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Young offenders caught in the act: A population-based cohort study comparing internationally adopted and non-adopted adolescents

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ABSTRACT

Empirical research has shown an elevated risk for externalizing behavior problems in international adoptees. To address the extent to which this risk exists for more serious externalizing problems we compared the rates of registered criminal offending of internationally adopted adolescents with those of non-adopted adolescents in the Netherlands. In a large population-based cohort study (N = 3,758,506 including n = 10,563 international adoptees) on Dutch youth with ages up to 19 years we examined registrations in the program on juvenile crime and in the national police system from 2005 to 2013. Controlling for time lapse and background variables we found that international adoptees had been in contact with the criminal justice system more frequently than non-adoptees. However, the findings differed across region of adoption: Adoptees from South America and from Africa had been in contact with the criminal justice system most frequently (and more often than non-adoptees), whereas adoptees from China (total n = 4569) had the least contacts (and less often than non-adoptees). The percentages of criminal offending of adoptees ranged between 1.16% and 15.83% across regions of adoption (versus 10.86% in non-adoptees). The large majority of adoptees – including those from South America and Africa – were not involved in criminal acts. We hypothesize that the higher and lower risks of criminal offending found for adoptees from certain countries are associated with the varying levels of pre-adoption adversity (e.g., neglect and abuse) that the adoptees have experienced.

1. Introduction

Child adjustment after international adoption has been the focus of many studies examining the long-term consequences of early adversity and the possibilities for recovery after placement in improved circumstances (Palacios & Brodzinsky, 2010; Sonuga-Barke et al., 2017). Based on the theoretical perspective of risk and protective factors (Rutter, 1987; Werner, 1993), adoption provides a unique situation: Adoptees often experience early adversity such as separations and neglect in institutions (risks), but they move to an improved and usually nurturing rearing environment after adoption (protective factors). A series of meta-analyses indeed revealed a remarkable catch-up in international adoptees in all domains of development after adoptive placement, but adoptees do not catch up completely compared to their non-adopted peers (Van IJzendoorn & Juffer, 2006). International adoptees show more behavior problems and are more often referred to educational and clinical services because of learning and mental health problems than non-adopted children (Juffer & Van IJzendoorn, 2005; Van IJzendoorn, Juffer, & Klein Poelhuis, 2005). Indeed, numerous empirical studies have revealed higher rates of behavior and mental health problems in adoptees (e.g., Askeland et al., 2017; Barroso, Barbosa-Ducharne, Coelho, Costa, & Silva, 2017; Behle & Pinquart, 2016; Rosnati, Montirosso, & Barni, 2008), while such problems could translate into higher rates of delinquent behavior in adolescence.

The (meta-analytic) studies did not address juvenile delinquency or criminal records, but the (modest) overrepresentation of externalizing behaviors (including delinquent and aggressive behavior), and the elevated rates of mental health referrals may point to larger numbers of young offenders among international adoptees. A relatively high rate of offending in international adoptees may be the result of pre-adoption

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adversity such as institutional neglect and abuse, but (also) based on variations in prenatal conditions and genetic risks in the birth parents (Juffer et al., 2011).

In the current study we examined the rates of registered criminal offending of internationally adopted adolescents compared to non-adopted adolescents in the Netherlands. More than two decades ago, Versluis-den Bieman (1994) found no difference in the incidence of criminal acts of internationally adopted and non-adopted adolescents in the Netherlands (2.6% vs. 3.1%). The adoptees in that cohort study ($N = 1538$; aged 13–17 years) had been adopted during the 1970s. There is no research on later Dutch cohorts of adoptees, including adoptees from new countries of origins such as China. In the current study we had the opportunity to examine a more recent and much larger cohort of international adoptees (born between 1986 and 2004; measurement period 2005–2013). We distinguished between different regions of adoption, in which China as country of origin has a special position. China's one-child policy resulted in the abandonment of many healthy, mostly female children (Johnson, 2004). The Chinese one-child policy as reason for abandonment is notably different from relinquishing or abandoning a child because of severe parental problems, such as extreme poverty and drugs or alcohol abuse in for example Eastern European countries (Miller, 2005; Selman, 2009). Would China's deviating social policy regarding abandonment and adoption translate into lower rates of criminal offending in adoptees from China compared to other regions of origin?

1.1. Crime in international adoptees

Several large-scale studies on criminal conviction show a higher risk for international adoptees in general, or for specific subsamples. In a Danish national register study Laubjerg and Petersson (2011) found no elevated risk for criminal conviction of 15–17-year-old international adoptees compared to non-adopted Danish age mates, but in the comparison for the 18–27-year-olds of the same cohort, the risk of a criminal conviction appeared to be doubled in international adoptees. Age at adoption was associated with the risk of crime: Children who had been adopted after their first birthday had higher rates of criminal convictions. In another Danish register study the risk of violent crime was examined in native Danes and international adoptees between 15 and 40 years (Webb, Antonsen, Mok, Agerbo, & Pedersen, 2015). A somewhat higher risk of violent offending was found for male adoptees but not for female adoptees. A high risk of violent offending was found for male adoptees and a somewhat elevated risk for female adoptees from adoptive families with middle and high socioeconomic status (SES), but not for adoptees from low-SES adoptive families (Webb et al., 2015).

