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Childhood explanatory factors for adolescent offending: A cross-national comparison based on official records in London, Pittsburgh and Zurich¹

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Abstract

This study compares childhood explanatory factors for adolescent offending according to official records obtained in three longitudinal projects conducted in three different countries: the Cambridge Study in Delinquent Development, the Pittsburgh Youth Study and the Zurich Project on Social Development from Childhood to Adulthood. This is the first comparison of a great variety of explanatory factors for recorded offending measured in three different geographic areas and different generations. Several common explanatory factors were found in the three projects, and they seem to be generalizable across time and context. Common explanatory factors for offending included individual factors such as high impulsivity, attention deficit, and low school achievement. Childrearing explanatory factors included poor supervision, physical discipline and parental conflict. Socioeconomic explanatory factors included low family income and divorced parents. Parental imprisonment was also a common risk factor among the three studies. Replicable childhood predictors of youth offending should be targeted in prevention.

Keywords: childhood explanatory factors, recorded offending, comparative study

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Cross-national comparisons in criminology are especially important to discover the generalizability of findings across different geographic areas and time periods. Nevertheless, the number of studies that include comparisons of results obtained in different longitudinal projects is low (see Farrington, 2015 for a review). To our knowledge, this is the first study that compares childhood explanatory factors for adolescent offending according to official records obtained in three longitudinal projects conducted in three different countries, including the Cambridge Study in Delinquent Development conducted in the UK, the Pittsburgh Youth Study conducted in the US and the Zurich Project on Social Development from Childhood to Adulthood (z-proso) conducted in Switzerland. A previous study compared findings in Cambridge and Pittsburgh (Farrington & Loeber, 1999), but this is the first study that includes the comparison of the findings of all three longitudinal projects and the first study that analyses childhood predictors of recorded offending using z-proso data.

Studying childhood risk factors for offending in Zurich and comparing the results to those found in London and Pittsburgh is especially interesting because of some particular characteristics of Zurich. Switzerland is a wealthy country with a relatively low level of inequalities. A study of 22 European countries showed that inequality in education and the inequality-related deaths were relatively low in Switzerland (Mackenbach et al., 2008). Switzerland has some very peculiar characteristics including a high degree of local and regional autonomy, neutrality, and direct democracy, together with different institutions which promote citizen wellbeing and a prosperous economy (Trampusch & Mach, 2011). Swiss basic values are security, democracy, rule of law, and welfare, avoiding extreme positions (Riklin & Mockli, 1983). Switzerland is also a highly multicultural country, with different nationalities and languages (Faeh et al., 2009). There are different linguistic areas in Switzerland, with a high population of foreigners (above 20%), with average households under 2.5 persons, multiple religions, and with one of the highest gross national products per capita in the world (Weibler & Wunderer, 2007).

Thus, the context in which the risk factors for offending are studied in z-proso is different from the context in which these factors were studied in the Cambridge Study in Delinquent Development and Pittsburgh Youth Study. The Cambridge Study in Delinquent Development was conducted mostly with a white, urban, working class sample (Farrington, 2003). In Pittsburgh, participants were recruited from all public schools, then the 30% of boys with the highest risk score were selected and included in the study, together with an equal number of boys randomly selected from the remaining 70% (Loeber et al., 2017). Just over half of the boys were African American and just under half were White.

Participants from Zurich seem to be less exposed to certain types of economic strain and poverty which could be related to less delinquent behaviors (Agnew, 1992). On the other hand, the study sample in Zurich is characterised by a diverse migration background (76% with one or both parents migrated, 90 different nationalities) and a high degree of religious diversity (e.g., 21% Muslim, 7% Orthodox, 5% Hindu) (Eisner and Ribeaud, 2007; Eisner et al, 2007). Also, youth in Switzerland have above-average levels of cannabis consumption and experience a low level of family support according to the HBSC study (Inchley et al., 2020). Comparing Zurich, London and Pittsburgh makes it possible to discover if risk factors are generalizable across time and context, and to add to the literature on risk factors that are context-dependent (Eisner and Malti, 2015)

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Childhood explanatory factors for offending

Identifying childhood explanatory factors for adolescent offending is one of the most important objectives of developmental criminology (Le Blanc & Loeber, 1998). If childhood explanatory factors can be identified, different strategies and intervention programs could be implemented to decrease risks and therefore reduce offending later in life.

Early explanatory factors are a crucial part of many major criminological theories. Already in the 1990s, in their General Theory of Crime, Gottfredson and Hirschi (1990) identified low self-control as a risk factor for offending. Sampson and Laub's (1993) Age-Graded Theory of Informal Social Control focused on informal social control, including the family, as one of the central points of a person's early childhood bonds to the society that could increase or decrease offending. Childhood explanatory factors such as poor child rearing, low family income, school failure, delinquent parents or peers, and high impulsiveness are the basis of the development of long term antisocial potential according to the Integrated Cognitive Antisocial Potential (ICAP) Theory (Farrington, 2005; Farrington & McGee, 2018). The Social Development Model (SDM) posed by Catalano and Hawkins (1996) suggests that children learn both prosocial and antisocial behaviors through socialization processes. Dysfunctional socialization may be a possible risk factor for antisocial behavior, where a socialization process may culminate with bonding to antisocial others, a risk factor for offending.

