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### Risk and needs assessment for juvenile delinquents

van der Put, C.E.

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# Chapter 5

## Changes in risk factors during adolescence: Implications for risk Assessment

Van der Put, C.E., Deković, M., Stams, G.J.J.M., Van der Laan, P.H., Hoeve, M.,  
& Amelsfort, L. van (2011).  
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## Abstract

This study examined to what extent the significance of both static and dynamic risk factors for recidivism changes in the course of adolescence. For this purpose, file and interview data of 1,396 juveniles charged with a criminal offense were analyzed. This study showed that the impact of almost all dynamic risk factors decreased as juveniles grew older. As a result, the predictive power of risk assessment models also decreased. From age 14, dynamic risk factors did not contribute significantly to the prediction of recidivism over static risk factors. Another consequence of the declining importance of dynamic risk factors is that the potential effect of an intervention aimed at these factors will also decrease as adolescents grow older, which indicates the importance of early intervention.

## 5.1 Introduction

One of the most consistent findings of criminological research is the age-crime curve, which shows a strong correlation between age and delinquency. This curve demonstrates that, initially, crime rates rise as children grow older, peak during their adolescence, but eventually diminish later in adolescence (Farrington, 1986; Laub & Sampson, 2003). Loeber, Slot, and Stouthamer-Loeber (2008) made clear that youngsters' exposure to risk factors displays a similar course. Their developmental model of onset, accumulation, and continuity of risk factors reveals that the extent to which youngsters are exposed to risk factors increases as they grow older, is highest in adolescence, and decreases when they reach young adulthood.

Risk factors are factors that increase the chance of delinquent behavior and consist of individual characteristics of youngsters on one hand, and of social characteristics, found in the domains of family, peers, school, and neighborhood, on the other hand (Howell, 2003; Loeber, DeLamatre, Keenan, & Zhang, 1998; Loeber et al., 2008; Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikström, 2002). These risk factors have been conceptualized as static or dynamic. Static factors are historic and cannot be changed, such as age at first offense and prior offenses. Dynamic risk factors can potentially be changed, such as the youth's friends or school performance. Overall, the notion that delinquent behavior can be considered to result from complex interactions between these various risk factors is accepted as common knowledge (Deković & Prinzie, 2008; Prinzie, Hoeve, & Stams, 2008). Important in this respect is the accumulation of risk factors in different domains rather than an exposure to risk factors from one domain. Loeber and colleagues (2008) have shown that exposure in early childhood consists only of individual and family factors. Friends and school are factors that do not play a role until late childhood, and only in adolescence do factors from the neighborhood (jobs included) enter the scene. The relevance of family, school, and friends subsequently declines in young adulthood.

It is not only the extent to which the exposure to risk factors changes as children grow older; the impact of these factors fluctuates as well. The impact of some risk factors diminishes, whereas that of others intensifies as youngsters come of age. For instance, the influence of peers on the behavior of youngsters increases with age, while the effect of parental supervision decreases with age (Holmbeck, Greenley, & Franks, 2003; Loeber et al., 2008; Loeber, Slot, & Stouthamer-Loeber (2006); Sampson & Laub, 1992, 1997; Stouthamer-Loeber et al., 2002; Van der Laan & Blom, 2006; Weijters, Vinke, Van der Logt, & Gerris, 2004). It must be noted that the above studies focus on risk factors as initiators of delinquent behavior in different age periods. To what extent these findings also apply to the continuation of such behavior (recidivism) has heretofore been insufficiently investigated. To perform an adequate assessment of risks at different ages and, subsequently, to determine the correct form and intensity of

interventions during these different periods, such knowledge seems vital.

Risk assessment allows us to establish the risk of recidivism in the case of specific youngsters and to analyze which factors are determinants of the level of this risk. The literature on the development of risk assessment instruments distinguishes four generations (Andrews & Bonta, 2003). The first generation of risk assessment consists of an unstructured judgment by a professional based on knowledge, experience, and intuition (the so-called clinical assessment). The second generation contains structured, actuarial risk assessment instruments that mostly contain static risk factors. These instruments can be used to predict the risk of reoffending but do not provide any information as to the ways in which these risks can be reduced. Third-generation instruments are structured risk assessment instruments that contain both static risk and dynamic risk factors. As such, these instruments also provide insight into the possibilities of lowering risks. Fourth-generation instruments also contain protective factors, and they clearly link the results gathered with the tool to a case management plan.

Research has shown that structured risk assessment instruments prove to be more reliable than clinical assessment (e.g., Aegisdottir et al., 2006; Mossman, 1994; Bishop & Trout, 2002; Wilcox, Beech, Markall, & Blacker 2009) and that third- and fourth-generation instruments have relatively higher levels of predictive validity than second-generation instruments (Schwalbe, 2007).