A Swedish national register study examined crime in international adoptees using court sentences, thus excluding minor crimes such as shoplifting (Hjern, Lindblad, & Vinnerljung, 2002). International adoptees (age range: childhood through young adulthood) were somewhat more likely to commit a crime than Swedish-born youth. Country of origin and adoptive parents' SES were associated with social maladjustment (a broader variable, not only including crime but also alcohol and drug abuse): Born in Latin America – as opposed to born in Asia – and living with 'white collar' adoptive parents were identified as risk factors. Within the category of born in Asia, the authors did not distinguish between China and other Asian countries.

In a national cohort study in the USA, Beaver and colleagues (Beaver, 2011; Beaver, Schwartz, Connolly, Al-Ghamdi, & Kobeis, 2015) examined the role of parenting in the prediction of criminal behavior of adopted and non-adopted youth. Parenting variables were not associated with variation in criminal activity of the adoptees in their study, whereas they were for non-adoptees. A lack of fit between the child's delays due to pre-adoption adversity and high expectations of well-educated adoptive parents might be partly responsible for the elevated levels of crime in high-SES adoptive families, and the absence of such an association in low-SES families. In line with this suggestion, results of a Dutch longitudinal cohort study showed that high SES of the adoptive parents was associated with more elevated rates of psychiatric problems in international adoptees compared to low SES or middle SES (Tieman, Van der Ende, & Verhulst, 2005). According to the authors this may indicate that an environment with high parental socioeconomic status does not automatically give adopted children better opportunities than other environments. Based on Agnew's (1992) sociological strain theory it could be hypothesized that well-educated adoptive parents may have high expectations of their adopted child to which the child cannot live up, and this disparity between what is expected and what is achieved might result in children's negative affect and problem behaviors.

1.2. Hypotheses

In the current study we examined the rates of registered criminal offenses in internationally adopted and non-adopted adolescents using Dutch population data. Based on previous research (Hjern et al., 2002; Webb et al., 2015) we hypothesized an elevated risk of juvenile crime in international adoptees compared to non-adopted youth. Comparable with findings in the general population reporting higher crime rates in males compared to females (Frisell, Pawitan, Långström, & Lichtenstein, 2012; Vaske, Wright, Boisvert, & Beaver, 2011), we expected male adoptees to show higher rates of crime than female adoptees (Webb et al., 2015). We also explored the role of age at adoption as a possible risk factor for criminal offenses (Hjern et al., 2002), expecting that higher ages at adoption (referring to longer stays in possibly adverse circumstances) may be related to higher rates of offending (Laubjerg & Petersson, 2011). Furthermore, we hypothesized differences related to global regions of countries of origin (Hjern et al., 2002). Because of China's deviating social policy regarding abandonment and adoption, adoptees from China may show lower rates of offending than adoptees from South America (Hjern et al., 2002) or other regions (e.g., Eastern Europe; Miller, 2005). Lastly, higher SES of the adoptive parents may be associated with more criminal activities of their adopted children compared to lower SES of the adoptive parents (Hjern et al., 2002; Webb et al., 2015).

2. Method

2.1. Data

Data on juvenile crime were available from 2005 to 2013 (measurement period) for the complete Dutch population. The data were collected from the Halt Program and Herkenningsdienstsysteem (HKS) by Statistics Netherlands (Centraal Bureau voor de Statistiek). Halt is an organization with a national network of offices aiming to prevent and combat juvenile crime. Halt is responsible for the enforcement of alternative punishment given to young people up to the age of 18 who committed minor offenses, to prevent them from relapsing (see http://www.halt.nl/en/). The parents of the juveniles are always involved in this process, and having the juveniles offer their apologies is part of the standard approach. HKS is a national police system in which suspects of all ages who have been charged of an offense are registered. While Halt is aimed at minor offenses to prevent worse crimes, getting in contact with HKS usually means that a juvenile is accused of a more serious offense. For each suspect, it is recorded how often (s)he is charged, and for what kind of offense.

Age and gender were collected by Statistics Netherlands, mainly from civil registers. Missing information was imputed by Statistics Netherlands in a few cases, following procedures that are standard with Statistics Netherlands. Variables concerning adoption were obtained by Statistics Netherlands using information from the Dutch Immigration and Naturalisation Service (Immigratie- en Naturalisatiedienst) and from the Municipal Personal Records Database (Gemeentelijke

Basisadministratie, GBA). Finally, data on parental income was collected by Statistics Netherlands mostly from the national tax collector's administration (Belastingdienst).

All members of the Dutch population who were born between 1986 and 2004 and were alive during the complete period of measurement were included. This cohort includes all children with ages between birth and late puberty during the period of measurement (2005–2013). The youngest children were younger than 1 year of age at the start while the oldest children were 19. The population of children who fell within this age range, was $N = 3{,}759{,}025$. This population included $n = 3{,}747{,}943$ non-adoptees, $n = 10{,}563$ international adoptees, and $n = 519$ domestic adoptees. In the current study domestic adoptees were not included to ensure a homogeneous sample of international adoptees. In the Netherlands, domestic adoptions mainly involve infants relinquished at birth, taken care of by a temporary foster family and placed for adoption at the age of three months. The experiences of domestic adoptees are therefore not comparable with the experiences of international adoptees who are adopted at older ages, usually after a (prolonged) period of deprivation in institutional care. Besides, in the Netherlands the number of domestic adoptions is low (about 20 each year), and in our study this would result in an unbalanced comparison between around 500 domestic adoptees and > 10,000 international adoptees. Excluding domestic adoptees resulted in a final study population of $N = 3{,}758{,}506$, including $n = 10{,}563$ international adoptees.

