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Neighbourhood disorder, crime and the Broken Windows Theory

An examination into the relationship between neighbourhood disorder and crime in the city districts of Rotterdam

Thijs Meinen
UNIVERSITEIT TWENTE

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Author

Name:	T.Meinen
Student number:	1388894
Location:	University of Twente, Enschede
Faculty:	Faculty of Management and Governance
Master:	Public Administration
Specialization:	Public Safety
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Supervisors

First supervisor:	Dr. Guus Meershoek
Second supervisor:	Dr. Jörgen Svensson

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Preface

The report that lies in front of you is my master thesis. This research is the final product of the master Public Administration. When I earned my bachelor degree in Applied Safety and Security Studies at the Saxion University in Enschede in 2012, I decided to continue studying. The choice fell upon the study Public Administration at the University of Twente. Roughly two and a quarter of a year later, is this the final result. The specialization of my master program is Public Safety and this research is therefore related to this topic. This final research concludes a period as a student for me and starts a new period as a master of science in the Public Administration.

This report is about the relationship between neighbourhood disorder and crime in the city districts of Rotterdam during the period 2006-2011. Main inspiration for this research is the Broken Windows Theory of Wilson and Kelling (1982) about how minor forms of public disorder (e.g. broken windows) could lead to severe crime and a downward spiral of urban decay. The focus of this research is on the mutual relationships of the variables of the Broken Windows Theory, especially on the relationship between neighbourhood disorder and crime, in the city districts of Rotterdam during this period.

This research has been performed internally at the University of Twente. A special thanks goes to Guus Meershoek and Jörgen Svensson for supervising this project and for the useful feedback and tips during this research. I also want to thank Arianne Need for the help she provided in setting up this research. I would like to thank Suzanne van den Berge for helping me collect the data that was required for carrying out this research. Last but not least, I want to thank my family for supporting me during this period. A special thanks goes out to Bart Meinen, Jurgen Meinen, Jan Hendriks, Daan Jan Hendriks and Marion Hendriks for providing feedback and checking my work in the completion of this research.

Enschede, december 1st, 2014

Thijs Meinen

Summary

During the years 2002 - 2005 many changes were made regarding safety in the city of Rotterdam. The most important events during these years comprised the municipal elections of Rotterdam in 2002. Leefbaar Rotterdam won the majority of seats in these elections, the party formed a coalition with the Christian Democrats (CDA) and the Liberal Party (VVD), together creating 'The new Elan of Rotterdam'. Safety was given the highest priority in the coalition agreement; specific targets were formulated and special funds were made available in order to guarantee this priority.

The new approach to safety seemed to work, because the ratings of the Safety Index grew from 5.6 in 2002 to 6.9 in 2005, reflecting the current state of affairs of safety in Rotterdam.
The changes that were made and the attention that was given to safety improved the safety in the city, but room for improvement remains. Rotterdam citizens gave ratings to livability and feelings of safety in the neighbourhood that were below the average in the Netherlands during recent years (Centraal Bureau voor de Statistiek, 2013b, 2014). Major problems according to the citizens of Rotterdam still remain crime, social unsafety, drug nuisance, pollution and management of the public space (COS, 2013). Deterioration is also seen as a problem among the citizens of Rotterdam. Key aspects of the safety policy since 2002 aimed to make Rotterdam cleaner and keep it more undamaged. More undamaged means for instance, less broken or damaged bus stops or broken street furniture.

To examine the effect of this kind of policy on crime, this research examines the physical and social decay of a neighbourhood and the impact of neighbourhood disorder on crime in different districts of Rotterdam. The following research questions are examined with this research:

- *To what extent did neighbourhood disorder change in the districts of Rotterdam in the period of 2006-2011 and*
- *Does neighbourhood disorder explain crime changes?*

The starting point for examining above relationship is the Broken Windows Theory (Wilson & Kelling, 1982). This Theory consists of four important variables: disorder, fear of crime, social control and crime. Hypotheses are formulated to test the relationships between these four variables, suggesting a positive relationship between the variables, except for social control, as the relationship between social control and the other variables is expected to be negative.

The basic structure of this research is a cross-sectional design. Univariate analyses are used to illustrate the development of neighbourhood disorder and crime. Bivariate analyses are used to test the correlation between the variables of the Broken Windows Theory, which includes the relationship between neighbourhood disorder and crime. The dependent variable crime is divided into four crime types:

- Theft and burglary crimes;
- Destruction or material damage against the public law and order;
- Violence and sex crimes;
- Drugs and alcohol offenses.

The results of the univariate analyses of crime and disorder are as follows: the overall crime rates declined with 10,1 percent in Rotterdam in the period of 2006-2011, there were some fluctuations however. Theft and burglary were the most reported types of crime, whereas violence and sex crimes

were the most declining types of crime. The second most declining types of crime were destruction and damage against public law and order followed by theft and burglary crimes. Drugs and alcohol offenses were more reported in this period.

The perceived disorder fluctuated in the districts of Rotterdam in the period 2006-2011. However, disorder was more perceived in 2011 than in 2006, meaning disorder has increased in this period. The highest point of perceived disorder was observed in 2008. The four districts with the most perceived disorder were Charlois, Delfshaven, Feijenoord and Stadscentrum. Disorder is more perceived to be a neighbourhood problem in almost all the districts. The district with the biggest increase of disorder was Hoek van Holland. The average increase of disorder in the period 2006-2011 was 17,1%.

The bivariate analyses demonstrated that the variables of the Broken Windows Theory are mutually correlated, confirming almost all hypotheses. Social control was not correlated with theft and burglary crimes, nor with destruction or material damage against the public law and order crimes. The fact that the variables of the Broken Windows Theory are correlated indicates that neighbourhood disorder and crime are also correlated. Drugs and alcohol offenses showed to have a strong correlation with disorder. Violence and sex crimes as well as theft and burglary crimes showed to have a moderate correlation with disorder. Destruction or damage against the public law and order had a weak correlation with disorder, whereas disorder and fear of crime showed to be the most correlated with crime. Disorder was even correlated with crime after correcting for fear of crime for? Violence and sex crimes, and drugs and alcohol offenses. To what extent neighbourhood disorder can explain crime cannot be discussed in terms of causation due to the cross-sectional design, but out of the variables of the Broken Windows Theory disorder was the best predictor for crime. The correlations between the variables of the Broken Windows Theory imply that the theory can explain the relationship between neighbourhood disorder and crime. The variables of the Broken Windows Theory are closely connected to each other, the analyses also demonstrated that disorder is moderately correlated with social control and strongly correlated with fear of crime.

The contribution of this research to the field of neighbourhood safety is confirmation of the mutual relationships between the variables associated with the Broken Windows Theory. The results found in this study are consistent with the majority of earlier conducted studies regarding this topic. The confirmation of the mutual relationships of the Broken Windows Theory and the significant positive relationship of neighbourhood disorder with crime after correction for fear of crime makes it plausible, also in Rotterdam, that neighbourhood disorder leads to crime and a downward spiral of urban decay (Wilson & Kelling, 1982).

Samenvatting

In de periode van 2002 tot en met 2005 is er veel veranderd betreffende veiligheid in Rotterdam. Een belangrijke gebeurtenis was de gemeenteraadsverkiezing van 2002 in Rotterdam. Bij deze verkiezingen won Leefbaar Rotterdam verrassend de meeste zetels en zij vormden een coalitie met het CDA en de VVD. Dit rolde uit in het coalitieakkoord 'een nieuw eland voor Rotterdam'. In dit coalitieakkoord werd aan veiligheid de hoogste prioriteit gesteld in het beleid van de gemeente. Daarnaast werden er veel doelen geformuleerd en werd er geld vrijgemaakt om een veiligere stad te maken van Rotterdam.

De nieuwe veiligheidsaanpak sloeg aan en dit was terug te zien aan de cijfers van de veiligheidsindex. Het cijfer van de veiligheidsindex steeg van een 5.6 in 2002 naar een 6.9 in 2005. Deze index beschrijft de huidige veiligheidssituatie in Rotterdam en geeft daaraan een cijfer. Alhoewel de veranderingen en de toegenomen aandacht voor veiligheid, de veiligheid in de stad verbeterde, is er nog steeds ruimte voor verbetering. De laatste jaren beoordelen de burgers van Rotterdam de leefbaarheid en de veiligheidsbeleving lager dan het gemiddelde in Nederland (Centraal Bureau voor de Statistiek, 2013b, 2014). De grootste problemen in de stad volgens de burgers is nog steeds criminaliteit, sociale onveiligheid en drugsoverlast, en vervuiling van de openbare ruimte en het beheer van de openbare ruimte (COS, 2013). Ook verloedering en verpaupering van wijken wordt nog steeds als een probleem gezien onder de burgers van Rotterdam. Terwijl een van de sleutel aspecten van het veiligheidsbeleid sinds 2002 was dat Rotterdam schoner en heler moet zijn.

Om te onderzoeken of dit soort beleid effect heeft op criminaliteit, wordt er in dit onderzoek onderzocht of de sociale en fysieke verval van een wijk invloed heeft op criminaliteit. Dit betekent dat de impact van wanorde op criminaliteit wordt onderzocht in de deelgemeenten van Rotterdam. De volgende vraag stond centraal in dit onderzoek:

In welke mate veranderde de wanorde in de deelgemeenten van Rotterdam in de periode van 2006-2011 en verklaart wanorde veranderingen in criminaliteit?