For adults, there is an abundance of well-researched instruments that have demonstrated strong power to predict recidivism (Welsh, Schmidt, McKinnon, Chattha, & Meyers, 2008). Although recent years have provided us with some instruments for adolescents, these have been validated only to a limited extent (Welsh et al., 2008). Not only is the extent to which youngsters are exposed to risk factors highest during adolescence, but the transition from childhood to adulthood is, in itself, also a period of radical change (Weijers, 2008). Considering these drastic changes, one needs to question to what extent the importance of risk factors for recidivism remains unchanged and, beyond this, to what extent the use of one and the same risk assessment instrument during the entire period of adolescence is possible. This study intends to provide more insight into this matter.

The aim of the present study was to determine whether differences exist in the prevalence and impact of both static and dynamic risk factors for recidivism in different age periods during adolescence. For this purpose, research was conducted among youngsters who had been referred to the Council of Child Care and Protection (CCCP)<sup>2</sup> for committing a criminal offense. Youngsters in early adolescence (12-13 years old), middle adolescence (14-15 years old), and late adolescence (16-17 years old) were compared. In addition, we investigated to what extent recidivism can be predicted at different ages and to what extent differences exist between the most important predictors for recidivism.

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2 Known in the Netherlands as Raad voor de Kinderbescherming

## 5.2 Method

### 5.2.1 Participants

The sample included 1,396 youngsters from 12 to 18 years old charged with a criminal offense and referred to the CCCP. The CCCP examines whether the alleged offense signals underlying disorders or problems in the youngster's circumstances and gives advice to judicial authorities as to how to proceed (e.g., diversion or other case processing).

### 5.2.2 Instruments

*Washington State Juvenile Court Prescreen Assessment (WSJCPA; prescreen)*. The pre-screen is a risk assessment instrument developed and validated in the United States (Barnoski, 2004). The prescreen is a shortened version of the Washington State Juvenile Court Assessment (full assessment). The full assessment contains 132 items and maps out the most important risk and protective factors for the following 11 domains: criminal history, school, use of free time, employment, relationships, family, alcohol/drugs, mental health, attitude, aggression, and skills. The domains and items have been selected on the basis of a meta-analysis on risk and protective factors for juvenile delinquency. These domains and items were then presented to a wide panel of international researchers in the field of juvenile delinquency for their feedback and comments (Barnoski, 2004b).

The prescreen enables the risk of recidivism to be relatively quickly estimated because the instrument uses only the most important predictors for recidivism from the full assessment (Barnoski, 2004b). These predictors are from two areas: the criminal and social domains. The psychometric properties of the prescreen have been tested in two studies: Barnoski (2004) and Orbis Partners (2007). The Barnoski study showed that the area under the curve (AUC) of the prescreen is .640 and the Orbis study showed that the AUC is about .630. The average AUC of juvenile justice risk assessment instruments range from .53 to .78, with an average of .64 (Schwalbe, 2007). Therefore, the AUC of the WSJCPA is equal to the average AUC of juvenile justice risk assessment instruments.

For this study, a Dutch translation of the prescreen was used, which was slightly adapted for use in the Netherlands (Van der Put & Spanjaard, 2009; Van der Put, Stams, Van der Laan, & Oort, 2009). Items from the criminal domain are: age first offense, prior judicial contact, prior contact Halt<sup>3</sup>, prior community service, prior detention, prior violent offense, prior offense against property, seriousness of the

3 The Halt program is a diversion program for youngsters arrested for shoplifting, vandalism, and other minor offenses. Instead of filing a report with the public prosecutor, the police can refer young offenders to Halt. At Halt, they carry out work for the benefit of victims or the community for a maximum of 20 hours.

current offense, type of current offense, and settlement current offense. Items from the social domain include: problems concerning friends (association with deviant friends, such as friends who have had contact with the police before), use of free time (lack of occupation during the day or lack of useful recreation), school (cutting classes, poor performance, and problematic behavior such as fighting, intimidation, or other severely disruptive behavior), mental health (both internalizing and externalizing), substance abuse (drugs and alcohol), and family (out-of-home placement, kicked out of home by parents, running away from home, substance abuse by parents, problems with parental rule enforcement, abuse of victim and/or neglect, and family members with judicial contact).

In this study, the above-mentioned items were used to map risk factors in the present study sample. The prescreen scoring system was not used because the items served as input to build risk assessment models for the different age groups. Previously collected data with the BARO questionnaire were used to complete the prescreen.

