	0.8	1.1
Parental supervision	3.1 *	2.4 *	2.0 *	1.3
Bad relationship with primary caregiver	2.1 *	2.1 *	1.8	1.0
Parental stress	3.2 *	1.7 *	1.4	1.9 *
Parental substance use	2.2 *	1.9 *	2.0 *	1.2
Family police contact	2.1 *	1.6 *	1.6	1.3
Living with a non-biological relative	4.9 *	2.9 *	1.4	1.7
Poor parental communication	4.6 *	2.5 *	2.7 *	1.8 *
Large family size	1.3	1.7 *	1.5	0.7
Socio-demographic				
Family on welfare	5.6 *	3.6 *	2.1 *	1.6
Small house	3.0 *	1.3	1.0	2.3 *
Poorly educated mother	4.3 *	3.2 *	2.9 *	1.3
Teenage mother	3.7 *	3.0 *	1.7	1.2
Bad neighborhood impression	2.4 *	3.0 *	2.1 *	0.8
African American	3.5 *	3.2 *	3.2 *	1.1
Unemployed Mother	2.7 *	1.6	1.0	1.7

*
 $p < 0.05$.

Table 6

Risk factors (age 8–10) for offending types in the CSDD.

Personality/individual	LCP OR	AL OR	LO OR	LCP v AL OR
Low nonverbal IQ	2.2 *	2.5 *	2.0	0.9
Low verbal IQ	2.3 *	2.2 *	1.9	1.1
Low school attainment	3.5 *	3.1 *	2.3 *	1.1
High hyperactivity	3.0 *	2.1 *	2.0	1.4
Psychomotor impulsivity	1.7	2.1 *	2.1 *	0.8
High daring	3.4 *	3.5 *	1.4	1.0
High nervousness	0.8	0.5	1.6	1.5
Low popularity	2.1 *	1.1	1.1	1.9
Family				
Disrupted family	4.4 *	2.6 *	2.7 *	1.7
Parental disharmony	2.5 *	2.4 *	1.7	1.1
Convicted parent	5.2**	3.3 *	1.7	1.6
Young mother	2.7 *	2.0 *	1.4	1.4
Poor supervision	5.1 *	2.2 *	2.1	2.3 *
Socio-demographic				
Large family size	2.8 *	3.0 *	2.1	0.9
Low family income	2.2 *	2.7 *	1.1	0.8
Low social class	2.3 *	1.2	1.4	1.8
Poor housing	1.6	3.4 *	2.6 *	0.5 *
Delinquent school	2.6 *	2.8 *	2.0 *	1.0

*
 $p < 0.05$.

Table 7

Risk factors (age 10–12) for offending types in the SSDP.

Individual/personality	LCP OR	AL OR	LO OR
Low school achievement	1.5	1.0	1.3
High anxiety	0.3	1.0	2.1
High depression	5.3 *	2.9 *	1.5
High impulsivity	4.5 *	2.5 *	0.8
School bonding	1.3	1.0	1.8
Family			
Single-parent family	2.8 *	2.3 *	1.8
Poor family management	4.0 *	1.2	1.1
Parent drinking	2.5	2.5	1.6
Parent cigarette use	6.8 *	4.8 *	4.2 *
Parent marijuana use	3.7	5.0 *	5.3 *
Parent criminal behavior	3.2	2.0	1.7
Low family bonding	1.7	1.7	0.9
Low parent-child involvement	2.1	1.2	1.2
Poor family communication	2.2	1.0	0.7
Harsh discipline	2.4	1.2	1.3
Socio-demographic			
Poverty	1.2	0.7	0.8
African American	2.4	2.2 *	1.0
Asian American	0.2 *	0.2 *	0.5
High neighborhood disorganization	2.9 *	2.0 *	0.4

*
 $p < 0.05$.

Table 8

Risk factors (age 8–10) for offending types in the CSDD with first revised definitions.

Personality/individual	LCP OR	AL OR	LO OR	LCP vs AL OR
Low nonverbal IQ	1.8	2.5 *	2.0 *	0.7
Low verbal IQ	2.1	2.4 *	1.8 *	0.9
Low school attainment	2.8 *	3.2 *	2.8 *	0.9
High hyperactivity	3.6 *	2.0	1.9 *	1.8
Psychomotor impulsivity	2.1	2.9 *	1.6	0.7
High daring	4.9 *	3.8 *	1.9 *	1.3
High nervousness	0.7	0.6	1.0	1.1
Low popularity	2.3	0.7	1.1	3.3 *
Family				
Disrupted family	4.9 *	3.1 *	2.1 *	1.5
Parental disharmony	2.9 *	4.4 *	1.7	0.6
Convicted parent	8.2 *	3.4 *	1.9 *	2.4
Young mother	2.9 *	1.4	1.8 *	2.1
Poor supervision	4.3 *	2.5 *	2.7 *	1.7
Socio-demographic				
Large family size	4.1 *	2.6 *	2.3 *	1.5
Low family income	2.4 *	3.1 *	1.4	0.8
Low social class	2.5 *	0.7	1.3	3.6 *
Poor housing	1.5	3.0 *	2.8 *	0.5
Delinquent school	2.0	3.1 *	1.9	0.7 *

*
 $p < 0.05$.