Het startpunt van het onderzoeken van de relatie tussen wanorde en criminaliteit is de Broken Windows Theory. Deze theorie gaat over hoe kleine vormen van publieke wanorde (bijv. kapotte ramen) kunnen leiden tot ernstige criminaliteit en een neerwaartse spiraal van stedelijk verval. De theorie bestaat uit vier variabelen: wanorde, onveiligheidsgevoel, sociale controle en criminaliteit. Om de relaties tussen deze variabelen te meten zijn er hypotheses opgesteld. Deze hypotheses verwachten een positieve relatie tussen de variabelen, behalve tussen sociale controle. Tussen sociale controle en de andere variabelen wordt een negatieve relatie verwacht. De verwachting is dat de variabelen van de Broken Windows Theory onderling correleren.

De onderzoeksopzet is een cross sectioneel ontwerp. Univariate analyses zijn gebruikt om de ontwikkeling van wanorde en criminaliteit in de deelgemeenten van Rotterdam tussen 2006 en 2011 weer te geven. Bivariate analyses zijn gebruikt om de correlatie testen tussen de variabelen van de Broken Windows Theory. Door deze test wordt ook de relatie tussen wanorde en criminaliteit getest. De afhankelijke variabele criminaliteit is verdeeld in vier criminaliteitssoorten: vermogensdelicten, vernielingen en misdrijven tegen openbare orde en gezag, gewelds- en seksuele misdrijven, en drugs en alcoholovertredingen.

De volgende resultaten zijn gevonden met de univariate analyses. De criminaliteitscijfers zijn gedaald met 10,1 procent in Rotterdam in de periode 2006-2011. Echter schommelde de ontwikkeling van criminaliteit in deze periode. Van de soorten criminaliteit zijn vermogensdelicten het meeste gemeld en had gewelds- en seksuele misdrijven de sterkste daling. De soort criminaliteit dat had de een na sterkste daling is vernielingen en misdrijven tegen openbare orde en gezag gevolgd door vermogensdelicten en drugs- en alcoholovertredingen. De criminaliteitssoort met de meest consistente daling is vernielingen en misdrijven tegen openbare orde en gezag gevolgd door vermogensdelicten, gewelds- en seksuele misdrijven, en drugs- en alcohol overtredingen zijn zelfs toegenomen.

De waargenomen wanorde in de deelgemeenten van Rotterdam schommelde in de periode van 2006 tot en met 2011. Echter is wanorde meer waargenomen in 2011 dan in 2006. Dit betekent dat de disorder is gestegen in deze periode. In 2008 is wanorde het meeste waargenomen. De vier deelgemeenten met de meeste waargenomen wanorde zijn Charlois, Delfshaven, Feijenoord en Stadscentrum. Wanorde is elke deelgemeente meer waargenomen als een buurtprobleem. De deelgemeente waarin wanorde het sterkst is gestegen is Hoek van Holland. De gemiddelde stijging van wanorde bedraagt 17,1 procent in de deelgemeenten van Rotterdam in deze periode.

De bivariate analyses demonstreerden dat de variabelen van de Broken Windows Theory onderling zijn gecorreleerd. Daardoor zijn bijna alle hypotheses volledig bevestigt. Sociale controle correleerde niet met vermogensdelicten en vernielingen en misdrijven tegen openbare orde en gezag. Dat de variabelen van de Broken Windows Theory onderling correleren, betekent dat wanorde en criminaliteit ook correleren. Drugs- en alcoholovertredingen toonde aan een sterke correlatie te hebben met wanorde. Vermogensdelicten en gewelds- en seksuele misdrijven toonden aan een matige correlatie te hebben met wanorde. Vernielingen en misdrijven tegen openbare orde en gezag had een zwakke correlatie met wanorde. Wanorde en onveiligheidsgevoel correleerden het sterkst met criminaliteit. Wanorde correleerde zelfs met drugs- en alcoholovertredingen en gewelds- en seksuele misdrijven na het controleren op onveiligheidsgevoel. De mate waarin wanorde verklaart criminaliteit kan niet worden besproken in termen van causaliteit door het cross sectionele ontwerp van dit onderzoek. Desalniettemin bleek wanorde van de variabelen van de Broken Windows Theory de beste voorspeller van criminaliteit. De gevonden correlaties tussen de variabelen van de Broken Windows Theory impliceren dat de Broken Windows Theory de relatie tussen criminaliteit en wanorde zou kunnen verklaren. Deze variabelen zijn nauw verbonden. De analyses demonstreerden ook dat wanorde een matige correlatie heeft met social control en een sterke correlatie met onveiligheidsgevoel.

De bijdrage van dit onderzoek aan het veld van wijkveiligheid is de bevestiging van de onderlinge relaties tussen de variabelen die worden geassocieerd met de Broken Windows Theory. De gevonden resultaten zijn consistent met de meerderheid van de eerder uitgevoerde onderzoeken betreffende dit onderwerp. De bevestiging van de onderlinge relaties van de variabelen van de Broken Windows Theory en de significante positieve relatie tussen wanorde en criminaliteit na het controleren op onveiligheidsgevoel, maken het aanneembaar dat, ook in Rotterdam, wanorde leidt tot criminaliteit en een neerwaartse spiraal van stedelijk verval (Wilson & Kelling, 1982).

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1. Introduction

This chapter describes the design of the research leading to this master thesis. First, the background of this research will be explained in paragraph 1.1. Subsequently, the aim of this research will be discussed in paragraph 1.2. Based on the research aim a central research question with several sub-questions has been formulated as described in paragraph 1.3. Finally, the outline of this report will be discussed in paragraph 1.4.

1.1 Background

Since the municipal elections of 2002, a lot has changed in the Dutch city of Rotterdam regarding safety. The previous Board of Mayor and Alderman gave safety the status of a program. This meant that six themes regarding safety were elaborated in a project book, which led to approximately thirty projects. The control of these projects was in the hands of the Steering Committee Safety, which was chaired by the Mayor. The main target was to improve the grade of safety from a six to a seven on a ten-point scale. In 2002 the safety index was introduced in Rotterdam. This index describes the current state of affairs of safety in Rotterdam and gives a score to the safety in Rotterdam. According to Mayor Opstelten, this target was barely operationalized (Tops, 2007). The used approach was not successful and resulted only in a displacement of the problems. Another problem of the safety policy was the excessive number of projects. In many cases there was uncertainty if there were financial means available to execute a project. In other cases it was uncertain if a project was executed at all (Tops, 2007). To make the first steps towards a safer Rotterdam, a conference was held in Kaatsheuvel in 2001, where a five-year plan was put together to improve the safety in the city.

The actual change began after the municipal elections in 2002. The political party 'Leefbaar Rotterdam', led by Pim Fortuyn, won the majority of seats in the city council, which was a big surprise. In that period, Rotterdam was the city with the highest crime rates and most unsolved murders in the Netherlands. Fortuyn thankfully used this fact and made safety the primary priority of the campaign of 'Leefbaar Rotterdam' in the election campaign. After winning the elections 'Leefbaar Rotterdam' formed a coalition with the political parties the Christen Democrats Appel (CDA) and the Liberal Party (VVD) after the elections, which resulted in the coalition agreement 'The new Elan of Rotterdam'. It was based on the five-year plan that was made in Kaatsheuvel in 2001. The coalition agreement had five key elements: Safety, Housing, Education and Youth, Economic development, and Integration. Safety was the element with the highest priority. The elaboration of the coalition agreement resulted in nineteen targets. The Police and Justice departments were also involved in determining these targets. This was to ensure that the targets were decided not only by politicians, but also by the organizations, which had to execute and achieve them. Some examples are:

- Rotterdam has to be measurable safer in 2005: The safety index of all the districts and neighbourhoods should be equal or higher than in June 2002;
- City marines will be used in the most unsafe districts. City marines are civil servants who can speed up processes with an amount of money to get results. Their job is to secure that the district which they are assigned to is safe;
- The city has to be cleaner and more undamaged;
- 100 million euro's was made available for tackling the safety issues.

The autumn of 2003 and the spring of 2004 were important periods in the safety approach of Rotterdam. There were some important events which reduced pressure of the safety approach. Some structural changes were also made. First Alderman de Faria was removed. Stakeholders saw Alderman de Faria as a disturbing factor and collaborating with her was perceived as impossible in this highly-strung period. There were also good results of the safety index. Improvement before the latest safety index measurement was minimal and it was about time that substantial results were achieved. At the

17th of Mai 2003 the new safety index was published and there was a significant difference. It improved from a 5.6 in 2002 to a 6.2 in 2003. This showed that the safety approach was effective, although there was still a lot of work to be done. A structural change was the particularizing and focusing of the neighbourhood safety action programs (WVAP's). The WVAP's were more specific and tailored to the needs of the different districts. Another structural change was the normalization of the relationship between the council of Mayor and Alderman and the civil service. Additionally, the city mariners were gradually more accepted and it showed that the city mariners were not the tough civil servants who put things in order as feared. Besides, the city mariners were able to build workable and valued relationships with the civil services and districts.

