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Does debt increase risk? A mixed methods approach to studying the potential underlying risk factors in the relationship between debt and crime

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ABSTRACT

Previous studies have found evidence for a relationship between debt and crime, and for problems in childhood, education, work, and mental and physical health as underlying risk factors. However, insight into the interplay between these possible risk factors is limited. Therefore, a mixed methods approach was applied by both creating a quantitative Gaussian Graphical Model (GGM) and conducting qualitative analyses on 250 client files including risk assessment data from the Dutch probation service, to gain more specific insight into the interaction between potential risk factors. The results show that debt is strongly related to criminal behavior and problems in many life domains for most probation clients. Debt seems to be a direct risk factor for crime, but debt and crime also appear to be highly interrelated as part of a complex interplay of risk factors. The most frequently rated factors – limited or incomplete education, no job and related lack of income, and mental and physical health problems – are highly interwoven and increase the risk of both debt and crime. The findings stress the importance of paying attention to and using interventions focusing on strongly related crime risk factors, including debt, and their complex interplay, to supervise probation clients effectively.

Introduction

An essential theme in criminological studies is the search for offender supervision methods that effectively reduce the risk of recidivism and stimulate resocialization (e.g. Bonta & Andrews, 2017; Cullen & Gendreau, 2001; Durnescu, 2012). Improving the effectiveness of supervision and interventions requires insight into established crime risk factors and an understanding of why and how they are related to offending behavior and recidivism. Over the past three decades, empirical knowledge about risk factors for crime has grown tremendously and multiple risk factors have been firmly established.

From a macroeconomic perspective, many studies have shown the influence of adverse socioeconomic conditions on crime. Studied socioeconomic factors include

poverty and low socioeconomic origin (Comanor & Phillips, 2002; Galloway & Skardhamar, 2010; Hsieh & Pugh, 1993), the economic situation of neighborhoods (Leventhal & Brooks-Gunn, 2011), unemployment (Bjerk, 2007; Phillips & Land, 2012), and lack of education. Furthermore, empirical work focusing on the individual has demonstrated that many risk factors for crime later in life originate during early childhood. Examples are parental education level, low socioeconomic origin, a broken family, severe mental health and substance use problems of family members, and victimization during childhood (Bonta & Andrews, 2017; Farrington, 2006; Shader, 2001).

In addition to socioeconomic and childhood conditions, problems relating to mental and physical health have been shown to increase crime risk because poor health may limit the ability to work and participate in society and therefore be connected to isolation (e.g. Grosholz & Semenza, 2018; Link et al., 2019; Wallace & Wang, 2020). Research has shown that offenders more often have health problems than the general population due to their lifestyle, for example, as a result of substance abuse (e.g. Kort-Butler, 2017; Piquero et al., 2007).

In addition, many empirical studies have shown that risk factors are related to each other and may reinforce each other. For instance, factors such as adverse childhood experiences and discontinuity of physical and mental health care have been demonstrated to be related to developing severe mental health problems, including personality disorders and substance use, which are also crime risk factors (e.g. Douglas et al., 2013; Goldstein et al., 2005; Pietrek et al., 2013). People classified with a cluster B personality disorder, such as the Antisocial Personality Disorder or Narcissistic Personality Disorder, tend to exhibit impulsive behavior more frequently, are usually less able to control their anger and show empathy, and are addicted to substances more often than those without personality disorders. Therefore, they often have authority problems, increasing their crime risk (Whiting & Fazel, 2020).

Furthermore, research has provided evidence for debt as a particular crime risk factor, especially among persistent offenders (de Jong, 2017). For example, a study on male adolescents released from a juvenile correctional institution has demonstrated that debt is related to a higher risk of recidivism. The results of this study suggest that offenders who recidivate are more likely to have debt (van Dam, 2005). Moreover, studies have shown that indebted people and people with a low income are overrepresented in the criminal justice system, with the experience of incarceration intensifying financial hardship, including worsening debt (Harper et al., 2021). In addition, many studies have clearly demonstrated the influence of monetary sanctions on (former) prisoners and probationers and have shown how criminal behavior, sometimes by itself a result of financial problems, can lead to a spiral of increasing financial problems (e.g. Iratzoqui & Metcalfe, 2017; Link, 2019; Martin et al., 2018; Piquero & Jennings, 2017; Pleggenkuhle, 2018). This spiral may, in turn, result in increasing (re)offending behavior due to the stress or strain caused by financial hardship. In addition, the strong reciprocal associations between debt and crime become stronger with age (Blom et al., 2011). Overall, the literature indicates that there is a strong association between debt and crime (e.g. Aaltonen et al., 2016; Hoeve et al., 2011, 2014, 2016), that the relationship between debt and crime is a result of mutual causation, and that debt increases crime risk, and vice versa (Moffitt et al., 2002; Siennick, 2009; van Dam, 2005; Zara & Farrington, 2010). Debt and crime thus reinforce each other, which may increase the risk of recidivism and cumulative problems in different life domains.

While the existence of the relationship between debt and crime is well-established, a more thorough, systematic understanding of the interaction between debt, crime, and related well-established risk factors is needed (Jungmann et al., 2014). Studies have shown that debt generally negatively affects well-being, resocialization, family structure, and mental health, which may increase crime and recidivism risk (Harper et al., 2021). Recently, a comprehensive study of the underlying factors of debt-related crime that examined debt was conducted in a sample of Dutch probationers based on their client files (van Beek et al., 2020b). The results showed a high prevalence rate of debt, with many probation clients having (problematic) debt. In addition, the study demonstrated that problems regarding childhood and living situation, lack of education and work or daytime activities leading to a lack of legal income, and behavioral, mental, and physical health problems may be possible underlying risk factors in the relationship between debt and crime. A substantial number of probation clients had never learned to manage their finances, possibly due to their caregivers living in poverty or debt. These client files also demonstrated that many of them experienced instability in childhood, for example, an unstable home situation, care discontinuity in their upbringing, and physical, mental, pedagogical, and affective neglect or sexual abuse. These adverse experiences and instability in childhood have been found to be related to the development of mental disorders and substance abuse, which may increase crime and recidivism risk (e.g. Bonta & Andrews, 2017; Farrington, 2006; Shader, 2001). One of the possible consequences of mental health problems is difficulty completing education and obtaining and maintaining work, leading to a lack of legal income.