The sample of international adoptees was divided into subgroups (Table 1). Classification of subgroups was based on region, group size, and frequency of occurrence in the literature on adoption. For example, the group from Eastern Europe is relatively small ($n = 452$) and includes different countries of origin, but is discussed in the literature as one group quite frequently (e.g., Lindblad, Weitoft, & Hjern, 2010; Van den Dries, Juffer, Van IJzendoorn, & Bakermans-Kranenburg, 2009), while the adoptees from China are homogeneous with respect to the country of birth, but form one regional group because of its large group size ($n = 4569$). Within each region, countries with frequencies lower than 10 were joined into a 'miscellaneous' category to guarantee anonymity, following Statistics Netherlands' standard procedures. The Institutional Review Board of Leiden University provided ethical approval of the study (ECPW2015/104).

2.2. Background variables and predictor variables

Background variables were gender, age at the start of the measurement period, and gross household income. For some analyses with adoptees only, age at adoption was included as a background variable as well. In the main analysis the predictor variable was adoption; in other analyses the predictor variable adoption was further specified into different regions of birth of the adopted child (reference category: non-adoptees).

2.3. Dependent variables

Dependent variables were examined as events over time in Cox regressions. The first event was contact with the criminal justice system (both Halt and HKS). The second event was contact with Halt. A further distinction was made between contact with Halt for minor offenses (mischief, violation of public education law, fireworks offenses, other small offenses), and contact with Halt for more serious offenses (acts of violence, vandalism and public order crimes, offenses against property, other serious offenses). The third event was being registered in HKS, the national police registration system. Finally, relapse was studied as an event within the group that got in touch with the police (both Halt and HKS).

2.4. Statistical analyses

Descriptive statistics were calculated for both the predictor and background variables and the dependent variables. Besides calculating descriptive statistics, Cox regression analyses were carried out to test the difference between non-adoptees and adoptees (from different regions). The time variable in these Cox regressions was the year in which the specific event first occurred during the measurement period (2005–2013). The six events were contact with the criminal justice system, Halt, Halt-minor, Halt-serious, HKS, and relapse. Because males were expected to be in contact with the criminal justice system more frequently than females (e.g., Webb et al., 2015), and because the male to female ratio is different for different adoption regions (especially for China, from which the adoptees are mostly females (Selman, 2009)), the interaction of gender and region of adoption was included in each model as well.

Each analysis was carried out in three blocks. The first block included the background variables (Model 1), the second block included the predictor variable region of adoption (Model 2), and the third block included the interaction of adoption region and gender (Model 3). Outcomes are reported in Hazard Ratios (HR). Here, the Hazard Ratio is the ratio of the hazard rate for contact with the criminal justice system, with Halt, or with HKS, for two adjacent levels of the specific independent variable (e.g., for gender: the ratio for males versus females).

The population was considered to be a sample from a population of populations over time. Because of the large sample size, many significant effects were expected. The focus was therefore mainly on the size of the effects rather than on the significance. On the other hand, if an effect is non-significant, this implies that the effect is almost definitely non-existent.

Table 1
Countries of adoption and their frequencies for each region of adoption.

Region of adoption											
China		South America		Africa		Eastern Europe		South-East Asia		Other	
Country	*n*	Country	*n*	Country	*n*	Country	*n*	Country	*n*	Country	*n*
China	4085	Colombia	1578	Ethiopia	540	Poland	224	India	489	S-Korea	341
Taiwan/Hong Kong	484	Haiti	449	S-Africa	194	Romania	130	Thailand	226	USA	135
		Brazil	440	Nigeria	68	Hungary	32	Philippines	121	Nepal	33
		Guatemala	165	Kenya	25	Russia	14	Sri Lanka	82	Turkey	18
		Surinam	129	Morocco	25	Bulgaria	12	Indonesia	30	Israel	11
		N Antilles	25	Senegal	19	Yugoslavia	11	Cambodia	17	W Germany	11
		Ecuador	21	Zaire	15	Other	29	Other	24	G Britain	10
		Peru	21	Zambia	13					Other	67
		Mexico	10	Uganda	11						
		Other	43	Other	86						
Total	4569	Total	2931	Total	996	Total	452	Total	989	Total	626

Table 2
Descriptive statistics for non-adoptees, and adoptees from different regions.