After the events in the autumn of 2003 and the spring of 2004, the safety approach stood on firm ground and could function to full extend (Tops, 2007). The safety index of 2004 showed another improvement to a score of 6.6 and the safety index of 2005 again increased to a 6.9. Mayor Opstelten was regarded as a key figure and the driving force of the safety approach of Rotterdam. He had most of the roles in the safety approach. He was the administrative body who was charged with maintaining of the public order in Rotterdam. He was also the chairman of the City Council, the Board of Mayor and Alderman, the Safety Steering Committee, the tripartite consultation with the chief commissioner of the Police and the Chief Prosecutor, Mayor consultation with the chairmen of the districts and he had often consultations with stakeholders from the city of Rotterdam. Mayor Opstelten was praised for his sharpness, managerial insight, he never slacked and he gave incisively comments (Tops, 2007).

Just before the elections of 2005, a second five-year plan was made and this plan was in line with the previous five-year plan. The Labor Party won the elections and formed a coalition with the Christen Democratic Appel, Groen Links and the Liberal party. The college program did not change much with regard to the previous college program. Ambitious targets were also made this time. The most important target was that there should be no more unsafe neighbourhoods in Rotterdam according to the scores of the safety index of 2010. Eventually was this target achieved.

The changes in and attention for safety in Rotterdam improved the safety in the city (Tops, 2007). Rotterdam improved a lot concerning safety and well-being of the people since 2002 (Centrum voor Criminaliteitspreventie en Veiligheid, 2013). The amount of robberies and burglaries decreased in the first three months of 2013 with regard to the same period in 2012. The fact that Rotterdam improved a lot, does not mean there is no more work to be done. The well-being increased the last years, but the residents of the police-region Rotterdam-Rijnmond are on average less positive about their neighbourhood than the residents of other police-regions in the Netherlands (Roodenburg, 2012). The thing which was most seen in the city of Rotterdam was deprivation. Clutter on the streets and graffiti were seen as the most annoying factors for the residents. This was mostly the case in neighbourhoods which were considered to be the most deprived.

The livability of neighbourhoods in Rotterdam scores a 7.1 in general on a ten-point scale (Centraal Bureau voor de Statistiek, 2014). At first sight this seems to be a good score, but in comparison with all the other municipalities and regions of the Netherlands it is the lowest. Rotterdam has also a significant higher amount of physical decay and social nuisance in neighbourhoods than the average in the Netherlands. 27,9% of the residents of Rotterdam experiences physical decay in their neighbourhood and 12,5% experiences social nuisance. The average in the Netherlands for physical decay is 24.4% and 9,8% for social nuisance

People in Rotterdam perceive a higher amount of feelings of unsafety compared to the average in the Netherlands. The average percentage of the citizens in the Netherlands who feel sometimes or often unsafe in their neighbourhood is 18,8%, in Rotterdam this is 21.8%. On all the indicators which the Safety Monitor 2013 used to measure the feelings of unsafety, Rotterdam scores significant higher

than the average of the Netherlands. These indicators are places where people are feeling themselves unsafe, for instance places where groups of youth are holding up or in the public transport. The perception of crime among the residents of Rotterdam is also less positive than the average in the Netherlands: 14.3% of the residents of Rotterdam thinks that a lot of crime occurs in their neighbourhood where as the average of the Netherlands is 9.8%. Noteworthy is the fact that 16.8% thinks that the amount of crime has increased where the objective crime rates suggests that this is decreasing (Centraal Bureau voor de Statistiek, 2013a).

The crime rates are decreasing in Rotterdam and the livability has increased, but the biggest problems in the city according to the citizens of Rotterdam are still crime, social unsafety and drugs related nuisance, pollution and the management of the public space (COS, 2013). Deterioration is also seen as a problem among the citizens of Rotterdam. One of the key aspects of the safety policy since 2002 was that Rotterdam has to be cleaner and more undamaged. To examine if this kind of policy has an effect on crime, this research will examine the impact of neighbourhood disorder on crime in the districts of Rotterdam.

1.2 Research aim

In the background it is addressed that Rotterdam scores for certain safety related topics such as safety feelings, perception of crime and livability lower than the average in the Netherlands. In addition, the citizens of Rotterdam experience more social nuisance and physical decay than the average in the Netherlands. Due to the fact that a cleaner and more undamaged city is a key aspect in the safety policy of Rotterdam since 2002, this research examines the relationship between neighbourhood disorder and crime. This relationship is interesting, because crime is steadily decreasing the last years in the Netherlands, but the amount of citizens that feel themselves unsafe does not decrease (Bierling, Lucas, & Tops, 2013). This is among other things due to the presence and visibility of disorder in neighbourhoods.

The research aim is twofold. First, the changes in neighbourhood disorder and crime in the city of Rotterdam between 2006 and 2011 will be examined. Second, the impact of neighbourhood disorder on crime will be analyzed. To achieve this, the city of Rotterdam is, like already mentioned earlier, chosen to be examined. The reasons for this are practical. Rotterdam is a city with a diverse variety of ethnicities, problems and crime. The availability of data about the citizens of Rotterdam played also a part in the choice of this city. Neighbourhood disorder can roughly be seen as the sum of physical decay and social nuisance in a neighbourhood. This concept will be elaborated in chapter two. The changes in neighbourhood disorder and crime will be examined between 2006 and 2011, because this gives information about trends and developments of crime and neighbourhood disorder. In addition, the districts of Rotterdam differ in composition, density and surface. Therefore gives the examination of these changes information about the differences between the districts regarding the number of crime and the degree in which disorder is perceived. Another reason why the changes in neighbourhood disorder are being examined, is to see if neighbourhoods with more perceived disorder also have a higher crime rate. When this is the case, there could be an association between crime and neighbourhood disorder. This is the second goal. If an association does exist, this could give implications for policies regarding neighbourhoods, safety and crime.

The research objectives can be summarized as follows: examine to what extent neighbourhoods with a higher level of disorder also have a high level of crime in the districts of Rotterdam between 2006 and 2011. Based on the findings, recommendations are made to improve the policies about neighbourhoods with regard to safety and crime.

1.3 Research questions

On the basis of the research aim the next questions can be drafted. These are divided in a central- and sub-questions.

1.3.1 Central research question

To achieve the afore mentioned goals the following central research question is stated:

To what extent does neighbourhood disorder change in the districts of Rotterdam in the period of 2006-2011 and does neighbourhood disorder explain crime changes?

1.3.2 Sub-questions

In order to answer the central research question the following sub-questions are formulated:

1. What is neighbourhood disorder and what is theoretically and empirically known about the impact of neighbourhood disorder on crime?
2. What is the variation in crime rates and how have the crime rates developed in the districts of Rotterdam between 2006 and 2011?
3. What is the variation of neighbourhood disorder and how has neighbourhood disorder developed in the districts of Rotterdam between 2006 and 2011?
4. What is the relationship between neighbourhood disorder and crime in the districts of Rotterdam between 2006 and 2011?

1.4 Outline of this report

This report consists of seven chapters. This chapter sketched the situation regarding safety and crime in Rotterdam before the examined period of this research. Further introduced this chapter the concept of neighbourhood disorder, the main question and the research aim. This research is focused on the relationship between neighbourhood disorder and crime. Therefore needs the concept of neighbourhood disorder be further explained. In addition, the relation between neighbourhood disorder and crime will be discussed on the basis of the available literature regarding this topic and hypotheses will be stated to examine the relationship between neighbourhood disorder and crime. This will happen in chapter two. The way in how this research is conducted will be discussed in chapter three. This chapter focuses on the units of analysis, the operationalization of the variables and the research methodology. Chapter four describes the variation and development of crime in Rotterdam. This chapter focuses on the magnitude of the crime decline in Rotterdam, the fluctuations in this crime decline and the extensiveness of the crime decline in the districts of Rotterdam. The fifth chapter describes the variation of neighbourhood disorder and how this develops in Rotterdam. This chapter will take a closer look at the development of social and physical disorder in the districts of Rotterdam. After the describing chapters an explanatory chapter follows in which the hypotheses are tested or in other words where the impact of neighbourhood disorder on crime will be tested. This will happen in chapter six. The last chapter gives the conclusion of this research and will discuss the results, the limitations and the contribution of this research to this field of research.

2. Theoretical Framework

This chapter describes the theoretical framework on which this research is based. At first the concept of disorder will be elaborated in paragraph 2.1. Subsequently in paragraph 2.2 the Broken Windows Theory will be explained. In paragraph 2.3 the disagreement in the literature about the Broken Windows Theory will be discussed. Thereafter are hypotheses stated based upon this theoretical framework in paragraph 2.4. Finally in paragraph 2.5 the following research question will be answered: *What is neighbourhood disorder and what is theoretically and empirically known about the impact of neighbourhood disorder on crime?*

2.1 Concept of disorder

The streets, sidewalks and parks do not belong to anyone and therefore to everyone. The visual salience and symbolism with regard to such places is what makes disorder of theoretical interest (Sampson & Raudenbush, 1999). Even if we do not want it to be so, disorder triggers attributions, predictions and prejudices in the minds of insiders as well as outsiders. Disorder changes the calculus of investors, real estate agents, future home buyers and insurance agents and it shapes perceptions of residents who consider moving out of the neighbourhood. Signs of disorder are also a cue of the effectiveness of residents who are seeking neighbourhood improvement, and that record may discourage or encourage future activism among residents. This means that disorder is fundamental to the general understanding of urban neighbourhoods.