*Basisraadsonderzoek (BARO)*. This instrument is a semistructured questionnaire completed by council researchers in the service of the CCCP based on interviews with the juvenile, his or her parents, and teachers (the adolescent's mentor). The BARO questionnaire serves two purposes: It is used to give advice to judicial authorities as to what penalties to impose, and it establishes whether the committed offense reflects any disorders or other problems in the youngster's circumstances (Doreleijers, Bijl, Veldt, & Van der Loosbroek, 1999). The BARO is a global diagnostic instrument that, as was previously mentioned, screens, among other things, for underlying psychiatric disturbance that may have been established in the past and should be reexamined in an additional mental health investigation. Validation studies have shown that the BARO enables reliable screenings for the presence of psychiatric disorders (Doreleijers et al., 1999; Spaander, 2003). It contains questions that concern the following domains: functioning in family situations, leisure activities, school, friends, external factors, development, case history, physical condition, behavior, emotions, and substance abuse.

*Recidivism*. Recidivism is defined as the occurrence of one or multiple new judicial contact(s) within 2 years. To measure recidivism, data from the Research and Policy database Judicial Documentation of the Research and Documentation Centre of the Ministry of Justice were used.

### 5.2.3 Procedure

Five branches of the CCCP were selected that were thought to be representative of the total number of 22 councils of child care and protection. Councils were consid-

ered to be representative if referred adolescents came from families with generally lower socio-economic backgrounds, if cultural minorities were sufficiently represented in the target population, and if there was variability in urban and rural areas. Subsequently, a random sample survey was drawn from each branch from the total number of youngsters reported to the specific branch in 2005. In this study, previously collected data with the BARO questionnaire (described above) were used to complete the prescreen. The information from the BARO reports was used to score the social domain items of the WSJCPA. The item scores of the criminal domain of the WSJCPA were based on official criminal records.

To guarantee interrater reliability, each 10th file in every branch was independently scored by two researchers, and their results were then compared. These comparisons indicated that the interrater reliability was high; the kappas showed a minimum of .85. The criminal section scores were based on information that was retrieved from the Research and Policy database as referenced above.

#### 5.2.4 Analyses

To measure the prevalence of the risk factors of the various domains, the risk factors were recoded into dichotomous variables (1 = an increased risk and 0 = no increased risk) and a total score was calculated for the social domains. Chi-square tests were used to identify differences in the prevalence of the risk factors in the various age groups. Pearson correlation coefficients were calculated to determine the strength of the relation between the risk factors and recidivism in the various age groups.

The risk assessment models were created by means of multiple logistic regression. The prediction value of the models was investigated by means of the AUC. The AUC indicates the generic percentage of correct classifications by the instrument. The average AUC of juvenile justice risk assessment instruments ranged from .53 to .78, with an average of .64 (Schwalbe, 2007). In general, an AUC value above .70 is acceptable, and that above .75 is considered to be high (Dolan & Doyle, 2000; Shapiro, 1999).

### 5.3 Results

#### 5.3.1 Age differences in the level of recidivism

The level of recidivism was dependent on age. At 41%, recidivism was lowest in early adolescence ( $n = 104$ ), peaked in middle adolescence at 54% ( $n = 284$ ), and decreased in late adolescence to 48% ( $n = 295$ ),  $\chi(2) = 12.2, p = .00$ . Table 1 shows the seriousness and nature of the repeated offense, divided according to age. The chi-square test is used to determine significant differences between age groups. Relatively few minor offenses and relatively many medium offenses were committed in early adolescence as compared with middle and late adolescence.



Table 1 Seriousness and Type of Recidivism for Each Age Group

	12-13 yr (n=104)		14-15 yr (n=284)		16-17 yr (n=295)		$\chi^2$ (df)
	n	%	n	%	n	%	
<b>Seriousness recidivism</b>							
Minor	(5)	5%	(51)	18%	(52)	18%	11.2**
Medium	(89)	86%	(201)	71%	(218)	74%	8.8*
Major	(10)	10%	(32)	11%	(25)	9%	1.3
<b>Type of recidivism</b>							
Nonviolent property (excl. property damage)	(56)	54%	(127)	45%	(119)	40%	5.7+
Violent property (excl. property damage)	(10)	10%	(25)	9%	(18)	6%	2.1
Other violence	(17)	16%	(57)	20%	(64)	22%	1.2
Property damage, aggression, disruption public order	(28)	27%	(73)	26%	(72)	24%	.3
Other	(7)	7%	(48)	17%	(59)	20%	9.6**

+P < 0.10, \*P < 0.05, \*\*P < 0.01

### 5.3.2 Age differences in static factors

Table 2 presents the prevalence and impact of static risk factors in the different age groups. The static risk factors consist of background characteristics and risk factors from the criminal domain. The first three columns of this table represent the numbers and percentages of youngsters for whom the particular risk factor is present (prevalence). The chi-square test was used to determine significant differences in prevalence between the groups (fourth column). The last three columns show the correlations between the risk factors and recidivism at different ages (impact).