Variable	Not adopted (n = 3,747,943)	Adopted (n = 10,563)	Region of adoption					
			China (n = 4569)	South America (n = 2931)	Africa (n = 996)	Eastern Europe (n = 452)	South-East Asia (n = 989)	Other (n = 626)
			Mean (Standard Deviation)					
Age at start	9.98 (5.48)	6.38 (3.49)	4.92 (2.79)	7.70 (3.44)	6.30 (3.92)	9.06 (3.47)	7.79 (3.21)	6.80 (3.33)
Income in €10.000	6.40 (4.38)	7.61 (4.56)	7.90 (4.54)	7.74 (4.68)	7.14 (4.56)	6.46 (3.47)	7.10 (4.06)	7.30 (5.25)
Age justice[a]	17.20 (3.00)	15.68 (2.00)	15.08 (1.55)	15.80 (2.01)	15.44 (2.14)	16.06 (2.18)	15.82 (2.00)	15.10 (1.62)
Age Halt[a]	15.34 (1.53)	15.13 (1.44)	14.97 (1.48)	15.23 (1.50)	14.81 (1.33)	15.04 (1.43)	15.56 (1.32)	14.58 (1.03)
Age Halt minor[a]	15.41 (1.52)	15.46 (1.43)	15.27 (1.68)	15.56 (1.48)	15.40 (1.15)	[b]	16.00 (1.57)	14.68 (0.89)
Age Halt serious[a]	15.34 (1.55)	15.02 (1.46)	14.81 (1.39)	15.14 (1.54)	14.55 (1.41)	15.15 (1.57)	15.38 (1.16)	14.57 (1.12)
Age HKS[a]	17.96 (3.03)	16.22 (2.14)	15.36 (1.66)	16.33 (2.09)	15.90 (2.35)	16.61 (2.16)	16.30 (2.36)	15.79 (1.86)
Age Relapse[a]	18.34 (3.05)	16.69 (2.09)	15.27 (1.49)	16.81 (2.01)	15.86 (1.66)	17.86 (2.46)	16.52 (1.94)	16.44 (2.81)
			Percentage					
Gender (Male)	51.14%	36.92%	13.79%	56.43%	54.72%	52.88%	50.35%	53.35%
Contact with justice	10.86%	7.88%	1.16%	15.83%	11.55%	15.49%	7.99%	8.15%
Halt	4.00%	4.32%	0.81%	8.29%	6.33%	6.19%	5.26%	5.27%
Halt minor	1.84%	1.61%	0.24%	3.31%	2.51%	[b]	1.82%	1.76%
Halt serious	2.15%	2.87%	0.59%	5.42%	4.02%	4.42%	3.44%	3.67%
HKS	8.46%	5.48%	0.55%	11.77%	7.93%	11.28%	5.06%	4.63%
Relapse	38.92%	42.67%	20.75%	47.84%	36.52%	41.43%	41.77%	35.29%

[a] Calculated only for the subgroup that got in contact with the specific instance.
[b] Joined with the Other group because of a too small group.

3. Results

3.1. Descriptive statistics

Table 2 displays the descriptive statistics of all the variables included in the statistical analyses. As expected, females were substantially overrepresented among Chinese adoptees (Selman, 2009) compared to adoptees from other regions and compared to non-adoptees. Table 2 (first column) shows that the rate of contact with the criminal justice system for non-adoptees is close to 11%. For adoptees the rate of contact with the criminal justice system ranges from slightly > 1% (China) to almost 16% (South America). As for relapse, the rate of relapsing after contact with the criminal justice system is 39% for non-adoptees. For adoptees, the rates range from 21% (China) to 48% (South America).

Although in general, adoptees had been in contact with the criminal justice system less frequently than non-adoptees (Table 2), for some regions of adoption, adoptees had been in contact with the criminal justice system more frequently than non-adoptees. More specifically, adoptees from South America, Africa, and Eastern Europe had contacts more frequently than non-adoptees (contact with the criminal justice system, Halt, Halt-minor, Halt-serious, HKS), but Chinese adoptees had fewer contacts than non-adoptees.

3.2. Contact with the criminal justice system

Although Table 2 is informative on how frequently different adoption groups had been in contact with the criminal justice system in general, it does not include information on the frequency of those contacts after including the aspect of time lapse and after correcting for background variables. Cox regressions, on the other hand, do take this information into account in testing the differences between non-adoptees and adoptees (from different regions). Table 3 shows the results of the Cox regression with contact with the criminal justice system as the event, and adoption (regardless of region of adoption) versus non-adoption as the predictor variable. Firstly, all three models showed a small negative effect of parental income on the hazard rate (HR) for contact with the criminal justice system: As parental income increases, the hazard rate for contact with the criminal justice system decreases. This effect did not change much when adding adoption (Model 2) and the interaction between adoption and gender (Model 3). Secondly, in all three models there was a substantial effect of gender on the HR, with (adopted and non-adopted) males having a HR of contact with the criminal justice system of more than three times the HR for (adopted and non-adopted) females. Thirdly, the effect of adoption was significant (Model 2) with adoptees having a higher HR of contact with the criminal justice system than non-adoptees. Finally, the interaction of adoption and gender was not significant.

Fig. 1 shows the HR curves for non-adopted females, non-adopted males, adopted females, and adopted males. The plot shows that the onset of contact with the criminal justice system was at about 11 years for all combinations of gender and adoption background. Furthermore, the plot shows that for males (adopted or non-adopted) the HR increased more rapidly than for females (adopted or non-adopted), and that for adoptees (regardless of gender) the HR increased more rapidly than for non-adoptees. The group for which the HR increased most rapidly was the group of adopted males, the group for which it increased least rapidly was the group of non-adopted females.

In a second step, adoption was further specified into region of adoption (Table 4). Here, the effect of region of adoption was significant (Model 2), with adoptees from South America, Africa, and to a lesser degree from Eastern Europe having a higher HR of contact with the criminal justice system than non-adoptees, and with Chinese adoptees having a lower HR of about half the HR of non-adoptees.

In Model 3 (Table 4) the interaction of region of adoption and gender indicated that for adoptees from South America and Eastern Europe, there was a smaller difference in HRs between males and females than for non-adoptees, suggesting that within those groups of adoptees males and females were more similar with respect to contact with the criminal justice system than non-adoptees. The effect of region of adoption changed for some groups as a result of adding the interaction of gender and region of adoption. For South America, Africa, and Eastern Europe the HRs increased, while for China it slightly decreased.

Fig. 2 shows the HR for the non-adoptees and the adoptees from different regions of adoption. The plot shows that HRs for particularly adoptees from South America and Africa increased more rapidly with age than for non-adoptees, and that for adoptees from China the HR increased slowest with age. For the remaining analyses no hazard

Table 3
Results of the Cox regression with age of contact with the criminal justice system in general as the dependent variable.