Since the early 2000s, there has been an increasing discussion about the definition of neighbourhood disorder. Some studies split neighbourhood disorder in two components: physical and social (Chappell, Monk-Turner, & Payne, 2011; Skogan, 1990). The definition of Skogan (1990) refers to visible indications of a lack of order and social control in the community. In this case order is a situation of safety, tranquility, and obedience of the law. Social control is about maintaining this order. Skogan states that disorder has a physical and a social dimension and that both dimensions signal a breakdown of the social order in a neighbourhood. Social disorder is a matter of behavior and physical disorder involves physical signs of unchecked decay (Skogan, 1990).

Ross and Mirowsky (1999) defined social disorder as signs that indicate a lack of social control which involves people. Examples are fights, disturbances among neighbors and people who are hanging out on the streets, drinking, consuming drugs and people who produce a sense of danger (Ross & Mirowsky, 1999). Ross and Mirowsky (1999) refer to physical disorder as the entire physical appearance and decay of a neighbourhood. Neighbourhoods with a high level of physical disorder are considered dirty and noisy. Vandalism and graffiti are common and in these neighbourhoods often broken street furniture, bus stops and abandoned buildings can be found. These are also indicators that social control has broken down (Ross & Mirowsky, 1999).

In literature on disorder and crime there is also attention for structural constraints and in particular on structural dimensions that have an economic nature. Residents have little control over these elements (Sampson & Raudenbush, 1999). A structure which often is mentioned is concentrated poverty. Economic deprivation is relevant in relation to disorder, because cleaning up residential and commercial areas and repairing buildings requires money. In addition, for in areas of concentrated disadvantage it is often difficult to support viable commercial enterprises, and many apartments and stores are vacant which gives little incentives to investors to repair their properties. However, structural constraints are not only about economic features. A feature that is considered important for

urban social organization is residential stability (Wilcox, Quisenberry, Cabrera, & Jones, 2004). Low transience and high levels of home ownership work together to inbreathe a stake of conformity among residents, in this case to neighbourhood well-being. Local ties and attachment are also linked to residential stability (Taylor, 1997). A number of other structural constraints affect the ability of a neighbourhood to counteract public incivilities including nonresidential land use, population that makes use of local services, the sheer density of a population and the immigrant's concentration. The differential land use of cities is important to comprehend neighbourhood crime and disorder patterns, because illegal activities feed the temporal and spatial structure of routine legal activities (Sampson & Raudenbush, 1999). This means that the effects of concentrated residential instability and resource disadvantage should be considered in relation with structural characteristics such as density.

Despite structural constraints, one might see human agency as the central explanation of neighbourhood disorder. In this perspective, residents do not only face ecological structures or material circumstances, but also face the challenge to organize themselves in order to achieve shared public ends. In this research the formulation of van Stokkom and Toenders (2010) will be adopted and refer to social control as the capacity of a social unit to regulate itself, monitoring and addressing people on unacceptable activities. Social control is also about the realization of collective goals. The desire of residents of a neighbourhood to live in safe environments free of crime and disorder is one of the most central of common goals (Sampson & Raudenbush, 1999). The shared willingness of local residents to take action for the common good depends on mutual trust and the social cohesion among neighbors (Sampson & Raudenbush, 1999). It is unlikely that someone takes action in a neighbourhood context where people mistrust each other and the rules are unclear.

Process-oriented mechanisms such as social control and structural constraints are not mutually exclusive. A more plausible way of thinking is that human agency and structural constraints are interrelated. It is likely that contributions of social control and structural characteristics could explain disorder and crime. Sampson, Raudenbush, and Earls (1997) suggest that residential instability and concentrated resource disadvantage are major structural conditions that undermine social control, in turn promote crime and disorder.

In literature it is unclear if disorder and crime are distinct concepts or that they are basically at opposite ends of the same continuum. Major crimes could be seen as the extreme end of the disorder continuum, but they are rare and mostly unseen (Gau & Pratt, 2008). Sampson and Raudenbush (1999) state that it is a reasonable hypothesis that public disorder and predatory crimes are phenomena of the same explanatory process and therefore at different ends of the same continuum. In addition it seems Sampson and Raudenbush unpersuasive that graffiti causes robbery, it is more likely to assume that a lack of social control caused graffiti and robbery. Gau and Pratt (2008) also observed that citizens do not see the difference between disorder and crime, in the view of the citizens those two phenomena blend together. In this case disorder and crime are only labels used by criminologists and police agencies in their practices.

2.2 The Broken Windows Theory

Keizer, Lindenberg and Steg (2008) performed a study in which was showed that disorder changes people's behavior. Six experiments were performed in this study and the conclusion based on these experiments was that '*signs of inappropriate behavior like graffiti or broken windows lead to other inappropriate behavior (e.g., litter or stealing), which in turn results in the inhibition of other norms (i.e., a general weakening of the goal to act appropriately)'* (Keizer, Lindenberg, & Steg, 2008). The

question in this research is: does disorder also lead to more crime in neighbourhoods? A theory which addresses this question is the Broken Windows Theory (Wilson & Kelling, 1982).

The Broken Windows Theory suggests that minor forms of public disorder (e.g. broken windows) could lead to severe crime and a downward spiral of urban decay. Wilson and Kelling (1982) suggest *'that untended behavior leads to the breakdown of community controls'.* For instance, when trash is not picked up and loiterers are not asked to move on, this invites more thrash being thrown on the ground and more loiterers to gather. As this disorder increases it sends a message to the inhabitants that the situation is escalating and that the social control in their neighbourhood is failing. A key part of this theory is the perception of untended disorder (Weisburd, Hinkle, Famega, & Ready, 2010).

Perceived disorder will lead inhabitants to think that crime is on the rise and therefore they will modify their behavior. These inhabitants will use the streets less often, become less likely to intervene against disorderly people and in some cases this could lead to that 'good' inhabitants move away. This results in a lowering of informal social control, which could lead to more disorder and crime, because people see that in these areas they can get away unpunished with such behavior. Eventually criminals could see such a neighbourhood as a good place to work with impunity.

Another key part of the theory is fear of crime. Through the perceived disorder people retreat to their homes, because they think the streets are not safe. Doran and Lees (2005) investigated if spatial-temporal links exist between disorder, crime and the fear of crime. It turned out that places that were avoided by people in the evening, were places with higher levels of disorder than places that were not avoided. This study showed that places that are avoided by people have the potential for the crime or disorder concentrations to increase over time. This is due to the lack of natural surveillance in these areas and this makes it easier for disorderly acts to take place or criminals to operate.

Places that are fearful and therefore avoided are places were disorder and crime could break down the mechanisms of social control. As citizens withdraw or avoid places, they also withdraw from their duty of mutual support with fellow citizens on the streets and as a result they are relinquishing the social controls of the neighbourhood which they formerly helped to maintain. What follows is that crime and fear of crime isolate residents and this leads to the undermining of mutual trust and solidarity among neighbors (Xu, Fiedler, & Flaming, 2005). The social cohesion is out of the question when people stop to interact with one another and this also counts for the shared willingness to engage in social control of public areas. The Broken Windows Theory could be summarized by figure 1.

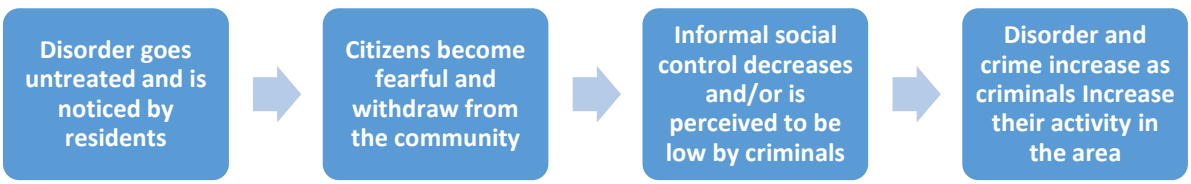

Figure 1: The Broken Window Theory (Weisburd et al., 2010)

2.2.1 Fear of crime

The Broken Windows Theory claims that perceived disorder makes residents fearful and withdraw themselves into their homes. Therefore it could be stated that fear of crime is a key part of the Broken Windows Theory. Fear of crime could be defined as '*an emotional reaction characterized by a sense of*

danger' (Garofalo, 1981). There is evidence that disorder is linked to fear of crime (Perkins, Meeks, & Taylor, 1992; Skogan, 1990; Wyant, 2008). Neighbourhood disorder is likely to affect an individual's perception of their community due to it is commonplace and visible and crime is a relatively rare and mostly invisible event. Skogan (1990) analyzed that fear and neighbourhood disorder were strongly correlated. People did not feel safe in neighbourhoods where disorder was high.