With regard to the prevalence of static risk factors, significant differences between the age groups occurred in the following areas: cultural background, type of the offense, settlement of the offense, and the items that concern the criminal past. In the case of adolescents ages 12-13 years, those with a Turkish or Other background were overrepresented, as were those who had committed a sexual offense. As teenagers grew older, educational sentences were less frequently imposed and detention became more common. Prevalence of all risk factors in the domain of criminal history increased with age. The older age group had more judicial contacts than the younger groups: They had committed more violent offenses and offenses against property, and they had more often been imposed a sentence of community service or detention.

With regard to the impact of static risk factors on recidivism, the strength of the correlations with recidivism increased with age for some of the risk factors. Sex was not a significant predictor of recidivism in the case of 12- to 13-year-olds, but in middle

and late adolescence boys had a higher risk of recidivism than girls. The correlation between sex and recidivism was particularly high in 14- to 15-year-olds; in fact, it was the most important predictor in this age group. Similarly, the type of the current offense was predictive only at a later stage: Adolescents ages 16 to 18 years who had committed a nonviolent property offense had a higher risk of recidivism, whereas adolescents from this age group who had committed a sexual offense reoffended relatively infrequently. Criminal history was predictive of reoffending in all age groups, and in this case, the correlations of the risk factors with recidivism increased with age. The settlement current offense variable was an exception to this rule. It was particularly predictive for 12- to 13-year-olds. The risk of recidivism increased significantly when detention was imposed at a young age. In addition, refraining from imposing a sentence and imposing educational sentences related negatively to recidivism for this age group. The settlement of a current offense significantly correlated with recidivism of 14- to 15-year-olds only in the case of detention and lost its impact in the group of 16- to 17-year-olds.

When taking a closer look at the 12- to 13-year-olds who had been placed in detention, it becomes clear that the high level of recidivism cannot be explained by the seriousness and type of the current offense or by prior judicial contacts. The partial correlation, controlled for the seriousness and type of current offense and prior judicial contacts, was .22 ( $p = .001$ ).

### 5.3.3 *Age differences in dynamic risk factors*

Table 3 presents the occurrence and impact of dynamic risk factors in different age groups. The first three columns of this table represent the percentage of youngsters for whom the particular risk factor is present (prevalence). The chi-square test was used to determine significant differences in prevalence between the groups. The last

Table 2 Prevalence of Static Risk Factors and Correlations with Recidivism for Each Age Group

	Prevalence				$\chi^2$ (2)	Impact			
	12-13 yr (n=255)	14-15 yr (n=527)	16-17 yr (n=614)	%		12-13 yr (n=255)	14-15 yr (n=527)	16-17 yr (n=614)	R
	N	N	n	%		R	R	R	
<b>Sex</b>									
Boy	(215)	(436)	(505)	82%	.5	.07	.29**	.12**	
Girl	(40)	(91)	(109)	18%	.5	-.07	-.29**	-.12**	
<b>Cultural background</b>									
Dutch	(99)	(211)	(232)	40%	.6	-.07	-.06	-.07*	
Moroccan	(43)	(111)	(138)	21%	3.4	.07	.10*	.11**	
Turkish	(26)	(41)	(30)	8%	8.8*	-.04	.03	.02	
Surinamese	(18)	(54)	(61)	10%	2.2	.15**	.02	.07	
Antillean	(16)	(27)	(29)	5%	.9	.05	-.10*	-.11**	
Other	(53)	(83)	(124)	16%	8.0*	-.06	-.05	-.02	
<b>Seriousness current offense</b>									
Minor	(34)	(87)	(107)	17%	2.2	.07	.05	.00	
Medium	(170)	(314)	(386)	60%	3.8	-.04	-.06	.04	
Major	(51)	(126)	(121)	24%	3.3	-.02	.02	-.04	
<b>Type of current offense</b>									
Nonviolent property	(92)	(177)	(213)	34%	.7	.07	.03	.14**	
Violent property	(25)	(82)	(91)	16%	4.8*	-.01	.03	-.01	
Sexual offense	(13)	(29)	(12)	6%	12.0**	-.08	-.03	-.07*	
Other violence	(44)	(94)	(128)	18%	2.8	-.04	-.01	-.03	
Property damage etc.	(81)	(145)	(170)	28%	1.9	-.04	-.01	-.04	
<b>Settlement current offense</b>									
Detention	(29)	(84)	(113)	16%	6.6*	.23**	.11**	.05	
Educational sentence	(58)	(92)	(80)	18%	13.0**	-.11	.00	.02	