Effect	Model 1			Model 2			Model 3		
	b	SE	HR	b	SE	HR	b	SE	HR
Age at start (2005)	−0.003	0.000	0.997*	−0.003	0.000	0.997*	−0.003	0.000	0.997*
Income (2005)	−0.085	0.000	0.919*	−0.085	0.000	0.919*	−0.085	0.000	0.919*
Gender[a]	1.227	0.004	3.412*	1.227	0.004	3.413*	1.218	0.076	3.379*
Adoption[b]				0.493	0.035	1.637*	0.500	0.064	1.648*
Adoption × Gender							0.010	0.076	1.010

Note: Model 1 includes only the background variables, in Model 2 adoption has been added, and in Model 3 the interaction between adoption and gender has been added.
[a] Reference category: Female;
[b] Reference category: Not adopted.
* $p < .05$.

functions are displayed, but the specific curves looked similar to the curves in Figs. 1 and 2.

3.3. Halt

The results for Halt are displayed in Table 5. Again, parental income had a small negative effect on the HR, that did not differ much across the three different models. Again there was a substantial difference in HR between males and females in all three models. Similar to the analysis for contact with the criminal justice system in general, the HRs for South America and Africa were about twice the HR for non-adoptees, while for China the HR was almost half the HR for non-adoptees. The interaction of region of adoption and gender in Model 3 was not significant but resulted in a significant HR for adoptees from Eastern Europe.

The results for Halt for minor offenses and for serious offenses separately are not tabulated but are available as supplementary material. The results of these analyses were largely in accordance with the analyses displayed in Table 5.

3.4. HKS

Table 6 displays the results of the analysis with being registered in the national police registration system (HKS) as the event. Again, in all three models, parental income had a small negative effect on the HR, and males had a higher HR for running in with HKS than females. Secondly, adoptees from South America, Africa, and Eastern Europe had a higher HR for running in with HKS than non-adoptees, while Chinese adoptees had a lower HR than non-adoptees (Model 2). Finally, the overall interaction of region of adoption and gender was not significant, but adding the interaction resulted in higher HRs for South America, Africa, and especially Eastern Europe.

3.5. Relapse

Table 7 shows the results of the analysis for relapse. Males had a higher HR of relapsing than females, and parental income had a small negative effect (all three models). In the analysis with region of adoption added (Model 2), adoptees from South America had a significantly higher HR of relapsing than non-adoptees. In Model 3 the interaction was not significant but resulted in a higher HR for adoptees from Eastern Europe.

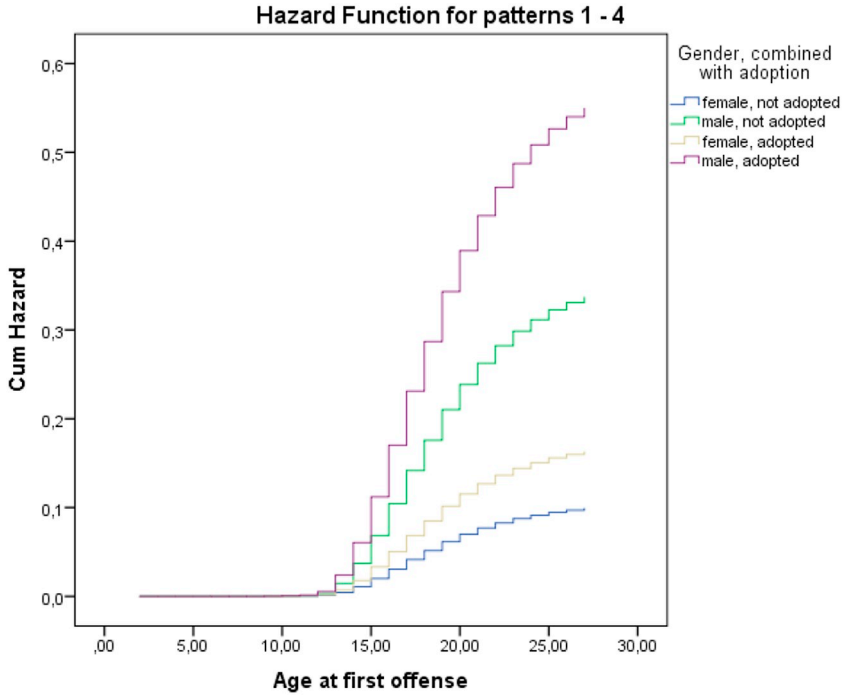

Fig. 1. Hazard curves for the analysis with contact with the criminal justice system in general for all combinations of gender and adoption.

Table 4
Results of the Cox regression with age of contact with the criminal justice system in general as the dependent variable and adoption split in different regions.