Although research focused on explanatory factors for offending has been fruitful, a systematic review of meta-analyses on the topic found only 20 meta-analyses on explanatory factors for violence, different types of offending, and delinquency conducted throughout the history of the field (Farrington, Gaffney, & Ttofi, 2017), most of them based on cross-sectional studies and with a limited number of predictors. It was concluded that more longitudinal studies focused on a wide range of explanatory factors are needed (Eisner & Malti, 2015). At the same time, meta-analyses conducted up to date provided valuable information about what is known and what still needs to be discovered. Delinquency is a complex problem that needs to be analysed taking into account individual factors together with interpersonal and socioeconomic factors. The current study included these different levels of analysis.

Childhood individual explanatory factors for offending have been described in several meta-analyses. A meta-analysis conducted by Young, Moss, Sedgwick, Fridman, and Hodgkins (2015) concluded that around 30% of the youth prison population had an ADHD diagnosis. Based on a meta-analysis of 38 prospective longitudinal studies, Leschied, Chiodo, Nowicki, and Rodger (2008) found individual predictors of offending such as attentional problems, motor restlessness, attention seeking, depression, withdrawal, anxiety, self-deprecation, and social alienation.

Childrearing and parental risk factors have also been described in several meta-analyses. Derzon (2010) performed a meta-analysis of 119 prospective longitudinal studies that focused primarily on family-related risk factors for problem, aggressive, criminal, and violent behavior. Regarding criminal behavior, risk factors ordered from the strongest to the weakest were parental discord and instability, child rearing skills, family stress, child maltreatment, other family deviance, parental education and expectations, warmth and relationship, discipline, parental antisocial behavior, foster

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care, and urban housing. Other factors included family SES, family size, unwanted pregnancy, a broken home, separation from parents, young parents, residential mobility, supervision and involvement. A meta-analysis conducted by Leschied et al. (2008) identified factors such as parental coerciveness, authoritarian behaviors, poor child supervision, witnessing violence in the home, parental conflict, family stressors, and poor parent-child communication. A meta-analysis based on 40 primary studies showed that parental incarceration was related to children's antisocial behavior (Murray, Farrington, & Sekol, 2012).

Another group of risk factors found in different studies focused on offending is related to socioeconomic status. Among them, Gerard, Jackson, Chou, Whitfield, and Browne (2014) conducted a systematic review of risk factors for juvenile homicide, including 16 primary studies. Besides individual and family factors, it was found that low socioeconomic status was a risk factor for juvenile homicide perpetration in cohort studies. Thus, there is a wide body of evidence focused on early risk factors for offending, although most of the studies in the field are cross-sectional. There are also some pressing gaps in knowledge related to the generalizability of these factors as the number of longitudinal studies with comparisons across countries and time periods is still low.

Comparisons across countries and time periods

A comparative study of childhood explanatory factors for recorded offending, including different countries and time periods can be especially interesting given that explanatory factors for offending may or may not be the same for different contexts. As stated by Murray et al. (2018), risk factors can differ depending on the community context, as it might interact with individual and family level factors. In their systematic review, Murray et al. (2018) synthesized findings on risk factors for antisocial behavior in low- and middle-income countries. They found that many of these risk factors were similar to those found in high income countries, but there was also substantial heterogeneity in the findings, including null associations between antisocial behavior and factors such as poor educational performance, maltreatment, poverty, low maternal education, and large family size in low- and middle-income countries. These inconsistencies were attributed by the authors to possible true differences, but also to issues in comparability of the findings, or inconsistencies among studies in general, both in high-income and low- and middle-income countries.

A narrative review conducted by Rutter (1999) focused on the importance of different sociocultural factors for desirable or undesirable psychosocial development. He argued that different variables have different connotations depending on a context (e.g., being an unmarried mother is perceived in different ways across the world or time). There is also a comparative effect (e.g., the same level of education is perceived in different ways depending on the average level of education in a society), a compositional effect (e.g., the same income can be perceived in terms of low or high, and in terms of income inequality), a contextual effect (e.g., individuals behave differently in different contexts), and social group characteristics (e.g., expectations, interpersonal interactions). All these sociocultural factors can differ across geographic areas and time periods. Thus, explanatory factors for offending may or may not be generalizable.

Even though comparative studies in developmental criminology can be very useful to fill pressing gaps in knowledge regarding the generalizability of the findings,

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and there are good reasons to believe that some findings may or may not be generalizable, the number of these studies is still low. Many of the previous studies were cross-sectional. Among them, a study conducted by Oesterle et al. (2012) compared 12- to 17-year-old adolescents in the US and in the Netherlands regarding risk and protective factors for self-reported delinquency. Risk and protective factors were similar in both countries, and they included community factors such as high disorganisation and neighbourhood attachment, family factors such as conflict and favorable attitudes towards substance use and antisocial behavior, school factors such as low academic performance, peer substance use, and individual factors such as a favorable attitude towards substance use and antisocial behavior. Some protective factors were attachment to the family, rewards for prosocial behavior in the community, school and family, and disapproval of cheating and stealing.

Some family-related longitudinal explanatory factors for offending in London boys were also compared to those discovered in a cross-sectional sample of more than 20,000 recruits to the Swiss Army (Haas, Farrington, Killias, & Sattar, 2004). In both countries, offending was predicted by family conflict and disrupted family, especially not living with a mother, both in relation to self-reported delinquency and appearances in juvenile courts. Another cross-sectional study compared risk factors for self-reported violence in Seattle and Osaka males (Bui, Farrington, Ueda, & Hill, 2014). They found that some risk factors were common in both cities, including high risk taking, low parental monitoring and troubled peers. Large family size was related to more violence in Osaka but not in Seattle, and a single parent household was related to less violence in Osaka only. Low school bonding and low parental attachment were related to violence in Seattle only. Many other cross-sectional studies based on self-reported antisocial behaviors have been conducted, including large representative-sample studies in Switzerland (Ribeaud, 2015; Ribeaud, Lucia, & Stadelmann, 2015) with some national comparisons among regions. Thus, these studies shed some light on possible comparative predictors of offending, but their cross-sectional designs do not make it possible to distinguish predictors from correlates.