Disorder could be linked to spatial patterns of fear (Kohm, 2009). This is especially the case with disorder that has a social nature (e.g. drunk people and drug addicts). Physical disorder does not tend to provoke fear for most of the residents of a high-crime community, but by visitors to an area it might be read as an invite for crime. This means that the possible contact with disorderly people concerns the residents more than the physical disorder. In contrary to Kohm, Brunton-Smith and Sturgis (2011) demonstrated that visible signs of neighbourhood disorder are a highly predictive of expressed fear of crime. This means that individuals respond to visual cues like graffiti, litter, and vandalism in the neighbourhood and use this information in relation to their risk of being victimized. Kanan and Pruitt (2002) also found evidence that the residents' perceptions of physical disorder such as signs of decay and deterioration in their neighbourhood, increased the levels of fear, the perceived risk of victimization, while it negatively influenced the neighbourhood safety ratings of the residents. In addition, perceptions of neighbourhood disorder made people to be more concerned with crime.

McGarrell, Giacomazzi, and Thurman (1997) examined the effects of fear of crime, neighbourhood disorder and social integration. A finding of this research was that the more a person perceives neighbors to be responding to noisy youths, the more this person feels rooted in the community, the more responsive this person perceives local institutions, and the more this person perceives this neighbourhood as a home where people help each other, the less fear this person experienced. This does not only mean that the decline of a community and disorder facilitate fear, but that social support, responsiveness, integration and social control inhibit fear.

The claim of the Broken Windows Theory that perceived disorder makes residents fearful is supported by other studies like discussed above. Neighbourhood disorder does not only makes residents fearful, but it also lowers the social control in a neighbourhood (McGarrell et al., 1997). This will be further discussed in subparagraph 2.2.2.

2.2.2 Social control

It is mentioned that perceived disorder makes residents fearful and withdraw from the community. As a result this diminished the social control in the neighbourhood and this gives criminals the space to operate in a neighbourhood (Wilson & Kelling, 1982). This makes social control another key part of the Broken Windows Theory.

Perceived neighbourhood disorder is associated with the erosion of social ties (Ross & Jang, 2000). People who live in neighbourhoods with a high level of disorder report lower levels of informal integration with neighbors. Those people also report somewhat lower levels of formal participation in neighbourhood organizations. A lack of informal attachments to neighbors makes the unfavorable effects of perceived neighbourhood disorder on fear and mistrust worse (Ross & Jang, 2000). In addition informal social ties decreases the negative effects of neighbourhood disorder. Neighbourhood disorder plays a substantial role in weakening the local social cohesion, trust, informal social control and local social ties with regard to elderly people (Oh, 2003). This also shows that perceived neighbourhood disorder will subvert local trust and informal social control among residents (Oh, 2003).

In addition, elderly people in general who perceived neighbourhood disorder tend to mistrust their neighbors and as a result do not pay attention to deviant behavior of local children. Neighbourhood disorder has an impact on fear and informal social control which is claimed in the Broken Windows Theory (Oh, 2003; Ross & Jang, 2000).

Ross, Mirowsky, and Pribesh (2001) studied the effects of neighbourhood disorder on the development of mistrust among individuals, with a few resources, who live in places with a common threat and where resources are scarce, and who feel powerless to avoid or deal with the threat. Ross, Mirowsky and Pribesh came to the conclusion that life under threatening conditions promotes mistrust. When people experience noise, vandalism, danger, public drinking, rundown and neglected buildings, crime, drugs and trouble in their neighbourhood on a daily basis, they learn that it is safer not to not trust other people (Ross et al., 2001). Residents may have come to this conclusion due to that the visible signs of neighbourhood disorder may have indicated that the other residents of the neighbourhood are not concerned with public order and have little or no respect for other people or their property. Residents in these neighbourhoods view those around them with suspicion. Ross, Mirowsky and Pribesh (2001) also found that widespread mistrust in a neighbourhood, could interfere with the ability of residents to form ties with each other and this could further break down the order in a neighbourhood. In addition Ross, Mirowsky and Pribesh's analysis demonstrates that a great part of the association between neighbourhood conditions and individual mistrust presumably represents the impact of the social and physical environment on the perceptions of individuals of others and themselves. The outcomes of this study shows that mistrust and perceptions of powerlessness could weaken a neighbourhood and therefore allowing disorder to proliferate.

Neighbourhood disorder has an effect on social control. Deteriorated and decayed neighbourhoods lead to that residents do not trust their neighbors, do not have social ties and do not correct misbehavior.

2.3 Discussion in the literature

The relationship between (neighbourhood) disorder and crime has been tested in several studies. These studies will be discussed in this paragraph. In the literature about the broken windows there is a discussion about if the relationship between neighbourhood disorder and crime exists.

Skogan (1990) claims to have found empirical evidence about the direct link between disorder and crime in his study *Disorder and Decline: Crime and the Spiral of Decay in American Neighbourhoods.* Skogan concludes that racial composition, poverty and instability of neighbourhoods are strongly connected with crime, but a substantial portion of this connection is through disorder. When disorder is taken into account this connection disappears. Kelling and Coles (1996) said that his evidence proves that crime and disorder go together in a substantial way. This is criticized by Harcourt (1998), because the evidence of Skogan misses a large number of values for important variables (e.g. harassment and litter). In addition, Skogan used for measuring disorder measures that included crime, for instance using respondents' assessment of gang activity. This means that both the dependent and independent variable are measuring crime. Skogan also referred to the dependent variable as crime in general, but selected as dependent variable only one type of crime, namely robbery. This turned out to be the type of crime with the highest correlation with neighbourhood disorder. On the other hand Perkins et al. (1992) observed results which confirm key portions of the study of Skogan and the Broken Windows Theory. The study of Perkins et al. found that the presence of disorder-related signals engender observations of social and crime problems.

Sampson and Raudenbush (1999) also examined if disorder leads to crime and they found that disorder does not directly promote crime. Although they found that disorder and crime are related. Sampson and Raudenbush found that crime and disorder both could be explained by collective efficacy. Collective efficacy could be described as '*the linkage of mutual trust and the willingness to intervene for the common good*' (Sampson et al., 1997). In their research they also found a reciprocal feedback loop between collective efficacy and crime. The first one who raised this issue was Skogan (1990). He stated that crime (in particular interpersonal crimes of violence) undermines the residents' sense of control and social trust. In addition, Liska and Warner (1991) found that social interactions in public settings are constrained by robbery. This could potentially dampen social cohesion and the creation of shared expectations among residents of a neighbourhood for taking action to safeguard their community. Kelling and Coles (1996) explain in their research that social control mechanisms in communities are broken down through crime and fear of crime. Fearful citizens will stay in their homes, lock themselves behind closed doors, limit their normal associations and activities and refrain from their basic civic obligations. As citizens withdraw physically, the social controls within the community are getting relinquished, because citizens do not only withdraw to their homes, but they also withdraw from their roles of mutual support with fellow citizens. This isolates residents and undermines the solidarity and the mutual trust among neighbors. Social cohesion is out of the question when people stop interacting with one another and this is also the case for the shared willingness to involve in informal social control of the public space. The reversed influence of crime on collective efficacy is confirmed by the reciprocal feedback loop of Sampson and Raudenbush (1999). This indirectly supports the suggestion that disorder and crime are related. In figure 2 are the results of Sampson and Raudenbush's reciprocal feedback loop summarized.

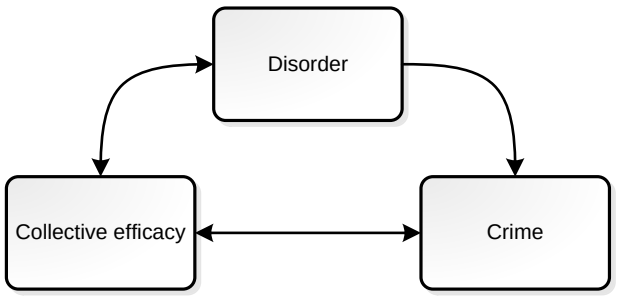

Figure 2: Reciprocal feedback loop (Sampson, 2009)

Figure 2 shows that with the confirmation of the reverse causation from crime to collective efficacy, an indirect causal relationship between disorder and crime has been established (Xu et al., 2005). This is the case due to that the fact relationship has two significant negative links (Sampson & Raudenbush, 1999). The first one is from crime to collective efficacy and the second one is from collective efficacy to disorder. This results in a positive relationship between crime and disorder that is mediated by collective efficacy (Xu et al., 2005). In accordance with this finding, Gault and Silver (2008) state that the opponents of the Broken Windows Theory did not consider this theory never stated that disorder had a direct unmediated effect on crime. The Broken Windows Theory claims that disorder undermines informal social control, which subsequently leads to an increase in crime. In addition Xu et al. (2005) found that the moral and physical decay of a community leads to increased criminality. They found that disorder has a strong direct, indirect, and total effect on crime even with collective efficacy being controlled for. However, according to Xu et al. does disorder elicit more fear of crime than actual crime.

Gau and Pratt (2008) are also critical about the Broken Windows Theory. The focus of their study was on the distinction between crime and disorder. The Broken Windows Theory assumes that disorder and crime are two different phenomena. Gau and Pratt tested this assumption and came to the conclusion that citizens could not always distinguish disorder from crime. These two phenomena had blended together in the view of the citizens. This means that when disorder is being measured, crime

will be measured as well. In that case it is tautological, because crime cannot be logically claimed to cause itself. In later research (2010) Gau and Pratt observed that residents of disordered areas might develop a sharper grasp on the distinction between routine nuisance and true danger. This made them less critical about the Broken Windows Theory.