Effect	Model 1			Model 2			Model 3		
	b	SE	HR	b	SE	HR	b	SE	HR
Age at start (2005)	−0.003	0.000	0.997*	−0.003	0.000	0.997*	−0.003	0.000	0.997*
Income (2005)	−0.085	0.000	0.919*	−0.085	0.000	0.919*	−0.085	0.000	0.919*
Gender[a]	1.227	0.004	3.412*	1.227	0.004	3.411*	1.227	0.004	3.413*
Region of birth[b]						*			*
China				−0.563	0.137	0.570*	−0.606	0.177	0.546*
S America				0.842	0.046	2.321*	1.105	0.089	3.019*
Africa				0.768	0.093	2.156*	0.953	0.174	2.592*
E Europe				0.413	0.120	1.512*	0.841	0.209	2.318*
SE Asia				0.027	0.113	1.027	0.213	0.213	1.238
Other				0.272	0.140	1.313	0.193	0.302	1.212
Region × Gender									*
China × Gender							0.112	0.281	1.119
S America × Gender							−0.345	0.104	0.708*
Africa × Gender							−0.249	0.206	0.779
E Europe × Gender							−0.585	0.254	0.557*
SE Asia × Gender							−0.250	0.251	0.779
Other × Gender							0.103	0.340	1.108

[a] Reference category: Female.
[b] Reference category: Not adopted.
* $p < .05$, note: a * on an empty line indicates overall significance of the specific categorical variable.

3.6. Age at adoption

In the full models, significant main effects of age at adoption were found for the analysis with contact with the criminal justice system in general as the dependent variable ($b = 0.088$, $p < .001$, HR = 1.092), for the analysis with Halt for serious offenses as the dependent variable ($b = 0.075$, $p < .01$, HR = 1.077), and for the analysis with HKS as the dependent variable ($b = 0.116$, $p < .001$, HR = 1.123). In each of the full models, the HR of running in with Halt or HKS increased as the age at adoption was higher. However, the main results did not change by adding age at adoption as a background variable.

4. Discussion and conclusion

In a large population-based cohort study ($N = 3{,}758{,}506$ including $n = 10{,}563$ international adoptees; assessment period: 2005 to 2013) on Dutch youth with ages up to 19 years we found that, controlling for time lapse and background variables, international adoptees had been in contact with the criminal justice system more frequently than non-adoptees. However, the findings did differ across region of adoption, and for some countries crime rates of adoptees were even lower than for non-adoptees: Adoptees from South America and from Africa had been in contact with the criminal justice system most frequently (and more often than non-adoptees), whereas adoptees from China had been in contact with the criminal justice system least (and less often than non-

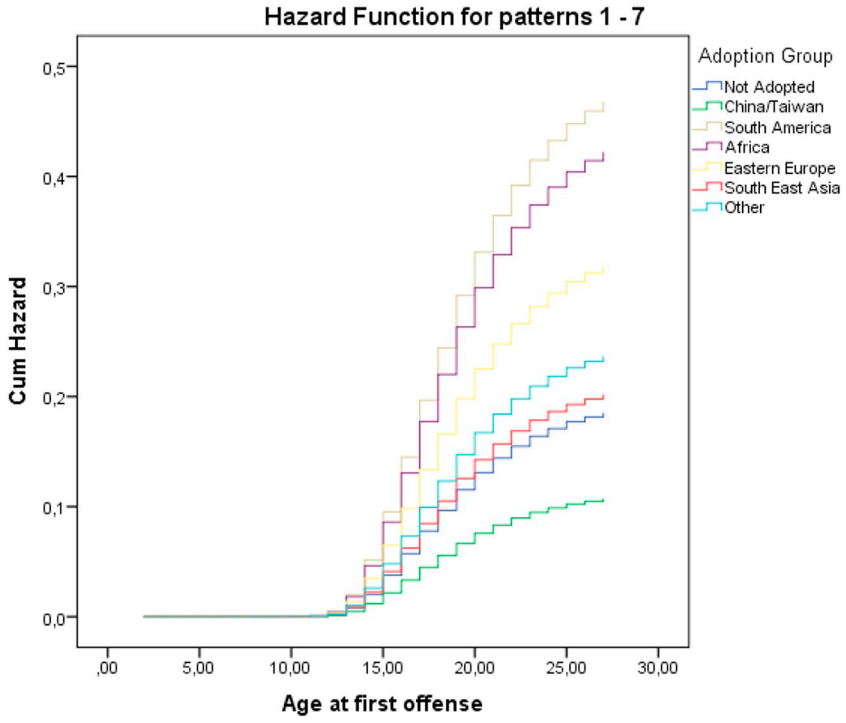

Fig. 2. Hazard curves for the analyses with contact with the criminal justice system in general for the regions of adoption separately.

Table 5
Results of the Cox regression with age of contact with Halt as the dependent variable and adoption split in different regions.

Effect	Model 1			Model 2			Model 3		
	b	SE	HR	b	SE	HR	b	SE	HR
Age at start (2005)	−0.068	0.001	0.935*	−0.067	0.001	0.935*	−0.067	0.001	0.935*
Income (2005)	−0.071	0.001	0.932*	−0.071	0.001	0.932*	−0.071	0.001	0.932*
Gender[a]	1.016	0.006	2.763*	1.016	0.006	2.761*	1.016	0.006	2.763*
Region of birth[b]						*			*
China				−0.627	0.164	0.534*	−0.724	0.209	0.485*
South America				0.705	0.064	2.024*	0.929	0.121	2.532*
Africa				0.686	0.126	1.986*	0.910	0.229	2.484*
Eastern Europe				0.213	0.189	1.237	0.359	0.354	1.432*
South East Asia				0.192	0.139	1.212	0.381	0.243	1.464
Other				0.304	0.174	1.356	0.386	0.333	1.471
Region × Gender									
China × Gender							0.282	0.339	1.326
S America × Gender							−0.301	0.142	0.740
Africa × Gender							−0.306	0.275	0.736*
E Europe × Gender							−0.199	0.418	0.819
SE Asia × Gender							−0.269	0.296	0.764
Other × Gender							−0.111	0.391	0.895

[a] Reference category: Female.
[b] Reference category: Not adopted.
* $p < .05$, note: a * on an empty line indicates overall significance of the specific categorical variable.