The practical implications of understanding that problems in several life domains may be underlying factors in the relationship between debt and crime are essential for professionals working with offenders in daily practice, such as probation officers. Probation officers supervise offenders with the aim to prevent recidivism and to stimulate resocialization. They focus on specific individual risk factors during these supervisions, including problematic substance use and antisocial attitudes. Although debt has been shown to be strongly related to crime, probation officers pay little attention to debt as a risk factor during their daily probation supervision activities (van Beek et al., 2020b).

Present study. Notwithstanding the knowledge about risk factors for crime and debt as a specific risk factor for crime, more specific insight into the association between different underlying crime risk factors in the relationship between debt and crime is important to prevent recidivism and increase the effectiveness of offender supervision methods. Therefore, this study aims to explore the interaction between the different factors that, according to the literature (for a review, see van Beek et al., 2020b), are possibly related to debt, namely (1) childhood and living situation, (2) education and work/daytime activities, and (3) mental and physical health (including substance abuse), and how they interplay to affect crime risk. These insights may help probation officers to more adequately support clients with debt problems, prevent crime and recidivism, and help professionals to make better informed and more effective and precise probation supervision choices.

Method

Procedure. The present study is part of an extensive research project on the relationship between debt and crime in probationers. In this study, data were collected from a sample

of adult probation clients (18 years or older) on (1) the prevalence and scope of debt among this group (i.e. finances, debt and financial assistance), and (2) on crime. Based on a literature review (van Beek et al., 2020a, 2020b), additional data were collected on the three domains that constitute potential underlying risk factors: (1) childhood and living situation, (2) education and work/daytime activities, and (3) mental and physical health. These domains are also included in the standard structured risk assessment instrument used by the Dutch probation service called the Recidivism Assessment Scales (Recidive Inschattingsschalen, RISc; for an overview of the Dutch probation service and the background of the RISc, see Bosker, 2015).

We collected data from files of 250 probation clients of the Dutch probation service. First, we analyzed RISc-data, after which we searched client files for more background information on the scores on the RISc-scales. The client file search was conducted with the official permission of the Dutch probation service. Permission to research client data is included in the general privacy statement of the Dutch probation service. In the client file search, case management plans and evaluations based on a standardized and structured format were included. The information in the client files combines both formal and informal sources. It is based on what probationers tell probation officers and verified and complemented by probation officers by consulting official documents and referents, such as other professionals (e.g. collaborating partners or previous care-givers) and the clients' social network. Three independent researchers conducted the client file search, frequently discussing their variable ratings to check for inconsistencies.

Instruments. The RISc is a standardized and validated risk assessment instrument developed for Dutch probation clients and based on the Offender Assessment System used by the probation and prison service in England and Wales (OASys Home Office, 2002). Research has shown that the interrater reliability is moderate to substantial for most RISc items (Cohen's K for nominal items; Tinsley and Weiss's T for ordinal items .30–.87 with most items between .41 and .79). The predictive validity for general recidivism of the total RISc-score was found to be moderate (Area Under the Curve (AUC) = .70; van der Knaap & Alberda, 2009). The RISc includes scales on (1) current offence, (2) offending history, (3) accommodation, (4) education, employment, and learning, (5) income and financial management, (6) relationships with partner, family, and relatives, (7) relationships with peers and acquaintances, (8) drug abuse, (9) alcohol abuse, (10) anti-social behavior, (11) thinking, behavior, and abilities, and (12) pro-criminal attitudes. The scale on income and financial management includes items on the primary income source and the current financial situation.

In the client file search, additional topics were included on childhood and living situation (e.g. childhood experiences and accommodation), education and work/daytime activities (e.g. education, work during earlier adulthood, and current job or other daytime activities), mental and physical health (e.g. mental health care in childhood and earlier in adulthood, psychopathology, and physical health), and finances, debt, and financial assistance (e.g. changes in income sources, debt level and creditors, and financial assistance). The complete dataset contains 28 variables (see Table 3).

Sample. Three probation organizations exist in the Netherlands, the Dutch Probation Service (Reclassering Nederland, RN), the Institute for Social Rehabilitation of Addicted Offenders (Stichting Verslavingsreclassering GGZ, SVG), and the Salvation Army Probation Service (Leger des Heils Jeugdbescherming & Reclassering, LJ&R). Probation officers in the

Netherlands are usually educated at universities of applied sciences and are trained to identify problems and assess risks. The three Dutch probation organizations completed a total of 15,845 probation supervision cases in 2015 (13,944 unique clients). Using SPSS' random sampling feature a random sample of 250 clients was drawn from the Dutch probation supervision cases completed in 2015 (for an overview of the characteristics of the sample in relation to all the clients whose probation supervision finished in 2015, see Table 1). The sample was taken from these cases because recidivism data is available for them, enabling follow-up studies to be conducted in a later phase of the research project. Of these 250 clients, 235 were men (94 per cent) and 15 were women (6 per cent). Of these 250 clients, 124 (49.6 per cent) were supervised by RN, 102 (40.8 per cent) by SVG and 24 (9.6 per cent) by LJ&R. The distributions over probation organizations, regions, and gender in the sample equaled the distribution of the total population of the supervision cases completed in 2015. The mean age of the sample (37 years) was slightly higher than of the total population.

Data analysis. A mixed methods approach was used to analyze the risk assessment and client file data by both quantitative and qualitative analyses. The quantitative analysis provides an overview of the main relationships between the important underlying factors in the relationship between debt and crime (controlling for confounders and mediators), while the qualitative analysis helps to understand and interpret these relationships by providing concrete examples and additional detail.

The quantitative analysis was conducted with the aim to model the potential underlying risk factors as a network of interconnected life domains (see Borsboom, 2017; Borsboom & Cramer, 2013; Elovainio et al., 2020). This was done by creating a Gaussian Graphical Model (GGM), an undirected network of partial correlation coefficients among the variables in our dataset. The GGM shows which variables predict one another (controlling for all other variables in the dataset), allows for sparse modeling of covariance structures, and may highlight potential causal relationships between observed variables (Epskamp et al., 2018b). The measures were either continuous or ordinal (with a higher value indicating that the score is more 'problematic'). The analyses were done

Table 1. Overview of research sample in relation to all clients who finished offender supervision in the Netherlands in 2015.