The number of longitudinal comparative studies is low. Among them, a study conducted by Farrington and Loeber (1999) compared childhood explanatory factors for adolescent offending according to official records in London and Pittsburgh boys. They discovered that individual explanatory factors such as high impulsivity (or hyperactivity), poor concentration (or high attention deficit), and low achievement were significantly related to offending in both projects. This was also true for childrearing factors such as poor supervision, physical punishment, low reinforcement and parental conflict (or unhappy parents), and low family leisure outside home in London, but not in Pittsburgh. Although low SES was a risk factor in Pittsburgh, but not in London, other socioeconomic factors such as low family income, and separation from a parent (or a broken family) were explanatory factors in both cities. Poor housing was a risk factor in London, but not in Pittsburgh. Regarding parental factors, having a convicted parent (or father behavior problems), and large family size were explanatory factors in both cities, but having a young mother was only a risk factor in Pittsburgh. Thus, there were some explanatory factors found in both projects, but there were also some factors found in one site only.

Another comparative study with a prospective longitudinal design found that parental conviction was related to offending in England and the Netherlands, but parental imprisonment was related to offending only in England (Besemer, Van Der Geest,

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Murray, Bijleveld, & Farrington, 2011). Thus, some but not all family related explanatory factors were found to be robust among different contexts.

A study conducted by Farrington, Ttofi, Cargo and Coin (2015) compared risk factors for offending in two generations of London males. They found eleven risk factors that significantly predicted offending in both generations, such as parental conviction, harsh discipline, poor parental supervision, a disrupted family, low family income, large family size, poor housing, low school attainment, risk-taking and antisocial child behavior. The 20 compared risk factors were strongly correlated (.80). Thus, risk factors for offending seemed to be rather robust across generations that lived in relatively different contexts and time periods.

Pulkkinen and Tremblay (1992) conducted a comparative study in Finland and Canada using two longitudinal prospective samples of boys, one from each country. They studied behaviors such as physical aggression, anxiety, inattention, hyperactivity and prosociality at age 6 in Montreal and age 8 in Finland, that were grouped into patterns. The pattern called multiproblem, with high scores on physical aggression, inattention, anxiety, hyperactivity, and low prosociality, showed the highest offending later in life, based on official records and arrest rates in Finland at ages 20 and 26, and self-reports and other-assessments at ages 10 and 11 in Montreal. Other patterns, including high inattention and hyperactivity and high aggressive behaviors, also had worse outcomes than among the boys labelled as normal or anxious only. Thus, the study advanced knowledge on longitudinal predictors of offending, but official records were only used in Finland, whereas the Canadian project used self-reports and other-assessments only.

Thus, most of the comparative studies focused on offending are based on cross-sectional research designs and self-reports that do not make it possible to differentiate explanatory factors for offending from correlates. There are a few comparative longitudinal studies of childhood predictors of recorded crime. Moreover, most comparative research focused on childhood predictors of recorded youth offending was conducted with males. Nevertheless, it is equally important to discover explanatory factors for female delinquency. A meta-analysis conducted by Hubbard and Pratt (2002) located 11 studies focused on risk factors for female offending. It was found that risk factors included prior antisocial behavior, antisocial peers, personality, attitudes or beliefs, school and family relationships, physical or sexual abuse, self-image, social adjustment, IQ, low SES and high anxiety. Thus, more studies based on longitudinal comparisons including females are needed.

The current study

Identifying childhood explanatory factors for recorded offending is crucial for prevention and intervention in antisocial behavior. Research focused on early explanatory factors has been fruitful, since they have been identified in many empirical studies and included in some major criminological theories. Nevertheless, individual, childrearing, socioeconomic and parental explanatory factors for offending have rarely been reported in the same study. Thus, a global vision including and comparing these different factors is still needed. Moreover, comparative studies including all these explanatory factors in different geographic areas and time periods can be especially important because they can shed light on the generalizability of findings. To our knowledge, this is the first study that compares a broad variety of childhood explanatory factors for adolescent offending in

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three different countries and time periods, conducted with a prospective longitudinal design, based on official records and including females. The three longitudinal projects are the Cambridge Study in Delinquent Development, The Pittsburgh Youth Study and The Zurich Project on the Social Development from Childhood to Adulthood (z-proso).

The Cambridge Study in Delinquent Development (CSDD; Farrington, Coid, & West, 2009; Farrington, Jolliffe, & Coid, 2021) is a prospective longitudinal study of 411 boys born in London around 1953. These London boys were first studied at age 8 and followed up to age 61 in criminal records. A great variety of risk and protective factors for antisocial behavior were studied, including individual, family, peer, school and social factors. Currently, the Cambridge Study in Delinquent Development includes three generations, with the original sample, their parents and their children.