Table 9

Risk factors (age 8–10) for revised offending types in the CSDD with second revised definitions.

Personality/individual	AL16 vs Non OR	LCP40 vs Non OR	LCP30 vs Non OR	LCP40 vs AL40 OR	LCP30 vs AL30 OR
Low nonverbal IQ	2.0	1.6	2.7*	0.6	1.1
Low verbal IQ	1.9	2.6*	2.0	1.2	0.7
Low school attainment	2.5*	3.3*	3.0*	0.9	0.9
High hyperactivity	1.4	2.6*	3.7*	1.1	1.8
Psychomotor impulsivity	2.8*	2.0	1.8	1.0	0.6
High daring	4.0*	3.4*	4.7*	0.9	1.3
High nervousness	0.7	0.8	0.7	1.4	0.9
Low popularity	0.8	1.9	2.5*	1.5	2.2
Family					
Disrupted family	3.7*	4.2*	5.2*	1.5	1.6
Parental disharmony	3.1*	2.7*	2.8*	1.1	0.9
Convicted parent	3.3*	4.6*	8.9*	1.2	2.5*
Young mother	1.1	3.0*	2.4*	1.5	1.3
Poor supervision	2.5*	5.3*	4.6*	2.1	2.2
Socio-demographic					
Large family size	2.0	3.9*	2.8*	1.6	0.9
Low family income	2.5*	2.3*	2.3*	0.8	0.7
Low social class	0.5	2.1	2.7*	1.6	2.6
Poor housing	3.3*	1.6	1.6	0.5	0.5
Delinquent school	2.5*	2.0	3.1*	0.6	0.9

* $p < 0.05$.

Table 10

Risk factors (age 10–12) for revised AL offending types in the SSDP.

Individual/personality	AL20 OR	AL OR
Low school achievement	0.8	1.0
High anxiety	0.9	1.0
High depression	1.8 *	2.9 *
High impulsivity	1.3	2.5 *
School bonding	0.8	1.0
Family		
Single-parent family	1.4 *	2.3 *
Poor family management	0.8	1.2
Parent drinking	1.0	2.5
Parent cigarette use	1.6 *	4.8 *
Parent marijuana use	1.3	5.0 *
Parent criminal behavior	1.2	2.0
Low family bonding	1.0	1.7
Low parent-child involvement	1.1	1.2
Poor family communication	0.9	1.0
Harsh discipline	1.1	1.2
Socio-demographic		
Poverty	0.8	0.7
African American	1.2	2.2 *
Asian American	0.5 *	0.2 *
High neighborhood disorganization	0.9	2.0 *

* $p < 0.05$.

Table 11

Risk factors (age 10–12) for revised AL offending type in the PYS.

	LCP vs AL20 OR	AL20 vs Non OR
Personality/individual		
Risk score at screening	1.7	2.8 *
Depressed mood	0.8	1.5
Withdrawn/shy	1.2	1.1
Callous/unemotional	1.0	3.3 *
Lack of guilt	3.2 *	3.6 *
Low school motivation	1.4	3.7 *
Low academic achievement	1.2	4.1 *
Old for grade	1.5	2.5 *
Hyperactivity	1.0	4.6 *
Low intelligence	1.3	4.6 *
Family		
Child abuse	1.9	5.3 *
Mother's smoking	2.0	1.0
Mother's drinking	1.2	1.6
Parental supervision	1.2	2.6 *
Bad relationship with primary caregiver	1.7	1.2
Parental stress	2.1 *	1.6
Parental substance use	1.1	2.0 *
Family police contact	1.1	1.9 *
Living with a non-biological relative	3.0 *	1.6
Poor parental communication	2.9 *	1.6
Large family size	1.0	1.2
Socio-demographic		
Family on welfare	3.3 *	1.7
Small house	3.5 *	0.9
Poorly educated mother	2.4 *	1.8
Teenage mother	1.5	2.4 *
Bad neighborhood impression	0.8	3.4 *
African American	1.5	2.3 *
Unemployed mother	1.3	2.1 *

*
 $p < 0.05$.

Table 12

Summary of early risk factors associated with offending types.

LCP v Nonoffender	AL v Nonoffender	LO v Nonoffender
SSDP	SSDP	SSDP
Risk factor	OR	Risk factor
Parent cigarette use	6.8	Parent marijuana use
High depression	5.3	Parent cigarette use
High impulsivity	4.5	High depression
PYS	PYS	High anxiety
Risk factor	OR	PYS
Lack of guilt	11.1	Risk factor
Child abuse	9.7	OR
Low intelligence	5.9	Child abuse
CSDD	CSDD	Lack of guilt
Risk factor	OR	Low intelligence
Convicted parent	5.2	CSDD
Poor supervision	5.1	Risk factor
Disrupted family	4.4	OR
		Disrupted family
		Poor housing
		Convicted parent
		Low school attainment