	Prevalence						Impact			
	12-13 yr (n=255)		14-15 yr (n=527)		16-17 yr (n=614)		$\chi^2$ (2)	12-13 yr (n=255)	14-15 yr (n=527)	16-17 yr (n=614)
	N	%	N	%	n	%	R	R	R	
Community service	(94)	37%	(206)	39%	(217)	35%	1.7	-.06	-.07	-.05
Other sentences	(39)	15%	(90)	17%	(140)	23%	9.1**	.10	-.00	-.02
No sentence/dismissal	(35)	14%	(55)	10%	(64)	10%	2.3	-.15*	-.07	-.05
<b>Criminal history</b>										
Age first offense		12.8		14.3		15.5	1.074**	.00	-.12**	-.12**
Prior judicial contact	(41)	16%	(166)	31%	(278)	45%	71.7**	.16**	.21**	.22**
Prior Minor offense	(4)	2%	(22)	4%	(49)	8%	17.0**	.15*	.10*	.08+
Prior Medium offense	(34)	13%	(134)	25%	(240)	39%	63.7**	.10	.19**	.23**
Prior Major offense	(10)	4%	(45)	9%	(74)	12%	14.7**	.16**	.09*	.12**
Prior contact Halt	(60)	24%	(136)	26%	(171)	28%	1.8	.14*	.17**	.15**
Prior violence offense	(20)	8%	(69)	13%	(118)	19%	20.5**	.17**	.15**	.18**
Prior property offense	(24)	9%	(107)	20%	(183)	30%	45.3**	.09	.24**	.17**
Prior community service	(17)	7%	(82)	16%	(161)	26%	50.7**	.03	.17**	.20**
Prior detention	(5)	2%	(27)	5%	(81)	13%	40.6**	.11+	.11**	.15**

+P < 0.10, \*P < 0.05, \*\*P < 0.01

three columns show the correlations between risk factors and recidivism at different ages (impact).

Significant differences between the age groups occurred in the prevalence of dynamic risk factors in relation to friends, substance abuse, and family. The occurrence of all of these problems was relatively low in the group of 12- to 13-year-olds. Also, the total number of problems was lowest in the group of 12- to 13-year-olds.

As far as the differences in impact of dynamic risk factors between the three age groups were concerned, this impact declined as juveniles grew older. Overall, the strength of the correlations diminished with increasing age.

#### 5.3.4 *Age differences in risk assessment: Predictors and most important risk factors*

The adequacy with which recidivism can be predicted on the basis of static and dynamic risk factors was examined by means of binary logistic regression analyses. Separate multivariate prediction models were set up for the three age groups based only on static risk factors (see Table 4) and based only on dynamic risk factors (see Table 5).

Significant static risk factors included: in the age group 12-13 years, a Surinamese background (Wald statistic = 6.45,  $p = .01$ ); in the age group 14-15 years, sex (Wald statistic = 30.0,  $p = .00$ ), prior contact Halt (Wald statistic = 9.78,  $p = .00$ ), and prior property offense (Wald statistic = 9.75,  $p = .00$ ); and in the age group 16-17 years, sex (Wald statistic = 5.77,  $p < .001$ ), an Antillean background (Wald statistic = 4.40,  $p = .04$ ), current nonviolent property offense (Wald statistic = 6.02,  $p = .01$ ), and prior contact Halt (Wald statistic = 5.64,  $p = .02$ ).

Significant dynamic risk factors included: in the age group 12-13 years, use of free time (Wald statistic = 10.55,  $p = .00$ ) and family (Wald statistic = 5.97,  $p = .02$ ); in the age group 14-15 years, no statistically significant dynamic risk factors; and in the age group 16-17 years, friends (Wald statistic = 9.68,  $p = .00$ ).

Subsequently, hierarchical multiple logistic regression analysis was used to test whether the dynamic variables contributed significantly to the prediction of recidivism after having entered static variables (see Table 6).

Table 3 Prevalence of Dynamic Risk Factors and Correlations with Recidivism for Each Age Group

	Prevalence						Impact					
	12-13 yr (n=255)		14-15 yr (n=527)		16-17 yr (n=614)		12-13 yr (n=255)		14-15 yr (n=527)		16-17 yr (n=614)	
	n	%	n	%	n	%	R	R	R	R	R	R
<b>Problems related to</b>												
School	(151)	59%	(348)	66%	(376)	61%	.19**	4.3(2)	.11*	.06*		
Friends	(92)	36%	(237)	45%	(260)	42%	.24**	5.6(2) <sup>+</sup>	.10*	.12**		
Use of free time	(79)	31%	(186)	35%	(198)	32%	.32**	1.9(2)	.09*	.08*		
Substance abuse	(11)	4%	(59)	11%	(117)	19%	.06	37.3(2)**	.08	.04		
Family	(105)	41%	(282)	47%	(246)	40%	.27**	5.1(2) <sup>+</sup>	.08	.01		
Average number of risk factors total		1.7		2.0		1.9		22.5(10)**				