		All clients ($N = 3115$)	Sample ($N = 250$)
Gender	Men	2881 (92.5%)	235 (94.0%)
	Women	234 (7.5%)	15 (6.0%)
Organization	Dutch Probation Service	1532 (49.6%)	124 (49.2%)
	Institute for Social Rehabilitation of Addicted Offenders	1285 (40.8%)	102 (41.3%)
	Salvation Army Probation Service	298 (9.6%)	24 (9.6%)
Age	18–25 years	909 (29.2%)	40 (16.0%)
	26–30 years	501 (16.1%)	43 (17.2%)
	31–40 years	740 (23.8%)	83 (33.2%)
	41–50 years	607 (19.5%)	51 (20.4%)
	51 years or older	358 (11.5%)	33 (13.2%)
Nationality[a]	Dutch		213 (85.2%)
	Western[b]		2 (0.8%)
	Other		35 (14.0%)
Country of birth	The Netherlands		178 (71.2%)
	Western countries[2]		4 (1.6%)
	Other		70 (27.2%)

[a]Data on nationality and country of birth were not available for all clients.
[b]Western nationality: Belgian and German. Western countries: Belgium, Germany, Italy, and Australia.

twice: The results shown in this paper are based on product-moment relations which are mainly defined for continuous variables. However, a second analysis was performed in which the type of correlations are used that are defined specifically for the measurement levels at hand: polychoric correlations between ordinal variables, polyserial correlations between ordinal and continuous variables, and Pearson correlations between continuous variables. This yielded identical results. One cause of the fact that identical results were found is that the scores on the categorical variables fitted quite well on a normal curve, yielding almost the same Pearson correlations as compared to the 'formally appropriate' correlations above. In fact, the correlation between the product-moment correlations used here and the 'formally appropriate' correlations was 0.952, showing that they are indeed virtually identical. Since we had 28 variables in the dataset (see Table 2) – based on the variables in the file study –, there are 28*27/2 = 348 partial

Table 2. Definitions of variables in the study.

Variable	Definition
Other country of origin	Client was born in the Netherlands/another Western country/a non-Western country
Childhood experiences	Client has predominantly positive/mixed/predominantly negative childhood experiences
Living situation	Client has permanent housing/temporary housing/no permanent residence
Homelessness	Client has never been homeless/was homeless for less than six months/was homeless for more than six months
Education level	Client only completed primary or special education/completed primary and secondary education/completed primary, secondary and professional education
Working experience	Client generally had a steady job or other structured daytime activities/alternately had work and no work/rarely had a job or other structured daytime activities
Current working situation	Client has a steady job or other structured daytime activities/alternately work and no work/no job or other structured daytime activities
Psychopathology	There are no indications of psychopathology/the probation officer has a suspicion of psychopathology/client is diagnosed with mental health problems
Behavioral problems	Client has behavioral problems (no/yes)
Intellectual disabilities	Client has intellectual disabilities (no/yes)
Substance abuse	Client is addicted to substances (no/yes)
Physical health problems	Client has physical health problems (no/yes)
Mental health care in childhood	Client had mental health care in adulthood (no/yes)
Mental health care in adulthood	Client had mental health care in adulthood (no/yes)
Main income source	Client has an own income/is for his income partly dependent on others/is for his income fully dependent on others, has illegal income of has no income
Net monthly income	Client has no income/an income of less than €500/€500–1.000/€1.000–1.500/an income of more than €1.500
Debt history	Client had debt earlier in life (no/yes)
Current debt	Client currently has debt (no/yes)
Debt level	The height of client's debt
Income as a criminogenic factor	Probation officer considers the income of the client not as a criminogenic factor/as a criminogenic factor/as a severe criminogenic factor
Financial problems caused by substance abuse	Client has financial problems caused by substance abuse (no/yes)
Budget limitations	Client has no budget limitations/has debt and is not able to pay off/has serious debt that limits client's income
Financial assistance	Client has no financial assistance/was registered with assistance but the assistance has not started or succeeded/has financial assistance
Special conditions on finances	Special conditions regarding finances are imposed (no/yes)
Financial goals	Client has a supervision goal on finances (no/yes)
Financial motivation for crime	The motivation for the committed crime was financial (no/yes)
Reason for crime	The reason for the crime was only financial/financial in combination with another type of crime/other than financial
Type of crime	The offense concerned property crime/property crime in combination with another type of crime/another type of crime than property crime

correlations among the variables, of which some relations are more meaningful than others. Therefore, we wanted to uncover the important relations and not be distracted by the unimportant ones. For this purpose, we used the LoGo Local/Global method to construct this pruned GGM. This simple and robust information filtering method creates a sparse matrix that shows the structure that best captures the relations between the variables (Barfuss et al., 2016). The GGM first determines all partial correlations, based on all relationships and values, and then 'regularizes' them. This means that the model, still based on all data and correlations, determines which correlations can be safely shrunk towards zero because they are weak. This principle of regularization is a common statistical method and is, for example, also often used in regression models. This can be seen as post-processing based on all data and relationships. Only the output changes, so that there is less distraction of the weaker relationships. The final result is a matrix with zeroes (or very low values) for the mathematically less important relations. A total of 58 important, non-zero partial correlations, controlling for the relations between all variables in the dataset, remained (see Table 3). The GGM was computed using the bootnet package in R (Epskamp et al., 2018a). We visualize the network in Figure 1 (using different shapes per life domain) and show the matrix with the final partial correlations in Table 3.

The qualitative analysis was conducted in order to gain more in-depth insight and obtain concrete illustrations from daily practice. The client files including the risk assessment data were analyzed using the software program for qualitative analysis Atlas.ti 8 and were initially coded using subcategories within the three domains of underlying risk factors described earlier. The coding was conducted in consultation with a steering committee of experts in the area of both debt and forensic work.

The quantitative and qualitative analyses were conducted independently from one another. Consequently, the findings from one analysis did not affect the findings or the approach in another analysis. After conducting both analyses separately, we found that the findings were very congruent and mutually supporting. Hence, below we will discuss and interpret the results of both analyses jointly.

Results

The results show how the different potential underlying risk factors in the relationship between debt and crime are related. These relationships are presented in Figure 1 and Table 3. In addition, the results describe in narrative form the role of different underlying factors in the relationship between debt and crime among probation clients, citing example statements from clients.