The Pittsburgh Youth Study (PYS; Ahonen, Farrington, Pardini, & Stouthamer-Loeber, 2021; Loeber et al., 2012) originally included a random sample of 1,517 Pittsburgh boys with three subsamples of around 500 participants first studied in the first, fourth and seventh grades in 1987-1988. This is a prospective longitudinal study that includes different risk and protective factors for offending and antisocial behavior, with a follow-up of over 20 years. The middle cohort was used for this comparative study for the closest comparability.

z-proso is a 15-year longitudinal study (Eisner & Ribeaud, 2007; Ribeaud & Eisner, 2010) that included a representative sample of 1,675 children since their admission to the first year of Zurich's primary schools in the autumn of 2004. z-proso focuses on aggression, violence, delinquency and substance use, and includes a great variety of predictors from different informants such as children, teachers and parents, focusing on antisocial and prosocial behaviors (Murray, Obsuth, Eisner, & Ribeaud, 2019).

The studies used for the current comparison were all conducted with a prospective longitudinal design based on recorded offending. A prospective longitudinal design is especially important when studying explanatory factors. Although a longitudinal design does not make it possible to draw firm conclusions about causality, it does make it possible to study explanatory factors, not only correlates, because variables not only demonstrate correlation, but they also precede the outcome (Murray, Farrington, & Eisner, 2009). The fact that the current research is based on official records avoids the social desirability bias that is present in research conducted through self-reports.

This study builds on a previous comparative research conducted by Farrington and Loeber (1999) that focused on predictors of juvenile court delinquency in the CSDD and PYS studies. Building on these previous findings, it focuses on explanatory factors, without including measures of previous offending or antisocial behavior that were measured in all the three projects. This means that variables that measured similar constructs as the outcome were not included in Farrington and Loeber (1999). According to the authors, the concept of a causal or explanatory factor requires that a variable X predicts a different outcome Y. It would be tautological to investigate whether antisocial behavior predicted delinquency, as both empirical variables are measuring the same underlying construct. Thus, an explanatory factor is one that is measuring a different underlying construct from antisocial behavior although it is not necessarily causal. The current study follows the same methodology to make z-proso findings comparable with the CSDD and PYS.

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The authors of the CSDD and PYS studies concluded that many explanatory factors were similar across the two societies (Farrington & Loeber, 1999). Partly, these similarities might be caused by cultural similarities, as both the UK and the US share a similar legal system, language, and cultural values. Analysing data from Zurich and including a comparison with Zurich adds a lot of variability in the socio-economic contexts. Zurich is one of the wealthiest cities in the world and children were born to different family structures. London participants were born in 1953, participants in Pittsburgh were born 1978, while participants in Zurich were born in 1997. Many of the criminological theories are based on data collected decades ago. Thus, analysing data collected in an early 21st century in one of the wealthiest places on earth and comparing them to findings from different places and generations can add valuable information that can be used either to update these theories or to indicate that they could be generalizable. Values and expectations may be different in Zurich too as well as unemployment rates. This is especially important taking into account the reproducibility crisis in science. A large-scale project conducted with the aim of reproducing 100 classical psychological studies found that only 36% of replication studies (versus 97% of original studies) had statistically significant findings (Open Science Collaboration, 2015), possibly because the strength of the initial findings was limited. The extent to which risk factors for delinquency are replicable in different settings is a crucial issue in criminology and the issue has not been resolved yet. It is therefore crucial to discover if findings of the classical criminological studies conducted in London and Pittsburgh still hold in 21st century Zurich which could indicate their generalizability. The current study is the first comparison of childhood explanatory factors for adolescent recorded offending in three different contexts and timepoints.

Methods

Participants

This study compares the childhood explanatory factors for adolescent court records of offending in London, Pittsburgh and Zurich. The CSDD sample includes 411 London boys, with explanatory factors measured at ages 8 to 9, and court records of convictions from ages 10 to 16. The Pittsburgh sample includes the middle sample of 508 Pittsburgh boys, with explanatory factors measured at ages 10 to 11, and court records of petitions from ages 10 to 16.

The current study includes participants of z-proso who are compared to the published results of London and Pittsburgh participants (Farrington & Loeber, 1999). The Zurich sample includes 1,675 boys and girls, with explanatory factors measured at ages 7.5 to 9.5, and court records of convictions at ages 12 to 17. At age 17, 1,274 out of 1,305 study participants (97.6%) consented on a search for possible criminal court records in the Canton of Zurich's Legal Information System (RIS2) and were included in the present study. The RIS2 system includes all recorded criminal offenses of minor residents of the canton of Zurich committed in Switzerland.

Table 1 shows some characteristics of the three samples. There are important differences regarding the year of birth, percentages and ages of young mothers, ethnicities, percentages of single parents, number of siblings and incomes. Thus, comparing the Zurich sample to the London and Pittsburgh samples can be especially interesting giving its different characteristics.

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Table 1. Some characteristics of the London, Pittsburgh, and Zurich samples

	London	Pittsburgh	Zurich
Year of birth	1953	1978	1997
Young mother (upper age limit of the lower quartile)	22% aged 19 or less	28% aged 17 or less	25% aged 26 or less
Ethnicity	97% White	42.7% White	81.8% Caucasian
Percentages of single parent	22%	61%	21%
Number of siblings	24% four or more	26% three or more	5% three or more
Financial support/low income	23% inadequate income (<15 GBP per week in 1961-62), 20% on welfare	43% on welfare	38% received financial support
Gross Domestic Product per capita	7,346	18,373	21,003

* based on Angus Maddison historical Data in London (1953), US (1978) and Switzerland (1997) in International GK\$ available at <http://www.ggdc.net/maddison>

Instruments

There were 20 common explanatory factors measured across the three longitudinal projects. These factors were measured using different instruments described in table 2. Offending was measured through official reports and it was treated as a dichotomous variable (offenders vs. non-offenders). For more information about all the childhood explanatory factors, see West and Farrington (1973) for the CSDD and Loeber, Farrington, Stouthamer-Loeber and van Kammen (1998) for the PYS. Detailed information about the z-proso measures can be found in Ribeaud and Eisner (2010).