\*P &lt; 0.10, \*\*P &lt; 0.05, \*\*\*P &lt; 0.01

Table 4 Logistic Regression Coefficients Predicting Recidivism from Static Risk Factors for Each Age Group

	12-13 year (n=255)						14-15 year (n=527)						16-17 year (n=614)					
	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)		
	Sex	-.50	.43	1.36	.61	-1.58	.29	30.02**	.21	.57	.24	5.77*	.57	.24	.23	.34	.88	
Dutch	.49	.36	1.92	1.64	.12	.25	.24	1.13	-.13	.23	.34	.25	.25	1.00	1.29	1.70		
Moroccan	.81	.43	3.52 <sup>+</sup>	2.24	.38	.30	1.63	1.46	.25	.33	2.59	1.70	.33	.48	4.40*	3.6		
Surinamese	1.50	.61	6.45*	4.67	-.05	.38	.02	.95	.53	.33	2.59	1.70	.33	.48	4.40*	3.6		
Antillean	.57	.63	.81	1.77	-.94	.49	3.66 <sup>+</sup>	.39	-1.01	.46	6.02*	1.58	.19	.25	.49	.84		
Nonviolent property	.26	.30	.73	1.30	-.06	.21	.07	.95	.46	.19	6.02*	1.58	.19	.25	.49	.84		
Detention	.95	.50	3.61 <sup>+</sup>	2.58	.53	.30	3.10 <sup>+</sup>	1.70	-.17	.25	.49	.84	.25	.49	.84	1.17		
Educational sentence	-.40	.35	1.26	.67	.22	.27	.69	1.25	-.16	.27	.49	.84	.27	.49	.84	1.17		

	12-13 year (n=255)			14-15 year (n=527)			16-17 year (n=614)						
	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)	
Prior judicial contact	.11	1.92	.00	1.11	.49	.61	.65	1.64	-.37	.47	.47	.60	.69
Prior Minor offense	.09	.90	.00	.82	.58	.65	.79	1.78	.31	.37	.37	.66	1.36
Prior Medium offense	-.21	1.90	.01	.82	-1.26	.73	3.03*	.28	.90	.48	3.43*	2.45	
Prior Major offense	-.16	1.51	.01	.85	-1.28	.70	3.29*	.28	-.12	.46	.07	.89	
Prior contact Halt	.64	.34	3.60*	1.90	.74	.24	9.78**	2.09	.48	.20	5.64*	1.61	
Prior violence offense	2.04	1.10	3.45*	7.70	.83	.53	2.43	2.29	.45	.37	1.44	1.56	
Prior property offense	-.09	.92	.01	.92	1.53	.49	9.75**	2.29	-.27	.33	.66	.77	
Prior community service	-1.43	.98	2.14	.24	.36	.40	.81	1.43	.29	.28	1.15	1.34	
Prior detention	.87	1.57	.31	2.39	.48	.65	.55	1.61	.28	.36	.44	1.32	
Constant	-.96	.33	8.58**	.38	-.12	.24	.23	.89	-.55	.21	6.57**	.58	

\*P < 0.10, \*\*P < 0.05, \*\*\*P < 0.01

Table 5 Logistic Regression Coefficients Predicting Recidivism from Dynamic Risk Factors for Each Age Group

	12-13 year (n=255)			14-15 year (n=527)			16-17 year (n=614)					
	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)	B	SE	Wald	Exp (B)
School	.14	.31	.20	1.15	.34	.20	2.95	1.41	.18	.18	.97	1.20
Friends	.38	.31	1.48	1.46	.27	.19	2.05	1.31	.55	.18	9.68**	1.74
Use of free time	1.05	.32	10.55**	2.86	.20	.20	.94	1.22	.16	.19	.69	1.17
Substance abuse	.30	.68	.00	1.03	.35	.29	1.40	1.42	.14	.21	.46	1.15
Family	.76	.31	5.97*	2.14	.06	.19	.11	1.07	-.19	.18	1.04	.83
Constant	-.27	.24	27.42**	.28	-.33	.17	3.72	.72	-.43	.15	8.30**	.65

\*P < 0.10, \*\*P < 0.05, \*\*\*P < 0.01

*Table 6 The Incremental Contribution of Dynamic Risk Factors for Each Age Group*

	12-13 year (n=255)	14-15 year (n=527)	16-17 year (n=614)
	$\chi^2$ (df)	$\chi^2$ (df)	$\chi^2$ (df)
Static risk factors (block 1)	46.0 (18)**	101.6 (18)**	73.6 (18)**
Dynamic risk factors (block 2)	28.2 (5)**	9.2 (5)	8.3 (5)
Total model	74.2 (23)**	110.8 (23)**	81.9 (23)**

\* P < 0.05, \*\* P < 0.01

It can be derived from Table 6 that adding dynamic variables significantly improved the prediction of recidivism in 12- to 13-year-olds, whereas adding dynamic variables did not improve the prediction of recidivism in 14- to 17-year-olds. Table 7 shows the AUC values and confidence intervals of the prediction models.