Debt and crime

Debt. The graphical model (see Figure 2 for the subgraph) demonstrates that debt is an important risk factor among probation clients. Debt is often related to budget limitations (0.24) due to an unstable source of income (−0.26) and an accompanying low net monthly income (−0.58) or due to substance use problems (0.13). These budget limitations are often connected to income as a criminogenic factor as the instability of one's income also makes crime more likely (0.66). When financial problems are associated with substance abuse, this thus further enhances the clients' limited budget and crime risk. An

Table 3. Relationships between risk factors among probation clients (N = 250).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(1) Mental health care in adulthood				0.1											
(2) Behavioral problems															
(3) Current debt							0.07			0.07	0.37			−0.05	
(4) Living situation	0.1							0.1		0.14					
(5) Current working situation													0.15	0.14	
(6) Debt level												0.17			
(7) Debt history			0.07								0.16				
(8) Education level				0.01											
(9) Financial assistance										0.04					
(10) Financial problems caused by substance abuse			0.07	0.14					0.04					0.39	
(11) Financial goals			0.37				0.16							0.05	
(12) Financial motivation for crime						0.17									
(13) Other country of origin					0.15									−0.02	
(14) Income as a criminogenic factor			−0.05	0.14						0.39	0.05		−0.02		0.42
(15) Main income source														0.42	
(16) Working experience				0.19	0.39			0.26			−0.01			−0.06	
(17) Budget limitations			0.24				0.11			−0.15	0.01			0.66	−0.26
(18) Intellectual disabilities								0.31							
(19) Net monthly income					−0.05								−0.06	−0,02	−0.58
(20) Reason for crime														0.02	
(21) Type of crime										0.01				0.03	
(22) Physical health problems		−0.03				0.09									
(23) Homelessness	0.09	−0.12		0.4				−0.01	0.08	0.15				0.05	
(24) Psychopathology	0.21			0.03											
(25) Special conditions on finances				0.09											
(26) Substance abuse														−0.05	0.08
(27) Childhood experiences				0.06		0.02			0.1	0.13		−0.05			
(28) Mental health care in childhood		0.17		0.02		−0.14						−0.02			

|	16	17	18	19	20	21	22	23	24	25	26	27	28
(1) Mental health care in adulthood								0.09	0.21				
(2) Behavioral problems							−0.03	−0.12					0.17
(3) Current debt		0.24											
(4) Living situation	0.19							0.4	0.03	0.08		0.06	0.02
(5) Current working situation	0.39			−0.05									
(6) Debt level							0.09					0.02	−0.14
(7) Debt history		0.11											
(8) Education level	0.26		0.31					−0.01					
(9) Financial assistance								0.08				0.1	
(10) Financial problems caused by substance abuse	−0.01	−0.15			0.29	0.01		0.15				0.13	
(11) Financial goals		0.01											
(12) Financial motivation for crime												−0.05	−0.02
(13) Other country of origin				−0.06									
(14) Income as a criminogenic factor	−0.06	−0.66		−0.02	0.02	0.03		0.05			−0.05		
(15) Main income source		−0.26		−0.58							0.08		
(16) Working experience		0.09		−0.13				0.03			0.13		
(17) Budget limitations	0.09			−0.07									
(18) Intellectual disabilities								0.08					
(19) Net monthly income	−0.13	−0.07											
(20) Reason for crime						0.12		0.02					
(21) Type of crime					0.12								
(22) Physical health problems								0.11				0.07	−0.29
(23) Homelessness	0.03		0.08		0.02		0.11		0.07			0.05	0.08
(24) Psychopathology								0.07		0.04			0.27
(25) Special conditions on finances									0.04				0.1
(26) Substance abuse		0.13											
(27) Childhood experiences							0.07	0.05					0.35
(28) Mental health care in childhood							−0.29	0.08	0.27	0.1			

DOES DEBT INCREASE RISK?
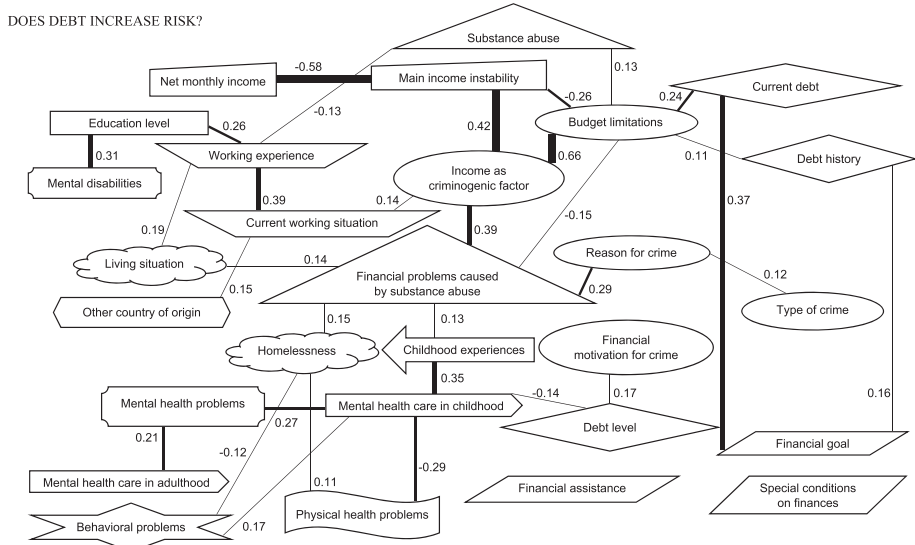
Figure 1. Network model risk factors based on a quantitative analysis of dossiers of a total of 250 probation clients (absolute partial correlation > 0.10).
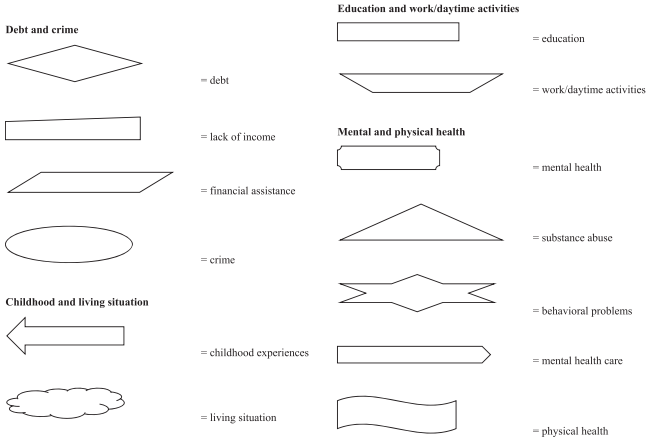
example from the qualitative analysis shows that substance abuse often causes limited income which increases crime risk:

> His substance abuse became so severe that he was no longer able to work. That is why he receives social assistance benefits. His substance abuse puts pressure on his finances, making him display criminal behavior and commit property crimes. His finances are an important criminogenic factor. (Male client, aged 56)

Another important cause of debt as shown by the qualitative analysis is poor financial management. Some clients got into debt as a result of incarceration:

> He did not complete his education. He got a job, but after he was dismissed, he was no longer motivated to work and showed criminal behavior. He committed property crimes to obtain money. As a consequence of his incarceration, he no longer received social assistance benefits.
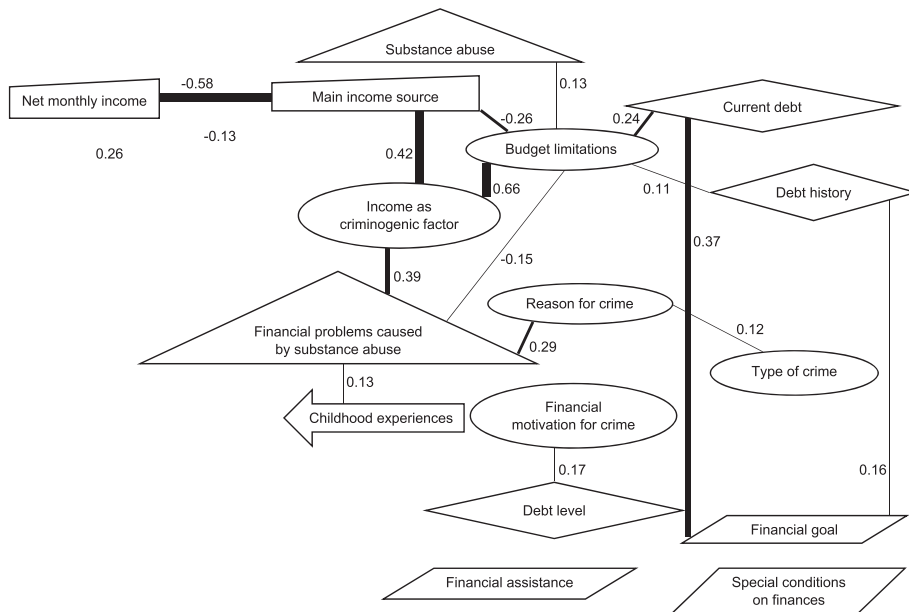
Figure 2. Part of GGM with regard to debt and crime.

> Moreover, he had to pay damages, and as a result he was demotivated, and his debt increased. This was the beginning of a vicious circle of debt and crime. (Male client, aged 46)

The qualitative analysis further shows that a lack of income may, in turn, have various negative consequences. As a result of a lack of income, clients may get into debt, and a considerable number of clients committed a crime to gain more income or pay off their debts. In addition, a substantial number of clients lost their home due to a lack of income.

With regard to assistance on finances, the graphical model demonstrates that for a considerable number of clients who have debt, a financial goal is formulated (0.37). However, having debt is not related to financial assistance or special conditions on finances, indicating that clients with debt not always are assisted with regard to these problems.

Crime. The graphical model (see Figure 2) shows that debt, often associated with limited income (0.24), may strongly increase crime risk and is related to (debt-related) crime (0.66), often strengthened by substance use problems as a risk-increasing factor (0.39) – sometimes strengthened by negative childhood experiences (0.13). This is illustrated by the quote from the qualitative analyses below:

> In secondary school, he dropped a school level due to truancy and behavioral problems. He did not get his diploma, and after he finished his education, he often was unemployed. His social assistance benefits were reclaimed because he gained other income and his financial situation was bad. He committed property crimes for financial gain and the perspective of committing crimes gave him a feeling of pleasant excitement. The financial problems did cause excessive stress. He was afraid of losing his house. (Male client, aged 40)

The qualitative analysis also illustrates how incarceration due to crime may, in turn, be connected to losing a job, not being able to get a job, or being forced to stop one's own business. People may also be unable to complete their education as a result of

incarceration. Furthermore, incarceration may be related to debt due to a lack of income, for example because clients do not receive social assistance benefits during incarceration, due to (high) criminal fines, or because debt settlement is hampered by incarceration. In some cases, a crime even results in losing housing and thus in homelessness:

> He does not have a job and is addicted to hard drugs. As a result, he lacks income, got into debt, and cannot pay for his basic needs. This means he now gets money by committing property crimes to pay for his substance abuse. Moreover, due to his incarceration, he no longer receives social assistance benefits. Consequently, he cannot pay off his debt and is not able to get a rental house. (Male client, aged 46)

Potential underlying risk factors

Both the graphical model and the qualitative analysis show that different potential underlying risk factors are highly interwoven and strongly influence the relationship between debt and crime. A quote from the qualitative analysis illustrates that, for example, not having a job and lacking income as a result of not having a job (possibly due to limited education), substance abuse, and behavioral, mental or physical health problems may result in debt:

> He does not have a job, and as a result of that, he earns money through theft. He uses hard drugs, and his expenses are too high, as a result of which he persistently does not have enough money to pay for the necessities of life. His financial situation is worrisome. He has debts, he cannot find a job, and his social assistance benefits have been stopped due to incarceration and after incarceration he did not receive social assistance benefits because he did not attend appointments. Therefore, he cannot pay off his debt and get a rental house. (Male client, aged 49)

Childhood and living situation

Childhood. The graphical model (see Figure 3 for the subgraph) shows that negative childhood experiences are often related to mental health care in childhood (0.35),
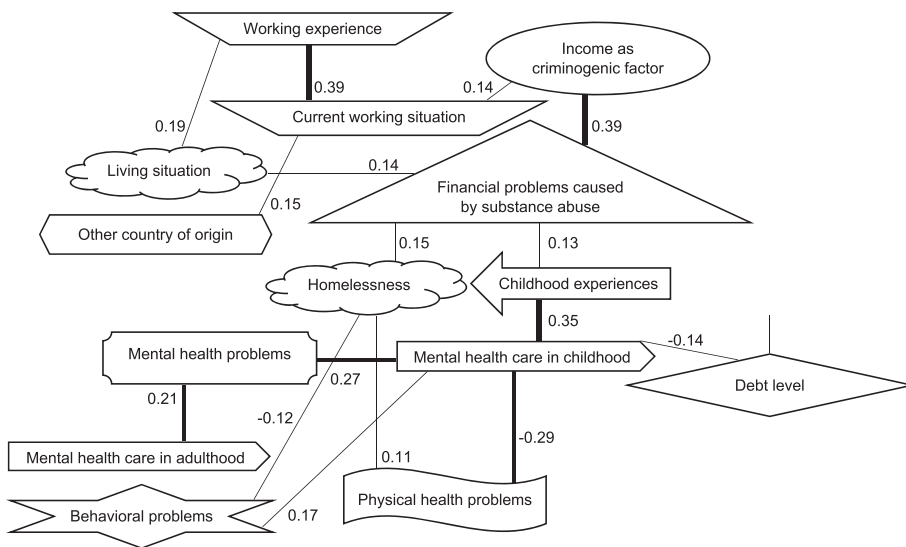