Table 6
Results of the Cox regression with age of contact with HKS as the dependent variable and adoption split in different regions.

Effect	Model 1			Model 2			Model 3		
	b	SE	HR	b	SE	HR	b	SE	HR
Age at start (2005)	0.030	0.001	1.031*	0.031	0.001	1.031*	0.031	0.001	1.031*
Income (2005)	−0.095	0.001	0.909*	−0.095	0.001	0.909*	−0.095	0.001	0.909*
Gender[a]	1.342	0.004	3.826*	1.342	0.004	3.826*	1.342	0.004	3.827*
Region of birth[b]						*			*
China				−0.653	0.200	0.521*	−0.640	0.258	0.527*
S America				1.009	0.054	2.743*	1.159	0.113	3.186*
Africa				0.847	0.113	2.332*	0.941	0.224	2.563*
Eastern Europe				0.468	0.140	1.597*	0.963	0.250	2.621*
SE Asia				0.034	0.141	1.035	−0.017	0.316	0.983
Other				0.201	0.186	1.222	−0.554	0.577	0.575
Region × Gender									
China × Gender							−0.031	0.408	0.969
S America × Gender							−0.190	0.128	0.827
Africa × Gender							−0.124	0.259	0.883
E Europe × Gender							−0.660	0.302	0.517*
SE Asia × Gender							0.064	0.354	1.066
Other × Gender							0.894	0.610	2.444

[a] Reference category: Female.
[b] Reference category: Not adopted.
* $p < .05$, note: a * on an empty line indicates overall significance of the specific categorical variable.

adoptees). Furthermore, males (adopted and non-adopted) had higher risks of getting in touch with criminal justice, as well as relapsing, than (adopted and non-adopted) females. Small effects of parental income (as an index for family SES) were found with higher risks of contact with the criminal justice system and relapsing for youth from low-SES families than for youth from high-SES families, and this was equally true for adoptees and non-adoptees.

4.1. Parental SES

In contrast to findings from previous studies pointing to elevated risks of criminal offending in international adoptees from high-SES adoptive families (Hjern et al., 2002; Webb et al., 2015), we did not find such an effect in our study. Small effects of parental income were found, but they were in the opposite direction and of the same magnitude for both adoptees and non-adoptees, with youth from low-SES families having a somewhat higher risk of contact with the criminal justice system. In our study, the relation between SES and criminal offending was comparable for adopted and non-adopted youth, and in line with general population studies pointing to higher risks of crime in lower-SES families compared to higher-SES families (e.g., Aebi, Giger, Plattner, Metzke, & Steinhausen, 2014; Kipping, Smith, Heron, Hickman, & Campbell, 2015; Rekker et al., 2015).

Previous studies suggest that even in well-functioning adoptive families adopted children might deviate onto a criminal trajectory. Parenting is not unimportant but a mismatch between parents and their adopted children in terms of SES background, life expectations, personality and genetics might trigger deviant developmental pathways. There is indeed evidence from behavior genetic research that heritable influences as well as interactions between genes and environments (G × E) play a role in the development of criminal behavior (e.g., Mason & Frick, 1994; Moffitt, 2005; Tuvblad & Beaver, 2013). Using data from population registers in Sweden, both genetic and environmental effects on criminal behavior of domestic adoptees were found

Table 7
Results of the Cox regression with age of relapse as the dependent variable and adoption split in different regions.

Effect	Model 1			Model 2			Model 3		
	b	SE	HR	b	SE	HR	b	SE	HR
Age at start (2005)	−0.104	0.001	0.902*	−0.104	0.001	0.902*	−0.103	0.001	0.902*
Income (2005)	−0.066	0.001	0.936*	−0.066	0.001	0.936*	−0.066	0.001	0.936*
Gender[a]	0.637	0.007	1.892*	0.638	0.007	1.892*	0.637	0.007	1.892*
Region of birth[b]						*			
China				−0.086	0.302	0.917	0.230	0.378	1.259
S America				0.516	0.067	1.675*	0.331	0.160	1.392*
Africa				0.246	0.154	1.279	−0.063	0.378	0.939
Eastern Europe				0.172	0.186	1.188	0.621	0.316	1.861*
SE Asia				0.254	0.174	1.289	0.237	0.408	1.267
Other				0.165	0.236	1.180	−0.062	0.707	0.940
Region × Gender									
China × Gender							−0.706	0.627	0.494
S America × Gender							0.230	0.177	1.258
Africa × Gender							0.384	0.414	1.468
E Europe × Gender							−0.623	0.391	0.536
SE Asia × Gender							0.021	0.451	1.021
Other × Gender							0.260	0.750	1.297

[a] Reference category: Female.
[b] Reference category: Not adopted.
* $p < .05$, note: a * on an empty line indicates overall significance of the specific categorical variable.

(Frisell et al., 2012; Hjalmarsson & Lindquist, 2013; Kendler et al., 2014). Comparable studies on international adoptees do not exist, as far as we know, because data on crime are usually not available for the adoptees' birth family. However, in our study we found no indication of a relation between high adoptive parents' SES and elevated rates of juvenile offending in adoptees. Thus, the current study does not support the theory of a mismatch between adoptive parents and adoptee contributing to elevated crime rates in the adoptee.