Table 2. Instruments used to measure explanatory factors for offending across the three studies

Explanatory factors	London	Pittsburgh	Zurich
Individual			
High impulsivity / hyperactivity	Psychomotor tests: the Porteus Maze, the Spiral Maze and the Tapping test	Hyperactivity- Impulsivity according to mothers and teachers based on DSM-III-R	Hyperactivity measure based on Social Behaviour Questionnaire (SBQ; Tremblay et al., 1991) reported by parents and teachers (4 items measured at 5 occasions, all

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Poor concentration / attention deficit	Boy lacked concentration or was restless in class according to the teacher	High attention deficit according to mothers based on DSM-III-R.	averaged, $\alpha = .64 - .93$) Attention deficit measure based on Social Behaviour Questionnaire (SBQ; Tremblay et al., 1991) reported by parents (5 items) and teachers (4 items) measured at 5 occasions, all averaged ($\alpha = .77 - .96$)
Low achievement	Based on school records of performance in Arithmetic, English and Verbal Reading tests.	Based on mother, boy and teacher reported measure of achievement	Teacher-reported maths and language achievement
High nervousness/ anxiety	Social worker rating based on an interview with mother	Nine items from Child Behavior Checklist (Achenbach, 1978) completed by caregivers and Teacher Report Form (Edelbrock & Achenbach, 1984) by teachers ($\alpha = .65$)	Anxiety measure based on Social Behaviour Questionnaire (SBQ; Tremblay et al., 1991) reported by parents (4 items) and teachers (3 items) measured at 5 occasions, all averaged ($\alpha = .55 - .84$)
Shy or withdrawn	Social worker rating based on an interview with mother	Seven items from Child Behavior Checklist (Achenbach, 1978) completed by caregivers and Teacher Report Form (Edelbrock & Achenbach, 1984) responded by teachers ($\alpha = .61$)	Shyness rated by the interviewer during three different interviews ($\alpha = .59$)
Few friends	Social worker rating based on an interview with mother	Information about the number of friends provided by mother and boy	Isolation reported by the teacher at three timepoints ($\alpha = .64$)
Church attender	Social worker rating based on an interview with mother	Two questions about religiosity answered by the boy regarding	Importance of religious faith reported by parents

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		preference behavior	and (one item, 4-point Likert scale)
Childrearing			
Poor supervision	Social worker rating based on an interview with mother (do the parents know what the child is doing)	Boy and parent report on supervision based on four questions ($\alpha = .64$)	Parental control measure based on Alabama Parenting Questionnaire (APQ; Shelton et al., 1996) reported by parents measured at 3 occasions, all averaged (10 items, $\alpha = .64 - .69$)
Harsh discipline	Social worker rating based on an interview with mother (harsh attitude and discipline)	Physical punishment (slapped or spanked) reported by boy and parent	Corporal punishment measure based on Alabama Parenting Questionnaire (APQ; Shelton et al., 1996) reported by parents measured at 3 occasions, all averaged (3 items, $\alpha = .53 - .55$)
Low parental reinforcement	Social worker rating based on an interview with mother (boy rarely praised)	Positive behaviors toward the boy ($\alpha = .72$) reported by mother (nine items) and the boy (seven items).	Positive parenting measure based on Alabama Parenting Questionnaire (APQ; Shelton et al., 1996) reported by parents measured at 3 occasions, all averaged (5 items, $\alpha = .56 - .67$)
Leisure outside home	Based on leisure questionnaire completed by mothers	Four questions answered by the parent and the boy about his involvement in family activities and outings ($\alpha = .62$)	Parental involvement measure based on Alabama Parenting Questionnaire (APQ; Shelton et al., 1996) reported by parents measured at 3 occasions, all averaged (10 items, $\alpha = .64 - .69$)
Parental conflict	Chronic tension or disagreement in many fields, raging conflicts or estrangement assessed by the	Degree of happiness of the relationship with a partner rated by the mother on a five-point Likert scale	Dyadic Adjustment Scale (Sharpely and Rogers, 1984) with 7 items ($\alpha = .62$)

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	social worker during the interview.		
Socioeconomic			
Low SES	Based on questions about the father's job, Registrar General's scale	Hollingshead (1975) index including occupational prestige and educational level	International Socio-economic Index score
Low family income	Assessed by the social worker based on interview with mother	Any member of the household on welfare during the previous year	Receiving financial support from the government
Poor housing	Poor housing assessed by the social worker	Assessed by the interviewer based on eight questions regarding the structure, peeling of paint and plaster, and cleanliness ($\alpha = .80$)	Rated by the interviewer using 8 items focused on the house and surroundings ($\alpha = .69$)
Separated from parent	Separation for reasons other than death or hospitalization based on interview	Not living with both biological parents according to mother report	Divorce reported by mother
Parental			
Convicted parent	Criminal record searches	Father behavior problems reported by the mother	Somebody in the family was arrested or had contact with the police and criminal justice, reported by parents
Young mother	First child before age 21, based on interview	Boy born when mother was below 20	Born when mother was 25 or less
Nervous mother	Mother's Health Questionnaire (Gibson, Hanson & West, 1967)	Anxiety reported by the mother	General Health Questionnaire (GHQ-12, Goldberg, 1978) answered by mother (12 items, $\alpha = .82$)
Large family size	Four or more siblings, based on interview	Living with three or more siblings, reported by the mother	Three or more siblings

Design and procedure

The three projects were conducted with a prospective longitudinal design. After receiving the requested consents, together with the approvals of each institutional ethics committee, data about the explanatory factors were mainly obtained through interviews

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(although in some cases through paper-and-pencil questionnaires). In all three cities, interviews were conducted by trained personnel in each family house (mainly with mothers) or at school (with teachers).