Figure 3. Part of GGM with regard to childhood and living situation.

indicating that children with negative childhood experiences often develop mental health problems (0.27) and behavioral problems (0.17), and thus need mental health care in adulthood (0.21). The qualitative analysis demonstrate how negative childhood experiences are related to the development of mental health problems and substance abuse and may cause that children, for example, do not finish their education:

> Her father was addicted to alcohol, abused her, and had an extramarital relationship. After her parents divorced, she ended up on the street in her teens, became addicted to drugs, and was forced by a boyfriend to work as a prostitute. She did not finish secondary education and never had legal work. (Female client, aged 27)

Living situation. The graphical model (see Figure 3) shows that an unstable living situation is often related to relatively little working experience (0.19), sometimes due to coming from another country of origin (0.15). In accordance, the qualitative analysis shows that clients may experience problems due to acculturation or language barriers (as a consequence of migration), related to problems regarding participation in society and obtaining legal income. Financial problems caused by substance abuse are also often related to an unstable living situation (0.14) and homelessness (0.15), sometimes associated with behavioral problems (−0.12) and physical health problems (0.11). For addicted clients, financial problems are thus often associated with homelessness. The qualitative analysis illustrates how an unstable living situation, for example due to a lack of income as a result of losing a job, may be related directly or indirectly to debt and crime:

> He got into debt because he lost his job while owning his own home. As a result, he was no longer able to make his mortgage payments. Therefore, he started to commit property crimes in order to pay off his debt. (Male client, aged 31)

Education and work/daytime activities

Education. The graphical model (see Figure 4 for the subgraph) demonstrates that education is an important underlying factor in the relationship between debt and crime. This
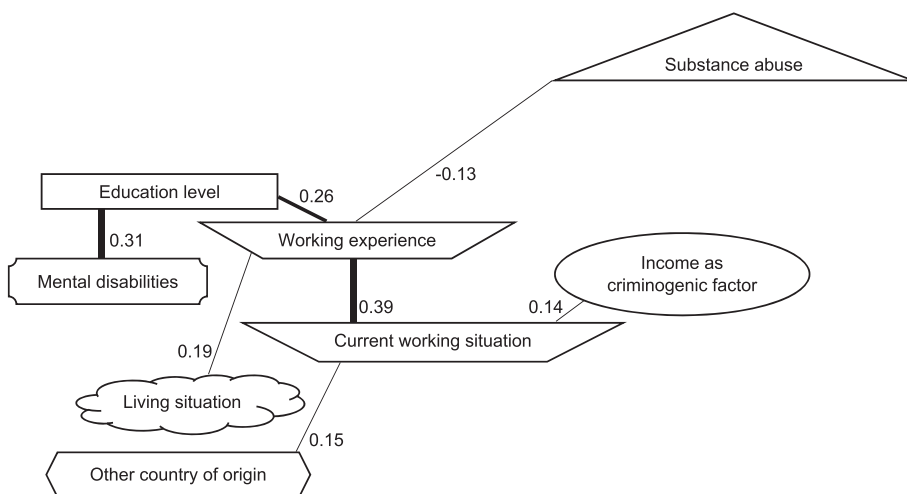

Figure 4. Part of GGM with regard to education and work/daytime activities.

lack of education is often due to intellectual disabilities (0.31) and often related to a lack of income due to limited working experience (0.26) – often strengthened by substance abuse (−0.13) – and a lower chance on a stable job (0.39), sometimes as a result of coming from another country to the Netherlands (0.15). This was also illustrated in the following quote:

> He has no school diploma. Truancy and frequent youth incarceration hampered consistent school attendance. In his third year, he left school for good. (Male client, aged 28)

Having limited or incomplete education may, in turn, have different consequences. The qualitative analysis shows that some clients started behaving criminally as a result of being away from home and school, a lack of daily structure and having criminal friends, which often stimulates a focus on financial gain:

> He attended four different primary schools. In secondary school, behavioral problems played a role. He skipped school because of debts at home, was impressed by the money the boys he met on the street gained from criminal activities, and also wanted that. He used the money he gained through criminal activities to buy expensive designer clothes and go to theme parks because his parents did not have money for luxuries. He dropped a school level, was held back a year, and was incarcerated. Before incarceration, he failed his exams and never returned to school after that. He had several jobs for a short time but was dismissed multiple times because of conflicts with his boss or colleagues. These dismissals resulted in a lack of income, as a result of which he continued committing property crimes. (Male client, aged 20)

> He had special education because he did not speak Dutch well. During secondary school it went downhill. He was involved in school fights, had friends who committed crimes, smoked joints, and left school due to frequent contact with the police. He did some temporary work, but was unable to keep his job. At the moment, he does not have a job. (Male client, aged 26)

Work/daytime activities. According to the graphical model (see Figure 4), limited working experience (0.26) and not having a stable job (0.39) – often strengthened by coming from another country of origin (0.15) – are often related to limited or incomplete education. Limited working experience is related to substance abuse on the one hand (−0.13), indicating that less working experience may be connected to a higher level of substance abuse and that a higher level of substance abuse may, in turn, be related to a lower level of working experience. On the other hand, limited working experience is related to an unstable living situation (0.19), indicating that people who have limited working experience may also have an unstable living situation. In addition, an unstable working situation may be related to income as a criminogenic factor (0.14), indicating that for people who have an unstable working experience income may be related to crime. An illustration of this:

He did not experience problems during primary school. After he came to the Netherlands, he had different jobs. As a result of a severe injury, he received disability benefits. Afterwards, he went abroad without his employer's permission, as a result of which he was dismissed. He had his own business and worked irregularly for his brother's employer. In recent years, he has not had any work; his alcohol abuse has increased, and his mental health problems have hampered him in finding other daytime activities. He receives social
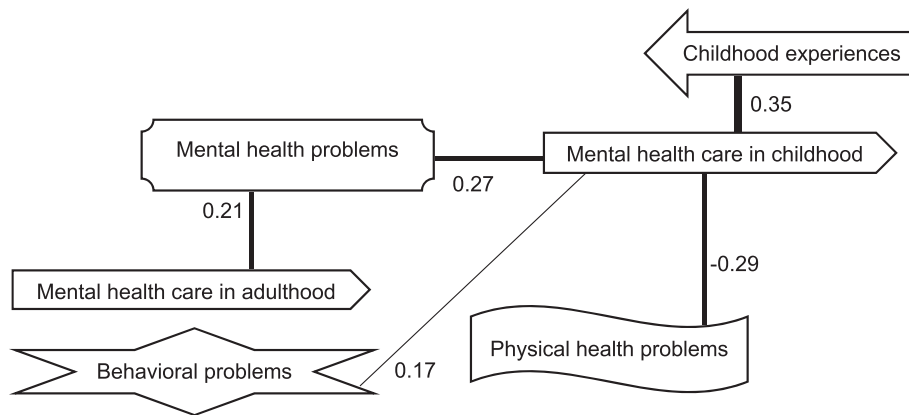
Figure 5. Part of GGM with regard to mental and physical health.