*Table 7 AUC Values and Confidence Intervals of the Predictive Models for Each Age Group*

	12-13 yr (n=255)	14-15 yr (n=527)	16-17 yr (n=614)
AUC model static risk factors	.732 (.669 - .795)	.740 (.696 - .784)	.701 (.656 - .741)
AUC model dynamic risk factors	.719 (.655 - .784)	.591 (.542 - .640)	.593 (.548 - .638)
AUC total model (static and dynamic risk factors)	.801 (.744 - .852)	.757 (.715 - .798)	.706 (.665 - .746)

Table 7 shows that no significant differences were found between age groups in the AUC values of the prediction models with only static risk factors. However, the AUC values of the prediction models that are based only on dynamic risk factors were significantly different for the three age groups: The AUC value in 12- to 13-year-olds was significantly higher than the AUC values in 14- to 15-year-olds and 16- to 17-year-olds. The AUC values of the models including both static and dynamic risk factors showed a significant decrease with age. Recidivism could be predicted very well (AUC = .801) in 12- to 13-year-olds, quite well (AUC = .757) in the 14- to 15-year-olds, and acceptable (AUC = .706) in the 16- to 17-year-olds.



## 5.4 Discussion

The goals of this study were to examine to what extent the occurrence and impact of both static and dynamic risk factors for recidivism change in the course of adolescence. The analyses have shown that the level of recidivism depends on the age of youngsters and, more specifically, that recidivism is lowest in early adolescence, peaks in middle adolescence, and diminishes again in late adolescence. This means that the course of the relation between recidivism and age (age-recidivism curve) broadly concurs with the course of the “age-crime curve” (Moffitt, 1993). Dutch national recidivism figures confirm that recidivism is highest with adolescents who are 14 years of age (of all youngsters with a criminal case settled in 2003; Wartna & Tollenaar, 2006). Five years earlier, this “peak” was measured at age 16 years, but it has shifted because of a sharp rise in the youngest group (about 18% for 12- to 14-year-olds) and a slight increase in the oldest group (about 8% for 15- to 17-year-olds).

Differences between the age groups exist both in static and in dynamic risk factors. Some static risk factors become increasingly important as adolescents grow older. Other static risk factors, such as settlement current offense, become less important. The impact of this variable is most significant in early adolescence by far. If detention is imposed at that age, the chances of recidivism strongly increase. This is an important finding for juvenile courts to take into account when detention is considered for very young offenders, especially because the increased chance of recidivism continues to exist even after correction for the seriousness and type of the offense and prior judicial contacts.

Like static risk factors, differences between age groups are found for dynamic risk factors. The impact of dynamic risk factors declines as youngsters get older. The correlations between dynamic risk factors and recidivism in early adolescence are considerably higher than those in middle and late adolescence. It is particularly surprising that the prevalence of dynamic risk factors turns out to be low in early adolescence; substantially fewer problems occur in this age group than in middle and late adolescence. Thus, an “age-risk factor paradox” applies to dynamic risk factors: The risk factors are least prevalent in the youngest age group but are most predictive for future recidivism at that age, whereas in the older age groups, dynamic risk factors occur more often but have a lower predictive power.

There are several possible explanations for the decline of the importance of dynamic risk factors as youngsters grow older. A first explanation is based on Moffitt’s theory (1993), which distinguishes between “adolescence-limited” and “life-course-persistent” antisocial behavior. Adolescence-limited antisocial behavior is not so much caused by exposure to risk factors but rather should be regarded as more or less normative in adolescence as a life phase, considering the high prevalence of antisocial

behavior during adolescence. Life-course persistent antisocial behavior, on the other hand, starts at an early age and continues through adolescence and into adulthood. Life-course-persistent antisocial behavior is thought to be explained by individual factors that are subsequently reinforced by a high-risk environment. The relation between recidivism and dynamic risk factors will therefore be stronger in the case of delinquent youth showing life-course-persistent antisocial behavior than in the case of delinquent youth showing adolescence-limited antisocial behavior, as the behavior of the latter group is not so much caused by dynamic risk factors as it is by situational factors. As youngsters grow older, the number of teenagers showing adolescent-limited antisocial behavior will increase. Thus, the late-adolescent delinquent group will consist of youngsters showing adolescence-limited antisocial behavior to a relatively large degree, whereas the early-adolescent delinquent group will largely consist of youngsters showing life-course-persistent antisocial behavior. This could be an explanation for the declining importance of dynamic risk factors in maturing youngsters. A recent study showed that the strength of the correlations between dynamic risk factors and recidivism again increases from 18 years of age (Van der Knaap & Alberda, 2009), which may be explained by the growing share of delinquents showing life-course-persistent antisocial behavior in the population of adult offenders.