In contrast to other adoption studies, we did not find a relation between high SES and adoptee delinquency. Based on general strain theory (Agnew, 1992), a disparity between high expectations of well-educated adoptive parents and what is actually achieved by their adopted child might result in negative affect and behavior problems in the child. A possible explanation for our findings may be that as a result of pre-adoption parent training the expectations of adoptive parents (of any SES) have been adjusted and modified. In the Netherlands, since 1990 prospective adoptive parents receive extensive compulsory preparation care before they adopt a child, and during this training parents learn to manage their expectations and set realistic goals about what they can expect from an adopted child.

4.2. Heterogeneity in adoptees

Our findings revealed marked differences between adoptees from different regions of origin: Adoptees from South America and Africa (and to a lesser extent Eastern Europe) were significantly overrepresented in the Dutch crime registers, whereas adoptees from China were underrepresented. This finding of diverging crime rates depending on country of origin illustrates that international adoption itself might not be related to elevated crime rates in adopted youth. However, the question is how the substantial differences can be explained, in particular the lower crime rates in Chinese adoptees compared to their non-adopted peers in their new home country. To answer this question we examined the role of age at adoptive placement, because many studies and meta-analyses have shown that an older age at placement is associated with higher risks of developmental delays and problems (Sonuga-Barke et al., 2017; Van den Dries et al., 2009; Van IJzendoorn & Juffer, 2006). Laubjerg and Petersson (2011) found higher rates of criminal conviction in adoptees who had been adopted at older ages. Converging with these results, we found that, in general, the risk of contact with the criminal justice system increased as the age at adoption was higher. However, the effect of country of origin did not change by adding age at adoption to our analyses.

Possible explanations for the regional differences in our outcomes may be found in varying levels of adversity experienced before the adoption (e.g., Juffer & Van IJzendoorn, 2005), and possible variations in risks associated with the various reasons for adoption (e.g., poverty, unwed motherhood; Juffer et al., 2011). Unfortunately, as is often the case in research on international adoption (Juffer et al., 2011), no information about the birth parents of the adoptees was available in our study. Regarding the varying reasons for adoption, China's one-child policy is a notably different reason for abandonment than relinquishing a child because of severe parental problems, such as drugs or alcohol abuse, in other countries. This may be one of the explanations for the relatively good adjustment of adoptees from China, not only documented in the current study but also in others (e.g., Tan & Marfo, 2006; Van Ginkel, Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2016).

In the Netherlands, prospective adoptive parents are not selected for specific countries of origin, and all adopters receive the same adoption preparation course and after-care service. Therefore, the possibility that selected groups of parents adopt from specific regions of adoption, implying that adoptive parents of adoptees from China would differ from adoptive parents of adoptees from other countries, is not very plausible. A last potential explanation of our findings may be related to varying post-adoption experiences of the international adoptees, including possibly different trajectories of peer-group identification and integration of adoptees from specific countries in the Netherlands. For example, some studies have focused on the intricacies of living in a multi-ethnic adoptive family or experiencing racial discrimination outside the adoptive home (e.g., Basow, Lilley, Bookwala, & Gillicuddy-DeLisi, 2008; Mohanty, 2013; Riley-Behringer, Groza, Tieman, & Juffer, 2014), but it is yet unknown whether these processes and experiences are largely similar or rather diverse for adoptees from different countries of origin.

4.3. Being adopted: risk and resilience

Our study shows that for most regions of adoption, internationally adopted adolescents had been in contact with the criminal justice system more often than non-adoptees. Adoptees from South America and Africa appeared to be at risk for juvenile offending, whereas this risk was nonexistent in the large group of adoptees from China

(n = 4569; nearly half of the total group of 10,189 adoptees). The percentages of adoptees who had been in contact with the criminal justice system ranged between 1.16% and 15.83% across regions of adoption (versus 10.86% in non-adoptees). Based on these rates, an important conclusion is that the large majority of adoptees – even those from South America, Africa, and Eastern Europa – were not involved in criminal acts. Considering the absence of any elevated risk of crime in the large group of Chinese adoptees, we suggest that being internationally adopted in itself is not related to antisocial behavior, and that other factors (e.g., pre-adoption adversity) come into play in a minority of adoptees (in particular coming from South America, Africa, and Eastern Europe) who are caught in criminal acts. The identification of these factors should be a priority for future adoption studies.

Our outcomes document risk as well as resilience (Rutter, 1987; Werner, 1993) in adoptees, which converges with the outcome that adoptees, even when they do not completely catch up with their non-adopted peers (Sonuga-Barke et al., 2017; Van IJzendoorn & Juffer, 2006), show a remarkable recovery in all domains of development. In addition, adoptees' resilience could be strengthened by focusing on protective factors (supporting family or peer relationships) and on preventive interventions such as positive parenting programs (e.g., Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2017) or group programs for parents and adolescents (e.g., Bertoni, Donato, Morgano, Iafrate, & Rosnati, 2017). Finally, preparation courses should be available for prospective adoptive parents to inform them about pre-adoption risks and delays, so that they can develop realistic expectations about their future adopted child.

Although we found elevated rates of crime in children adopted from specific countries, this does not, of course, inevitably translate into a higher risk for every child adopted from one of those specific countries. Further, being adopted from a certain country is not a valid diagnostic measure to assess risk in children, because pre-adoption conditions and adversities vary widely within as well as among different countries of origin (and over time). Therefore, we suggest that adoption practice focuses on supporting adoptive families and strengthening adopted children's resilience, in particular when children have experienced severe pre-adoption deprivation.

Declarations of interest

None.

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