All the projects complied with the national and international ethical standards in research. Participants were free to withdraw from the study at any moment and skip questions. Personal data were anonymized, and no personal information was included in the database analysed in this study, with an externally managed key table by a data officer.

In London, participants were aged 8 to 9 when the explanatory factors were measured in 1961-1962. Pittsburgh explanatory factor data were collected in 1987-1988 when children were aged 10 to 11. In Zurich, data about the childhood explanatory factors were obtained in 2004 to 2006, when children were 7.5 to 9.5 years old. Offending was measured considering written procedures by the youth attorney with registered offences (excluding minor traffic offenses) at ages 10 to 17. This was done using official court records of convictions (London and Zurich) and petitions to the juvenile court (Pittsburgh). In Pittsburgh, 95% of the middle cohort participants recruited at age 10 were followed up at age 12 (Loeber et al., 2017). In London, 97% of the original sample were interviewed at age 16 (Farrington, 2020). In z-proso, a thorough analysis of attrition and non-response rates was conducted for the whole duration of the study (Eisner, Murray, Eisner, & Ribeaud, 2019). In general, there was no serious bias in the data, although it was found that attrition was higher in the participants with an immigrant background. For each analysis, participants with data available at least one measurement point provided by at least one informant were kept.

Data analysis

Given that variables were measured with different instruments in each site, a standard cut-off could not be used. To make the results as comparable and easily interpretable as possible, for the three samples, data about the explanatory factors were dichotomized into a 25%-75% split to differentiate the “worst” quarter from the remaining participants on each variable. This made the dichotomizations comparable, as participants with the “worst” scores in each variable were compared to the rest.. Then, the relation between each risk factor and offending was measured using Odds Ratios (ORs). ORs are especially useful for the calculation of the strength of each relation, comparison among the explanatory factors, and they are also easy to interpret. An OR greater than 1 indicates that a high score in the risk factor is related to high offending, whereas an OR smaller than 1 indicates that a high score in a factor is related to lower offending. Given that directional hypotheses were tested (i.e., factors were hypothesized to be risks related to high offending), one-tailed p values were used. This was also done in the comparison between London and Pittsburgh (Farrington & Loeber, 1999), so one-tailed test made the results directly comparable. Effects in the same direction as in London and Pittsburgh were expected assuming a universal causal mechanism leading to delinquency, and the cut-off of the prior published studies was kept for examining the null-hypothesis.

Also, product-moment correlations among the countries based on Ln(OR)s for explanatory factors versus delinquency, were calculated. The Pearson r's indicated the extent to which explanatory factors had similar relations with delinquency over time, place, and gender. Twenty Ln(OR)s for the comparable explanatory factors were

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correlated among the three countries to check if the strongest explanatory factors for one country were similar to the strongest explanatory factors for another country, differentiating between boys and girls in Zurich. It is necessary to take the logarithm of ORs in order to convert them from ratio scales to interval scales. Mean effect sizes (OR) for London, Pittsburgh and Zurich were also calculated.

Results

Table 3 shows detailed results of the three-country comparison including the relations between early risk-factors and offending in London boys, Pittsburgh boys and Zurich boys and girls.

Table 3. Childhood explanatory factors for adolescent offending in London, Pittsburgh and Zurich

London		Pittsburgh		Zurich		
Individual	Boys OR		Boys OR		Boys OR	Girls OR
High impulsivity	2.28*	Hyperactive	1.91*	Hyperactive	2.13*	2.84*
Poor concentration	2.29*	High attention deficit	1.78*	High attention deficit	2.01*	2.90*
Low achievement	2.58*	Low achievement	2.16*	Low achievement	1.42	2.11*
High nervousness	0.99	High anxiety	0.75	High anxiety	1.08	0.80
Shy or withdrawn	0.79	Shy or withdrawn	1.21	Shyness	0.41*	0.67
Few friends	0.58	Few friends	1.21	Few friends	1.30	1.26
Church attender	0.68	High religiosity	1.01	High importance of faith	0.77	0.92
Childrearing						
Poor supervision	2.23*	Poor supervision	2.02*	Poor monitoring	1.23	1.73*
Harsh discipline	3.27*	Physical punishment	1.17	Corporal discipline	1.57*	1.86*
Low reinforcement	1.42	Low reinforcement	1.54*	Low positive parenting	1.08	0.97
Leisure outside home	2.12*	Boy not involved	1.43*	Low parental involvement	1.30	0.93
Parental conflict	2.57*	Unhappy parents	2.34*	Low dyadic adjustment	1.69*	1.21
Socioeconomic						
Low SES	1.52	Low SES	2.55*	Low SES	1.36	1.31
Low family income	2.62*	Family welfare	3.15*	Financial help (welfare)	2.01*	1.67*