Another possible explanation is that youth autonomy increases during adolescence, and therefore, risk factors from youngsters' social surroundings lose their significance for the prediction of recidivism as they grow older. During puberty, a youngster is exposed to risk factors from all domains of his or her social surroundings (such as school, friends, family, and neighborhood), but after puberty, the only risk factors that remain are those that emanate from the individual domain and only a fraction of risk factors from the neighborhood (Loeber et al., 2008). Thus, the exposure to risk factors from the domains of family, friends, and school starts to diminish during adolescence, which is a possible explanation for the continued decline of the importance of dynamic risk factors for recidivism.

Because of the declining importance of dynamic risk factors, the predictive power of the risk models for recidivism also decreased. Recidivism can be predicted very well in the group of 12- to 13-year-olds, quite well in the group of 14- to 15-year-olds, and at an acceptable level in the group of 16- to 17-year-olds. From age 14, dynamic risk factors did not contribute significantly to the prediction of recidivism over static risk factors.

These findings have several implications for judicial interventions targeting desistance from delinquent behavior and the criminal justice system at large. First, it is particularly important that the juvenile justice system uses only risk assessment instruments of which the predictive validity has proven to be sufficient for each age group because the impact of static and dynamic risk factors on recidivism differs greatly

between these age groups. Second, the declining influence of dynamic risk factors on recidivism clearly illustrates the importance of early intervention. Research has shown that interventions targeting prevention of recidivism are most effective when these are aimed at dynamic risk factors that correlate with recidivism (Deković & Asscher, 2008; Farmer, Compton, Burns, & Robertson, 2002). In early adolescence, the correlations between dynamic risk factors and recidivism are high, and therefore the potential effect of an intervention focusing on these factors must be relatively high during this age period. Third, the results show that the relative importance of dynamic risk factors of recidivism differs across age groups. For example, the relative importance of the family decreases as adolescents grow older, whereas the relative importance of school and friends increases. These findings emphasize the need for developmentally appropriate interventions.

The diminishing influence of dynamic risk factors as teenagers mature illustrates the importance of further research on predictors of recidivism in late adolescence. During late adolescence, only a few dynamic risk factors relate significantly to recidivism, namely, problems that relate to friends, school, and use of free time. However, the correlations are low at this age, and the effect of interventions aimed at these risk factors may very well be minimal. As such, it becomes increasingly difficult to set up adequate treatment with an effect on recidivism as youngsters grow older. Therefore, it is of great importance that further research is conducted to examine more potential dynamic risk factors than the ones discussed in this study that link to recidivism in late adolescence. Such research should predominantly focus on individual factors because the review by Loeber et al. (2008) shows that the exposure to individual risk factors increases as adolescents reach adulthood. Such individual risk factors could include poor social skills, cognitive distortions, immature moral development, positive attitude toward antisocial behavior, impulsive behavior, lack of remorse, and problems around attention (Deković & Asscher, 2008; Loeber et al., 2008). Whether some of these variables may improve our capability to predict recidivism as youngsters grow older needs to be examined. Knowledge of the most important dynamic predictors of recidivism for 16- to 17-year-olds especially is needed to develop adequate treatment—aimed at the dynamic risk factors that relate to recidivism most strongly—for this age group.

Some limitations of this study need to be mentioned. First, our conclusions about the relative importance of static and dynamic risk factors are based on data from a single measure and in one sample. It is therefore recommended that further research be conducted to examine whether our findings can be replicated, preferably with alternative assessment instruments. Second, there are only two moments of measurement in this study. Because there is an absence of studies that have measured risk factors at multiple time points in delinquent samples, there is a lack of knowledge regarding

which of the factors commonly referred to as “dynamic” are truly dynamic (Douglas & Skeem, 2005). Another limitation is the reliance on official records of recidivism. The use of official records involves the risk of underestimating the actual number of criminal acts, as there is more criminality than is registered in the official systems. On the other hand, self-reported data have their limitations as well. For instance, Breuk, Clauser, Stams, Slot, and Doreleijers (2007) showed that juvenile delinquents tend to underreport delinquent behavior, in particular relative to severe offenses.

Despite these limitations, this study deals with a very important topic in criminological research. The idea that dynamic risk factors become less relevant for youth as they grow older is essential to our understanding of the assessment of risk to reoffend, as well as for the practical significance of providing adequate treatment in efforts to reduce juvenile criminal recidivism.