Skogan (2008) is not impressed with the critiques that disorder and crime are linked in complex ways to race and class, because nearly everything in criminology is strongly correlated with structural neighbourhood characteristics. In a more recent study (Boggess & Maskaly, 2014) a variety of factors with regard to social disorganization or in other words socioeconomic factors are controlled for, when testing the relationship between disorder and crime. The results showed that higher rates of disorder lead to significant, although modest, increases of violent crime.

As discussed in this paragraph, there is disagreement about the empirical relationship between neighbourhood disorder and crime. The evidence for neighbourhood disorder causing crime was criticized; other researchers could not find this evidence. However, it is observed that disorder and crime are correlated.

2.4 Hypotheses

In this section are hypotheses formulated that will help to answer the research questions. The review of the literature shows that neighbourhood disorder and crime are connected to each other. Several authors stated that there is a relationship between disorder and crime. Where Skogan (1990) claimed that neighbourhood disorder is a cause of crime, do other authors (Harcourt, 1998, 2001; Sampson & Raudenbush, 2004) refute this claim. From the discussion about the Broken Windows Theory could be derived that neighbourhood disorder and crime are correlated. This leads to the first hypotheses of this research:

Hypothesis 1:	*Neighbourhoods with a higher level of neighbourhood disorder will have a higher level of crime, than neighbourhoods with a lower level of neighbourhood disorder.*

The expectation is that neighbourhood disorder and crime will be correlated. This means that neighbourhoods with a high level of disorder will have a high level of crime and neighbourhoods with a low level of disorder will have a low level of crime.

The Broken Windows Theory connects disorder to crime. The theory states that when disorder increases in a neighbourhood, crime increases as well. Although the theory does not state that disorder directly causes crime to increase. The Broken Windows Theory states that in neighbourhoods were disorder is increasing; this lowers the social control which gives room to criminals to operate in these neighbourhoods. According to Gault and Silver (2008) undermines disorder social control, which subsequently leads to an increase in crime. Whereas Xu et al. (2005) found a strong direct, indirect, and total effect on crime even with collective efficacy being controlled for. The theoretical framework showed several relations between neighbourhood disorder, fear of crime, social control/collective efficacy and crime. These relationships are shown in figure 3.

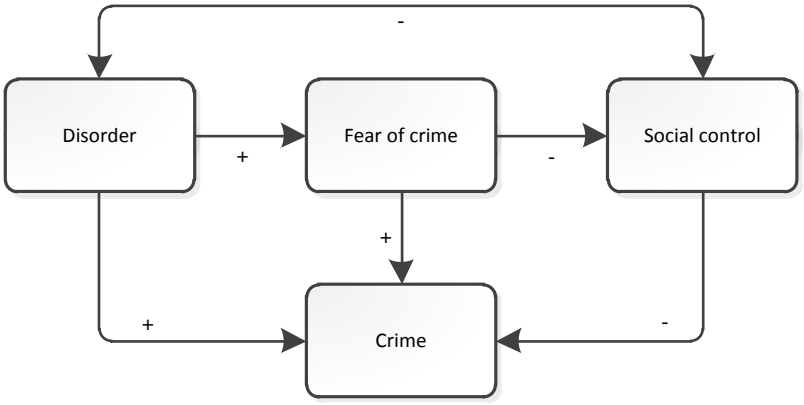

Figure 3: Relations between the variables of the Broken Windows Theory

The relationships that are shown in figure 3 will be examined in this research. The variables fear of crime and social control are included in figure 3 to see if these variables enhance the relationship between neighbourhood disorder and crime. This leads to the following hypotheses.

Hypothesis 2:	*Neighbourhoods with a higher level of disorder will have a higher level of fear of crime, than neighbourhoods with a lower level of disorder.*
Hypothesis 3:	*Neighbourhoods with a higher level of disorder will have a lower degree of social control than neighbourhoods with a lower level of disorder.*
Hypothesis 4:	*Neighbourhoods with a higher level of fear of crime will have a lower degree of social control than neighbourhoods with a lower level of fear of crime.*
Hypothesis 5:	*Neighbourhoods with a higher level of fear of crime will have a higher level of crime, than neighbourhoods with a lower level of fear of crime.*
Hypotheses 6:	*Neighbourhoods with a lower degree of social control will have a higher level of crime than neighbourhoods with a high degree of social control.*

The hypotheses formulated above are the relations which are shown in figure 3, except for the relationship between neighbourhood disorder and crime. This relationship is already formulated in hypothesis 1

2.5 Conclusion

This paragraph will answer the following research question: *What is neighbourhood disorder and what is theoretically and empirically known about the impact of neighbourhood disorder on crime?*

The definition of Skogan (1990) refers to neighbourhood disorder as visible indications of a lack of order and social control in the community. Two components could be distinguished: social and physical disorder. Social disorder could be seen as signs that indicate a lack of social control that involve people and physical disorder as the entire physical appearance and decay of a neighbourhood (Ross & Mirowsky, 1999). In the literature there is the question if crime and disorder are two different concepts or that they are basically at opposite ends of the same continuum (Sampson & Raudenbush, 1999).

A theory which addresses the relationship between neighbourhood disorder and crime is the Broken Windows Theory. The Broken Windows Theory suggests that minor forms of public disorder (e.g. broken windows) could lead to severe crime and a downward spiral of urban decay. Wilson and Kelling (1982) suggest *'that untended behavior leads to the breakdown of community controls'.* Perceived disorder will lead to that inhabitants think that crime is on the rise and therefore they will modify their behavior. These inhabitants will retreat to their homes, become less likely to intervene against disorderly people and in some cases this could lead to that 'good' inhabitants move away. This results in a lowering of informal social control, which could lead to more disorder and crime, because people see that in these areas they can get away unpunished with such behavior. Eventually criminals could see such a neighbourhood as a good place to work with impunity.

In the literature about the Broken Windows Theory is disagreement about the empirical relationship between neighbourhood disorder and crime. The evidence indicating that neighbourhood disorder causes crime was criticized and other researchers could not find this evidence. However, it is observed that disorder and crime are correlated and that disorder has a strong direct, indirect, and total effect on crime even with collective efficacy being controlled for (Xu et al., 2005).

3. Data and operationalization

This chapter will describe how this research was conducted. The units of analysis will be described in paragraph 3.1. Subsequently the operationalization of the variables will be elaborated in paragraph 3.2. Important variables for this research are crime and neighbourhood disorder, but also fear of crime and social control. Finally, the way in which this research is conducted will be explained in paragraph 3.3. This paragraph provides information about the data collection and the statistical analysis.

3.1 Units of analysis

This paragraph will discuss the units of analysis of this research. The units of analysis are districts of Rotterdam. There are fourteen districts of Rotterdam, but in this research only thirteen will be used. The reason for this is that the district Rozenburg had merged with Rotterdam in 2010. This means that there is not enough data known about the examined period (2006-2011) of this research. The normal districts of Rotterdam, in which citizens live, are used and also their boundaries. This means that the port and industrial areas of Rotterdam are not taken into account in this research. Figure 4 gives an overview of the districts of Rotterdam that are used and where they are situated.

Figure 4: Overview the districts of Rotterdam (Gemeente Rotterdam, 2014).

A small description of the districts is given in appendix A. As a consequence of the exclusion of some districts and areas, the total of 63 neighbourhoods are taken into account during the analysis of this research. The phenomenon of interest in these neighbourhoods is the social and physical disorder within its purview. Urban neighbourhoods are often subjectively defined entities with ambiguous boundaries and within neighbourhoods many smaller geographical areas can be distinguished. These geographical areas have their own specific characteristics, for example they could have different levels of physical and social characteristics. This means that disorder and crime are measured on the neighbourhood level, while disorder and crime are more common in specific places of neighbourhoods, the so called 'hotspots', than in the whole neighbourhood. This means that statements that are made in this thesis are based on average crime and disorder levels in the neighbourhood. The choice to analyze crime and disorder on the neighbourhood level is a deliberate one. Smaller geographical areas such as 'hotspot's have a small amount of citizens. As a result there is not much information available about these geographical areas. In addition, this limited information makes it difficult to draw conclusions without strong influences of extreme observations and biases. Furthermore, the data that are used in this thesis were only available on the neighbourhood level or

on a higher aggregation level. A higher aggregation level makes the comparison of neighbourhoods less complex.

3.2 Operationalization

In this paragraph the variables that are used and measured in this research are described and operationalized. First the dependent variable crime will be described. Thereafter, the independent variables that affect crime, such as neighbourhood disorder, social control and fear of crime will be described.

3.2.1 Crime

Crime is the dependent variable in this research. This means that crime can be explained with the data about other variables such as neighbourhood disorder, fear of crime and social control. This research is about crime in neighbourhoods and therefore not all the types of crime are included in the analysis. The main focus of this research lies on the impact of disorder on crime in neighbourhoods. In particular the focus lies on the consequences of disorder on the behavior of people. For example, do residents of a neighbourhood retreat to their homes, which gives room for criminals to operate in that neighbourhood. This means that several types of crime such as traffic and environmental crimes/offenses are excluded from the analysis. The types of crime that are included in this research are theft and burglary crimes, destruction and damage against public law and order crimes, violence and sex crimes, and drugs and alcohol offenses. These types of crime are based on the literature (Gau & Pratt, 2008; Weisburd et al., 2010) and are classified according to the Standard Classification Criminal Offenses of the Police 2010. The different criminal offenses that are underlying the types of crime are shown in Appendix B.