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				contributions etc.)	
Poor housing	1.85*	Poor housing	1.35	Poor housing	1.03 0.86
Separated from parent	2.42*	Broken family	3.46*	Divorced parents	2.05* 2.42*
Parental					
Convicted parent	4.03*	Father behavior problems	1.94*	Imprisonment or contact with the police	2.45* 0.38
Young mother	1.61*	Young mother	1.82*	Young mother (under 25)	1.02 1.27
Nervous mother	1.59*	Anxious parent	0.93	Anxious and depressive mother	1.53* 1.30
Large family size (4 or more siblings)	2.50*	Large family size (3 or more siblings)	2.13*	Large family size (3 or more siblings)	1.06 2.18

*p<.05, one-tailed

Of the 14 significant explanatory factors in London, 11 were significant in Pittsburgh, eight were significant in Zurich boys and seven were significant in Zurich girls. Of the 13 significant explanatory factors in Pittsburgh, six were significant in Zurich boys and six were significant in Zurich girls. Of the nine significant predictors in Zurich boys, five were significant in Zurich girls.

Results included in table 3 showed that there were several childhood explanatory factors related to adolescent offending in all three studies and both genders. These were high attention deficit, hyperactivity, low family income, and separation from a parent (or divorce). Other explanatory factors were less universal, although there was still a high coincidence across the studies. The strongest explanatory factors for offending were having a convicted parent in London (OR = 4.03), broken family (OR = 3.46) and family on welfare (OR = 3.15) in Pittsburgh, parental imprisonment or contact with the police in Zurich boys (OR = 2.45), and poor concentration in Zurich girls (OR = 2.90).

The relation between attention deficit and hyperactivity with offending was the strongest for Zurich girls in comparison to other samples. The relation between childrearing and parental factors and offending was the strongest in London, and socioeconomic factors had the strongest relation with offending in Pittsburgh.

Table 4 shows correlations among the 20 explanatory factors in London, Pittsburgh, Zurich boys and Zurich girls.

Table 4. Correlations among the effect sizes of 20 explanatory factors used in each study

	<i>London</i> <i>r (p)</i>	<i>Pittsburgh</i> <i>r (p)</i>	<i>Zurich Boys</i> <i>r (p)</i>
Pittsburgh	.579 (.004)		
Zurich boys	.691 (<.001)	.491 (.014)	
Zurich girls	.289 (.109)	.437 (.027)	.373 (.053)

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Note: N = 20 explanatory factors using Ln (OR), one-tailed p values in parentheses

Correlations showed that there was similarity in explanatory factors in boys in all three studies, with the strongest correlation between the Zurich and London boys ($r = .69$, $p < .001$), and strong correlations between Pittsburgh and London boys ($r = .58$, $p < .01$), and Pittsburgh and Zurich boys ($r = .49$, $p < .05$). There was a strong correlation between Zurich girls and Pittsburgh boys ($r = .44$, $p < .05$), and a near-to-significant correlation between Zurich girls and boys ($r = .37$, $p = .05$). There was a non-significant correlation between explanatory factors in Zurich girls and London boys. The mean effect sizes were OR = 1.79 for London boys, OR = 1.66 for Pittsburgh boys, OR = 1.33 for Zurich boys and OR = 1.31 for Zurich girls.

Discussion

Although identifying childhood explanatory factors for later offending is one of the most important aims of developmental criminology (Le Blanc & Loeber, 1998), the number of longitudinal studies with long follow-ups that used official records as the outcome variable is still low. These studies are being conducted in specific contexts and time periods. However, results are rarely compared across time and children that grow up in different socio-historical circumstances. Thus, there are still pressing gaps in knowledge regarding the generalizability of these results, and this study advances knowledge on this crucial topic.

This study is the first comparison of a great variety of explanatory factors for recorded offending measured in three different geographic areas and different generations. Explanatory factors included in the three studies are conceptually similar and were measured in a similar way. Several common explanatory factors were found in the three projects, and they could be generalizable across time and context, but future research should confirm this in non-Western societies.

Individual factors such as high attention deficit and hyperactivity were related to adolescent offending in all three studies including Zurich boys and girls. Low school achievement was related to offending in London, Pittsburgh, and Zurich girls, but not in Zurich boys. Shyness was significantly related to less offending only in Zurich boys. Other individual factors tested, such as high anxiety, having few friends and religiosity were not significantly related to offending. These results are in line with different criminological theories. Among them, low self-control is a central point of Gottfredson and Hirschi's (1990) General Theory of Crime, a construct related to high hyperactivity and attention deficit. High impulsiveness and low school achievement are also crucial components of the Integrated Cognitive Antisocial Potential (ICAP) Theory (Farrington, 2005; Farrington & McGee, 2018). Thus, high attention deficit and hyperactivity, together with low school achievement seem to be robust explanatory factors for offending. High hyperactivity and attention deficit were the strongest risk factors in girls and the effect sizes were bigger than for London, Pittsburgh and Zurich boys. It is therefore possible that girls committed more impulsive offending, but this should be confirmed in future.

Regarding childrearing, risk factors varied across the study sites. Poor supervision was relatively robust, being a risk factor in London, Pittsburgh and Zurich girls. Physical

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discipline was a risk factor in London and Zurich, for both boys and girls. Parental conflict was also relatively robust, with significant findings in London, Pittsburgh and Zurich boys. Other factors varied among the contexts. Thus, the robust explanatory factors could be related to informal social control, as stated in Sampson and Laub's theory (1993) or to high strain as stated by Agnew (1992). At the same time, differences among the projects can be related to changing connotations of some family-related variables in different social contexts, as suggested by Rutter (1999).