assistance benefits, and sometimes his brothers give him some money, but his income is insufficient to pay for his alcohol and cocaine addiction. He frequently commits property crimes and spends all his money on drugs. As a result of this, he does not save enough money to pay for his basic needs and goes to the food bank. Debt triggers stress and more substance abuse, as a result of which his debt increases. He is under protective guardianship. (Male client, aged 39)

Mental and physical health problems can also prevent people from working and be connected to losing a job:

> He lost his job because his contract was not extended. After this, he no longer worked because of the stress he experienced due to his debt. His alcohol addiction also triggered his depression. (Male client, aged 46)

An example of how incarceration as a consequence of crime can be related to losing a job or prevent from finding a job afterward:

> He had a permanent contract but lost his job due to incarceration and committed property crimes. (Male client, aged 22)

Mental and physical health. The graphical model (see Figure 5 for the subgraph) indicates that behavioral, mental, and physical problems are important factors in the relationship between debt and crime. Mental health problems are often related to mental health care in childhood (0.27) and adulthood (0.21), indicating that a number of clients with mental health problems have had mental health care in childhood or adulthood. Behavioral problems are also related to mental health care in childhood (0.17), demonstrating that children with behavioral problems, possibly related to mental health problems, often receive mental health care. Mental health care in childhood is also related to negative childhood experiences (0.35), indicating that children with negative childhood experiences – possibly related to behavioral and mental health problems – frequently received assistance. The graphical model shows that health care is also related to physical health problems (−0.29). The qualitative analysis illustrates that some clients most likely developed mental problems as a result of instabilities in childhood. Other clients developed mental problems after immigration

to the Netherlands. Examples from the qualitative analysis illustrate that mental and physical health problems may, in turn, have various consequences. Some clients were unable to complete their education due to mental or physical health problems, which may also affect their chances of finding a job and, thus, on their financial situation:

> He had special education [a specific form of primary education for children with special educational needs]. He often had to undergo surgery due to inflammation of his skull, which hindered his school time. He has also suffered from depression from an early age. At the age of 14, he left school. Due to mental problems, including a psychosis, he was unable to proceed in further education. He worked for four years and has been unemployed ever since. (Male client, aged 36)

Other clients lost their job as a result of mental or physical health problems:

> She started working at the age of 16. As a result of diabetes, she is no longer able to work anymore and receives disability benefits. She commits property crimes, apparently not principally motivated by financial gain but because she does not know what she is doing due to low sugar. (Female client, aged 48)

Behavioral and mental health problems may thus also go hand in hand with a lack of income:

> He is in debt because he received too much allowance from the tax authorities. Smoking is a major expense given his limited income. His lack of income combined with his impulsivity, verbal weakness, influenceability, PDD-NOS, and lack of insight into the consequences of behavior results in crime. He tends to commit property crimes as a solution to his debts. (Male client, aged 29)

> He attended different secondary schools but was frequently held back in school, and finally, he left school. Afterwards, he had a job, and during this time, he had significantly less contact with justice, but he was dismissed because of a conflict and also lost his house. He has an addiction and focuses on the immediate satisfaction of his needs. He threatens his parents due to his problematic financial situation, forces them to give him money, and spends his money on alcohol and drugs. His financial management is poor, and he does not have insight into his financial situation. (Male client, aged 37)

Conclusion and discussion

Theory and practice show that debt and crime are highly interrelated and that underlying potential risk factors likely mediate this relationship. However, insight into the interaction between these possible risk factors and how they affect the relationship between debt and crime is limited. Therefore, this study aimed at exploring the specific interactions between underlying risk factors in the relationship between debt and crime using descriptions of probation officers in client files. It was found that debt is not only a direct crime risk factor, but debt and crime also appear to be highly interrelated by a complex interplay of underlying risk factors, such as problems with respect to education, work and income, and mental and physical health.

Results show that a substantial number of clients did not complete their education or only had limited education, which is an important risk factor for both a lack of income and crime. This lack of education is directly related to the development of debts and focus on financial gain, but is also indirectly connected because it decreases the probability that

people find a job and gain income (which is also an important risk factor for both debt and crime). This finding underlines the potential protective role of education and work in preventing crime (see also de Vries Robbé, 2014). Factors such as behavioral problems, mental and physical health problems, and substance abuse – sometimes related to negative childhood experiences – may also considerably influence the ability to finish education and find work, thereby increasing the likelihood of criminal behavior (Bonta & Andrews, 2017).

Strengths and limitations. The present study has both strengths and limitations. The first strength of this study is that it is based on a unique database of a relatively large representative sample of clients of all three Dutch probation organizations. A second strength of the present study is the combination of quantitative and qualitative methods. The graphical model provides a clear overview of the main relationships between the important underlying factors in the relationship between debt and crime, while the qualitative data provides concrete examples helping to interpret these relationships. One could argue that the Gaussian Graphical Model uncovers objective relationships between variables and is able to correct the effect of A on B for the effects that other variables have on A and/or B. At the same time, the quantitative model requires qualitative interpretation by the researcher to 'come to life' and to enhance our understanding of the nuance behind the numbers. Conversely, qualitative analyses can sometimes overinterpret effects between variables that, statistically, are only weak. GGM is especially useful for exploration, to uncover structures and coherence in a complex multiplicity of relationships, removing the effects of other variables (such as confounders or mediators). Because of its regularization approach, it 'separates the wheat from the chaff' by shrinking mathematically less important relations towards zero, assisting the researcher's focus on relations that do matter in the dataset. Therefore, the method is especially suitable for our research, because the relationship between debt and crime is very complex. Even with a structured text analysis it is difficult to make sense of the web of relationships. Therefore, we decided to combine both approaches. The strength of the GGM is that it separates correlations objectively and filters the effects of confounders and mediators – if present in the dataset –, so that real relationships remain. The limitation of the GGM is that it is a mathematical method that captures nuances only to a limited extent and only reports (shrunken) correlations; the researcher still has to interpret and make sense of them. The strength of qualitative text analysis is that the researcher can use field data and look at the data into detail and build on field expertise and existing literature. The GGM is able to show that possible correlations disappear when controlling for other variables and can highlight correlations that do not emerge in the qualitative research because they are outside of the qualitative scope. The GGM in itself is thus not sufficient to analyze a complex problem, nor is the qualitative text analysis in itself. Therefore, we combine the strengths of both approaches as the two methods are highly complementary. We believe that the combination of the Gaussian Graphical Model and the qualitative analysis of the client files provides the best of both worlds, combining rigor, interpretation, and depth. In addition, our findings are consolidated by the fact that the quantitative and qualitative analyses yielded corresponding results, while having been performed independently of one another. Whereas any analysis is likely to suffer from some sort of researcher bias, the fact that two quite different research

approaches yielded highly congruent results lends credence to the robustness of our conclusions from this dataset.