The data to measure the types of crime are acquired from the Neighbourhood Monitor Rotterdam. This monitor contains a lot of information about multiple topics including crime. The data about crime are registered reports from the police. This means that crime is going to be measured through the reports of criminal offenses that are known by the police. These police reports contain all the criminal offenses that are reported to the police between 2006 and 2011. This type of data chosen to be used is due to the availability and the impression it gives of the total crime that is known by the police. The most important reason to choose police reports is that these reports are not about feelings and/or attitudes of citizens towards crime. Why this is important will be explained in subparagraph 3.2.2.

3.2.2 Neighbourhood disorder

The most important independent variable of this research is neighbourhood disorder. After all, this research is about the impact of neighbourhood disorder on crime. The theoretical framework provided an explanation about the concept of disorder. It explained that two components could be distinguished: social and physical. In order to answer the central research question, disorder will be analyzed as a whole. Although it could be interesting for policy makers and recommendations to know if one of the two components has a bigger impact on crime. Therefore is the impact of social and physical disorder on crime also examined. Neighbourhood disorder is measured by questions about indicators regarding nuisance, vandalism and the physical environment of the neighbourhood. These questions show the attitudes and/or feelings of citizens towards the mentioned topics. The indicators of neighbourhood disorder that are used in this research are shown on page 25. Additional information about these indicators is available in appendix B.

Social neighbourhood disorder indicators:

1. Drugs nuisance
2. Loitering
3. Drunk people on the streets
4. Harassment on the streets

Physical neighbourhood disorder indicators:

1. Graffiti on walls and buildings
2. Destruction of phone booths, bus- and tram stops
3. Litter next to the container
4. Urinating in public
5. Holes or cracks in pavement
6. Dog dirt on the streets
7. Pollution on the streets
8. Broken or destroyed street furniture

The indicators are based upon other studies (Chappell et al., 2011; Gau & Pratt, 2008; Ross & Mirowsky, 1999) and the theory of the broken window theory. The indicators of neighbourhood disorder are all in terms of the number of citizens who thinks that a certain issue, for example graffiti, is a neighbourhood problem. This means that all the indicators give a score between 0 – 100. Important to mention is that neighbourhood disorder is measured with a subjective measure and that crime is measured with an objective measure. In the literature is mentioned that disorder and crime are at opposite ends of the same continuum (Sampson & Raudenbush, 1999). This means that it could be possible that crime is also measured when disorder is being measured. To avoid that crime and disorder are measured by the same indicators, there is chosen to measure neighbourhood disorder as the feelings and/or attitudes of citizens and crime as police reports. Feelings and attitudes of citizens of Rotterdam towards the above standing indicators are subjective and could therefore not be seen as crime. This ensures that there is a clear distinction between the measures of the two variables.

3.2.3 Fear of crime

The fear of crime of citizens is based on the percentage of residents that feel themselves unsafe in their own neighbourhood. This is measured using data of the Safety Monitor. The particular question of the Safety Monitor was: “Do you feel unsafe in your own neighbourhood”? The percentage of the citizens that felt unsafe answered ‘yes’ on this question. This means that the number of persons who answered this question is based on the number of participants and is not based on the ‘real’ number of citizens. Although, the Safety Monitor uses at least 30% of the residents in a neighbourhood. This ensures that the reliability and validity of the conclusions that are drawn from this data, can be maintained.

The fear of crime is a negative variable, because it causes people to retreat to their homes according to the Broken Window Theory. In addition, according to the Broken Window Theory does fear of crime increase when disorder increases in a neighbourhood.

3.2.4 Social control

In the theoretical framework were some concepts of social control mentioned. Important concepts regarding social control are social ties between citizens, participation of citizens in the society and trust

among citizens (van Stokkom & Toenders, 2010). In this research social control is composed of the following three indicators:

1. The participation of citizens
2. The social ties of citizens
3. Satisfaction with the neighbourhood

The underlying factors of which the indicators are composes are shown in appendix B. The level of social control within the neighbourhood will be measured by a scale score (0-100). This score is based on the indicators that are mentioned. The indicators that are used to measure social control are based on previous studies (Beckett & Herbert, 2008; Bellair, 2000). Underlying these indicators are several questions from the Social Index of Rotterdam and data from other sources such as the municipal basic administration. Social control is a positive variable. Social control normally has a positive effect on a neighbourhood (van Stokkom & Toenders, 2010).

3.3 Research design

This paragraph describes the research method that is used for conducting this research. To conduct this research several methods have been used. The first method was desk research. This was used to get acquainted with the concept of disorder and to formulate hypotheses. To test the hypotheses data have been collected from multiple sources. These sources will be explained in sub-paragraph 3.3.1 and the manner in which the hypothesis is going to be tested will be discussed in sub-paragraph 3.3.2. This research is about the impact of neighbourhood disorder on crime in the districts of Rotterdam between 2006 and 2011. The cross sectional design is chosen for this research, because there are only data available over a period of six years. A cross sectional design involves observations of a population, or cross section, or phenomenon or a sample at one point in time (Babbie, 2010). This means that the averages of the available data about the period 2006-2011 is calculated.

3.3.1 Data collection

The data that are collected to perform the analysis are existing data originated from multiple sources. The data to measure crime is acquired from the Neighbourhood Monitor Rotterdam. This monitor contains a lot of information about multiple topics including crime. The data about crime are registered reports from the police. This monitor is also used to get data about the structural characteristics of the districts of Rotterdam.

The source that mainly used for collecting data about neighbourhood disorder is the Neighbourhood Profile. The Neighbourhood Profile is a monitor instrument of the municipality of Rotterdam used to create a coherent image of the actual and the subjective situation experienced through citizens about the safety, and the social and physical state of the neighbourhoods. This instrument makes it possible to compare neighbourhoods among each other and in the time. The data are gathered through surveys which are randomly held among approximately 30.000 citizens. Because of that the same approach is used among all the districts of Rotterdam, the data are usable to draw conclusions that combine all the districts. This will increase the reliability and the validity of this research.

The data used to collect data about fear of crime are originative of the Safety Monitor. This is an annual research that is being held among municipalities in the Netherlands based on livability, safety and victimization. The Safety Monitor gathered their data from questionnaires among citizens of Rotterdam. This data is gathered at the district and neighbourhood level between 2006 and 2011. The

citizens who completed the questionnaire were asked about their opinion regarding police functioning, livability, unsafe spots in their neighbourhood, perceived safety and nuisance in the neighbourhood. The data from the Safety Monitor that will be used are the number of citizens in Rotterdam who feel themselves unsafe in their own neighbourhood.

The source used to get data about social control in the districts of Rotterdam is the Social Index of Rotterdam. This index gives information about participation of citizens in the society, social ties and the involvement of citizens with their neighbourhood. This data is also gathered with surveys among citizens of Rotterdam at the district and neighbourhood level between 2008 and 2012.

3.3.2 Statistical analysis

In this section are the methods for testing of the hypotheses explained. In the theoretical framework six hypotheses are formulated to test the relationships between neighbourhood disorder, fear of crime, social control and crime.

The hypotheses based on the theoretical framework are tested with the statistical software program 'SPSS'. The variables used for the analysis are measured at the ratio-level, which makes the correlation or regression analyses most suitable to perform the analyses (Babbie, 2010). All The hypotheses suggest a relation between two variables and due to the cross sectional design of this research, correlations are used to test the hypotheses. With the cross sectional design that is used in this research, it is not possible to establish a causal link between the tested variables. Another thing that has to be kept in mind is that there are many factors involved in explaining crime rates and therefore the omitted variable bias will most likely affect the analysis. This is another reason to describe the relations between the examined variables in terms of correlation and not causation.

When the correlation is measured, this means that the direction and strength of a linear association between two variables is measured (Deveaux, Velleman, & Bock, 2011). Three conditions are in order when correlational analysis is used. The quantitative variable condition, the outlier condition and the straight enough condition. It could be possible that in some cases it may not be able to comply with the outlier and the straight enough condition, when using data about neighbourhood disorder and crime rates. Because of the differences between the neighbourhoods in Rotterdam it is possible that an outlier could affect the relationship between two variables. It could also be the case that the relationship between two variables is not linear. To deal with these problems the nonparametric measure Spearman's rho is used. This measure replaces the original data with their ranks within each variable. This method has the advantage over the Pearson correlation coefficient that this measure can still be used if only the ranks are known. In addition, the replacement of the original values with their ranks ensures that this measure is not much affected by outliers. The Spearman's rho measure does not make the assumption that a trend is linear, this fixes problems with the straight enough condition. The disadvantage of this measure is that it is not applicable for more complex methods. The level of significance that will be used in this research is $p = 0.05$, which tells us that the results of the statistical analyses are for 95% a reflection of the reality. When the outcomes of the statistical regression analyses do not meet the level of significance it will be difficult to draw conclusions based on these results, because it is most likely that the results are not reliable.