The fact that low SES was a significant risk factor only in Pittsburgh, whereas poverty measured by low family income or being on welfare was a robust risk factor among all the projects and subsamples, could also be explained taking into account Rutter's (1999) suggestions regarding changing social contexts. Low SES relates to occupational prestige, which may be more closely related to income in the USA than in other countries, while poverty is important everywhere. Parental divorce (or being a single parent) was also a risk factor for offending, although this should be interpreted with caution as some studies have found that it is parental conflict, not the divorce itself, that increases the risk of offending (Juby & Farrington, 2001).

Paternal criminality was a risk factor for offending in London, Pittsburgh, and Zurich boys (but not girls). It is therefore possible that boys begin criminal careers through social learning and undesired socialization, as suggested by Catalano and Hawkins (1996). Although this may also reflect genetic explanatory factors. Other parental factors varied across the projects, which can also be related to different social contexts. For example, having a large family might not be a problem in Zurich as there are different financial and social benefits for large families.

There are risk factors that are similar in the three study sites. Nevertheless, there are also some important differences. Fewer factors are significant in Zurich, compared to Pittsburgh and London, where risk factors are more similar to each other. This is especially true of childrearing factors and some parental factors such as young mothers and large family size. It is possible that findings reflect the specific context of Zurich, as Switzerland has different socio-economic institutions which promote citizen wellbeing and a prosperous economy (Trampusch & Mach, 2011) that could buffer the effects of childrearing and family problems. It should also be noted that young mothers in Zurich were older than young mothers in Pittsburgh and London.

This study identified some childhood explanatory factors for adolescent offending that seem to be generalizable. Thus, it has some important implications for theories, research and practice. Research studies could focus on these explanatory factors in other contexts and in relation to different antisocial behaviors that tend to form different patterns (Nasaescu, Zych, Ortega-Ruiz, Farrington, & Llorent, 2020). It could also be desirable to use designs that make it possible to draw conclusions about causality. Using big samples, with long follow-ups and official records, is a strength of this study, but not being able to draw conclusions about causality is a limitation. We also note that putative risk factors were compared across the three studies on the basis of an approximate conceptual equivalence rather than a more rigorous measurement equivalence based on the matching of individual items. Future comparative work of longitudinal risk factors should aim to harmonize data sets with the goal of pooling data for a more rigorous assessment of heterogeneity in risk factors for offending across societies and over time. This would make it possible to check if differences in risk factors among study sites are statistically significant. The number of studies on female offending is still low, which is

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an important strength of this study. Offending has also been analyzed in the Pittsburgh Girls study (Loeber et al., 2016) but including these data was beyond the scope of this manuscript. Comparable data were not available, but future projects could include such a comparison.

It is beyond the scope of this article to investigate the extent to which explanatory factors are predictive independently of other explanatory factors. Nevertheless, longitudinal studies such as this one do make it possible to study explanatory factors, not only correlates, as explanatory factors precede the outcome (Murray et al., 2009). Although the included variables were measured in a similar way, another limitation of the study is that they were not identical in all three contexts. Future projects could overcome these difficulties. Given that new types of problem behaviors emerged together with the development of the Internet and communication and information technologies (Baldry et al., 2018; Marín-López et al., 2020; Oksanen et al., 2021), future studies should also focus on risk factors for these new forms of problem behavior.

Although criminal justice systems differ across the study sites, using official records is an important strength of this study, as self-reports can be biased because of social desirability, not recalling certain events and other response biases. Moreover, being an offender according to official records is an indicator of serious antisocial behavior regardless of the differences in justice systems. Even though studies with self-reports are valuable, our results are an important addition to the literature as the number of studies with official records is low and they are rarely available. Thus, the extent to which the results can be replicated across different types of official records is an important issue in criminology.

Even with some limitations, the current study provides valuable data on robust childhood explanatory factors for offending, and the results should be used in early interventions that should focus on these factors. Developmental preschool and school programs against offending are being conducted around the world (Zych & Farrington, 2018), but only some of them are effective and there is still room for improvement.

Tailored interventions focused on the specific explanatory factors found in the current study could be useful to prevent or decrease offending. These interventions should focus especially on risk factors that seem robust across different contexts. Prevention and intervention programs could be conducted to decrease hyperactivity and attention deficit. Schools should motivate students and promote high achievement. Childrearing practices should also be improved, with more parental supervision, no corporal punishment, and less parental conflict. Help should be offered to families on welfare and divorced parents. Help should be also offered to families with a convicted parent and parents with mental health problems.

In general, comprehensive interventions that include individual, childrearing, socioeconomic and parental factors seem to be especially useful. There are some specific programs that were effective in decreasing risk factors found in our study such as cognitive-behavioral skills training programs to decrease impulsivity and poor concentration, parent training programs to target poor supervision, harsh discipline and low reinforcement, functional family therapy for parental conflict and support for separated parents, (Farrington, 2021), income maintenance programs for low SES, low income and poor housing (Calnitsky & Gonalons-Pons, 2020). Some risk factors could

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be used to identify families at risk that could be targeted with programs such as families with convicted parents and young mothers.

Even with some limitations, to our knowledge, this is the first study that compared explanatory factors for recorded offending across three longitudinal projects conducted in three different countries and time points. A wide range of explanatory factors was compared, including individual, childrearing, socioeconomic, and parental variables. Some of these factors explained offending in the three projects. Common factors included high impulsivity, attention deficit, low school achievement, poor supervision, physical discipline, parental conflict, low family income, divorced parents, and parental imprisonment. Tailored interventions focused on these explanatory factors could potentially be useful to decrease offending.

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