The present study also has several characteristics which have to be taken into account when drawing conclusions. First, the results are based on data from client files including risk assessment data as coded by probation officers. Therefore, this information may be incomplete or subjective because it only contains information that probation officers noted as relevant. In addition, a significant amount of the information in the client files is based on what clients and other referents, such as family members and other professionals, told probation officers and might therefore be biased. Furthermore, probation officers may have received more relevant information and implemented more interventions than they officially registered in the client files. Still, the information in the client files is based on multiple sources, both formal and informal, and probation officers usually verify the information about clients by consulting other sources as much as possible. This verification of information is an official part of the work of probation officers and an official working method within probation organizations. In addition, probation officers in the Netherlands are highly educated and trained to identify problems and assess risks. Therefore, although the data source may not be entirely complete and objective, this study still offers rich and unique quantitative and qualitative insights into the factors that play a role in the interaction between debt and crime.

Second, the sample consists of a select group of clients from one country only (the Netherlands), which may limit the generalizability of the results because criminal justice and debt systems differ per country. However, international comparisons show that although systems differ per country, risk factors and thus characteristics of offenders are comparatively universal. Therefore, based on theory, the risk factors and their interrelationships likely do not differ much across countries (e.g. Mann et al., 2010). Replication of this study in other countries is recommended to be able to generalize results to other countries. Still, the findings provide a first systematic insight into the interaction between different risk factors and how they mediate the relationship between debt and crime because the client files contain information from both structured and standardized instruments and the professional judgment of highly trained probation officers. Although women represent a minority in the sample of this study, the distribution over gender in the sample equaled the distribution of the total population of probation clients whose supervision case completed in 2015. It was not possible to study gender differences due to the small sample size of women, but we recommend future research to examine gender differences with respect to the relation between debt and crime. The model presented in the study is based on data taken from the daily practice of probation work. Future research is highly recommended to test this model, for example, using longitudinal studies into causality.

Implications. The findings show that for many probation clients, debt problems are an intrinsic factor related to criminal behavior and to problems in many other life domains, such as education, work and income, and mental and physical health. These findings indicate that implementing an adequate approach toward debt problems at the client level requires a thorough analysis of the relationship between debt problems and problems in other life domains and a combination of appropriate interventions regarding the combination of problems. Although probation focuses on preventing relapse and stimulating resocialization, probation officers must not treat the different domains as individual,

separate risk factors but view them as a complex interplay of risk factors (Durnescu, 2012). Therefore, debt should be an essential factor in risk assessment instruments, as was also concluded by Logan (2014), stating that risk formulation is necessary for an integrated risk assessment, which is the understanding of underlying mechanisms of offending behavior.

In supervision, it is necessary for probation officers to pay more attention to prominent risk factors such as lack of education, work and income, and mental and physical health problems, and to provide support for clients in these domains to decrease the risk of recidivism. In many cases, solutions to underlying problems may form an essential basis for solving debt problems. The results of this study specifically underline the potentially protective role of education and work. Interventions focusing on education and work could thus be important instruments in the supervision of clients with financial problems. However, direct interventions focusing on debt, such as offering budget training to clients – such as the budget training that was formerly offered to probation clients –, may also be necessary, both at the individual level and at national levels.

Furthermore, to adequately support clients, probation officers should have sufficient knowledge and skills to supervise clients regarding debt. In addition, they should be trained and facilitated by probation services to adequately help clients with financial problems. Designating specific professionals within a team as collaborating specialists in specific subject areas such as debt counseling may also be helpful. However, probation officers are not fully responsible for the supervision of clients with regard to finances on their own. They have limited time to supervise clients and have to supervise them in several different life domains. They are thus supposed to have knowledge about different domains, and as a result their knowledge of one specific subject area may be limited, and they cannot address all the problems themselves. Therefore, they have to collaborate with other professionals who are specialists, such as debt counselors. Although collaboration can be complicated and requires careful coordination, information sharing, and customization between professionals and organizations, this is especially vital to improve continuity of care (de Vogel & Clercx, 2019). Better cooperation and information transfer between probation services and other organizations such as debt counseling agencies may reduce relapse as clients can be supervised more adequately. More generally, continuous registration and monitoring of the clients' financial situation in collaboration with other professionals may be a vital debt supervision instrument for professionals and help them to collaborate with other professionals in supervision of clients with regard to debt.

Future research. The results of this study show that debt is not only a direct risk factor of crime, but debt and crime are also highly interrelated by a complex interplay of different risk factors, such as education, work and income, and mental and physical health. However, more empirical, quantitative, and longitudinal insights are needed to fully understand the complicated relationship between debt and crime and the underlying influence of other risk factors on this relationship. For example, a study into debt as a predictive factor for recidivism would be of added value. Conducting more mixed methods research can be particularly helpful as it combines quantitative and qualitative analyses and in that way helps to gain deeper understanding of the relationship between debt and crime. In addition, more insights are needed into the influence of debt problems on the daily practice of probation supervision and into what

probation officers need to more adequately support clients with debt problems during supervision to decrease the risk of recidivism. It might be insightful to gain deeper insight into the considerations of probation officers when supervising clients with debt and the choices they make, for example, regarding lack of knowledge and skills, taboo on finances and debt, and possible fear of violating human rights by being more controlling than the courts have dictated. As the present study is conducted among a group of proven and convicted offenders, more specific insight in the interaction between risk factors among non-forensic samples in various countries is recommended.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Gercoline van Beek, upon reasonable request.

Declaration of conflicting interests

The authors declare that they have no relevant or material financial interests relating to the research described in this paper.

Ethical approval

The study design, the data collection method, and the data analysis and storage were approved by the ethics committee of the Research Centre for Social Innovation of Utrecht University of Applied Sciences. The authors also declare that they honor the International Standards for Authors of the Committee on Publication Ethics.

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