Table 1 gives an overview of the variables that are used in this research. These variables were already explained in section 3.2. The variables are presented with their minimum, maximum and mean values in table 1. The formula of how a variable is computed with regard to their underlying indicators is also presented. The Cronbach's alpha is given to show if the indicators are allowed to be measured as one

scale. Finally, table 1 shows which source is used to acquire the data that is used to measure the variables. Table 1 shows crime as a whole and the types of crime that are measured in this research. The reason for this is that the Cronbach's alpha score of crime with the four types of crime being pooled is too low to use them as one scale of crime. The rule of thumb with regard to the score of the Cronbach's alpha is that indicators could be merged to one scale when the score is at least ,700. As table 1 shows, the score of the Cronbach's alpha of the four types of crime is ,537. This means that in the analyses of this research the four types of crime will be separately measured. Table 1 shows also variables without a formula or Cronbach's alpha score. Such variables are measured with one indicator and this means that a formula or Cronbach's alpha score is not applicable. The values that are shown in the min., max., and mean columns are absolute values and percentages. The absolute values are applicable on crime and the types of crime. The values about crime are reported crimes to the police. The values of the other variables are percentages.

Variable	Min.	Max.	Mean	Std. dev.	Formula	Cronbach's Alpha	Source
Crime	56,0	4427,0	841,92	755,83	The sum of the crime indicators	,537	Neighbourhood monitor (Police data)
Theft and burglary crimes	30,0	3341,0	574,43	567,21	-	-	Neighbourhood monitor (Police data)
Destruction or material damage	8	483	133,68	93,41	-	-	Neighbourhood monitor (Police data)
Violence and sex crimes	8	555	118,95	101,97	-	-	Neighbourhood monitor (Police data)
Drugs and alcohol offenses	1	98	14,87	17,65	-	-	Neighbourhood monitor (Police data)
Neighbourhood disorder	5,97	26,86	17,87	5,47	(The sum of all the disorder indicators) / 12	,876	Neighbourhood profile
Physical disorder	7,91	31,04	22,04	5,92	(The sum of the physical disorder indicators) /8	,779	Neighbourhood profile
Social disorder	1,30	22,65	9,53	5,12	(The sum of the social disorder indicators) / 4	,907	Neighbourhood profile
Fear of crime	13,05	43,45	30,02	6,91	-	-	Safety Monitor
Social control	52,67	81,87	65,91	7,32	(Participation + social ties + satisfaction with the neighbourhood)/ 3	,772	Social Index of Rotterdam

Table 1: Variables that are used in this research (N=63)

4. Variation and development of crime in Rotterdam between 2006 and 2011

This chapter describes the variation and developments of crime in the districts of Rotterdam during the period 2006-2011. It addresses the second research question: *What is the variation in crime rates and how have the crime rates developed in the districts of Rotterdam between 2006 and 2011?* Four types of crime are selected for this research. Underlying these types of crime are criminal offenses. Important statistics about the development and variation in crime rates are given in this chapter to provide for an answer to the research question. In order to provide an answer, a closer look will be taken into the development of crime, the magnitude of the decline in crime rates, the fluctuations during the period 2006-2011, and how broad the crime declined from a geographical point of view. The development of crime will be discussed in section 4.1. The magnitude of the crime decline will be discussed in section 4.2. Subsequently, section 4.3 is about the fluctuations in the crime decline. Section 4.4 is about the broadness of the crime decline seen from the perspective of the districts of Rotterdam. Finally, in section 4.5 will the research question be answered and this section will contain the conclusion of this chapter.

4.1 Development of crime in Rotterdam

In the introduction of this research was mentioned that safety got the priority in the municipal policy of Rotterdam after Pim Fortuyn won the elections with Leefbaar Rotterdam in 2001. Another thing that was mentioned is that the safety scores improved every year after 2001. The question is if this could also been seen in the crime rates reported and registered by the police in Rotterdam. Figure 5 shows the development of the reported crime in Rotterdam in the period 2006-2011. From this figure can be derived that the crime rates declined. Although, the decline in crime rates was not consecutive in the years examined in this research. The crime rates increased in the years 2008 and 2011. The crime rates declined with 10,1 percent in Rotterdam in this period.

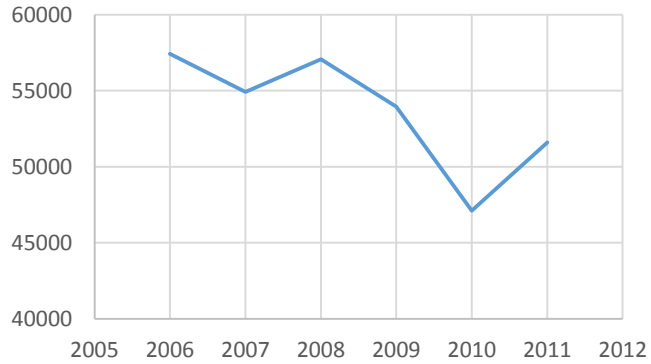

Figure 5: Development of crime since 2006, Rotterdam, 2011. Source: (processed data from) Police Rotterdam.

The crime rates declined in the period 2006-2011, but how was the distribution among the districts of Rotterdam? Did some districts contribute more to the number of reported crime than other districts? Figure 6 shows the distribution of the crime rates among the districts of Rotterdam in the period 2006-2011. This figure shows that Stadscentrum is the district with the most reported crime. The districts that follow with the subsequent highest reported crime are Prins Alexander, Charlois, Delfshaven and Feijenoord. The districts that have the lowest number of reported crime are Pernis, Hoek van Holland and Overschie. Hillegersberg-Schiebroek and Hoogvliet are other districts that have a low number of reported crime. Almost all the districts have a similar development as the total number of crime. However, some of the districts that have a larger number of crime do not follow the exact same development of the total crime. The differences are not big and concern mostly one year that does not

develop in the same direction as the total crime. For example, the district Stadscentrum follows the same development as the total crime except for the year 2007, in which the crime rates increased whereas the crime rates of the total crime declined. The distribution of crime is consistent with a previous research that is conducted in the Netherlands (Bernasco, 2011). This research stated that the most crimes are committed in the city center or the adjacent neighbourhoods. The only neighbourhood that is an exception to this statement is Prins Alexander, which is situated at the outskirts of Rotterdam.

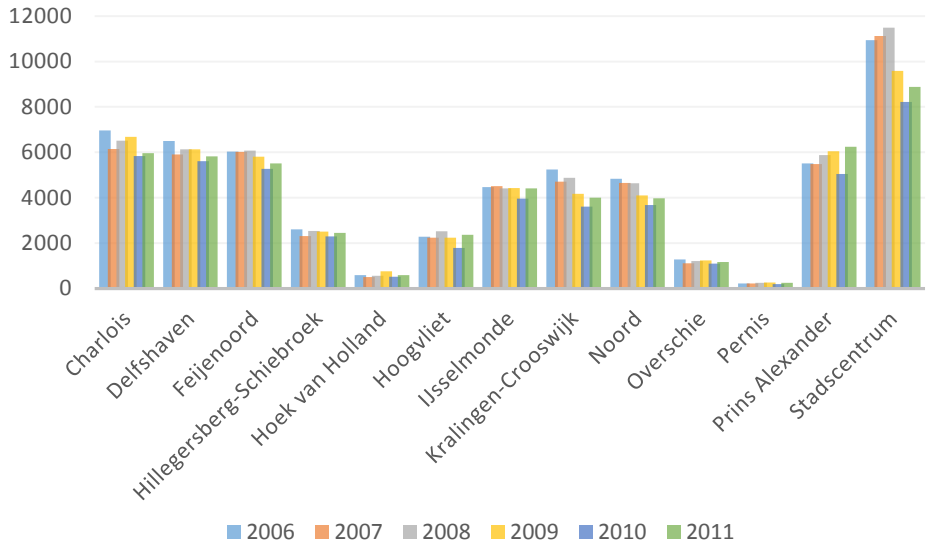

Figure 6: Development of crime in the districts since 2006, Rotterdam, 2011. Source: (processed data from) Police Rotterdam

4.2 Magnitude of the crime decline

This section is about the magnitude of the crime decline in Rotterdam between 2006 and 2011. The magnitude of the crime decline is determined by comparing the most recent crime levels that are being used in this research against the highest point of crime rates in Rotterdam in this period (Zimring, 2012). This means that the highest levels of crime rates of the types of crime will be compared with the level of crime in 2011. Another method to measure the magnitude of the crime decline is to compare the lowest rate of crime with the highest rate of crime. The outcomes of this method could give information about the consistency and length of the crime decline in Rotterdam. This will be discussed in a more extensive way in section 4.2. Figure 7 shows both the methods of measuring the magnitude of the decline of crime.

The first method of determining the magnitude shows that crime declined with rates of 8,4 percent to 15,8 percent between 2006 and 2011. The types of crime that declined were theft and burglary crimes, destruction and damage against public law and order crimes and, violence- and sex crimes. Remarkably is that drugs and alcohol offenses did not decline but increased with 2,4 percent in this period. When looking at the lowest rates compared to the highest rates it is striking that the percentages of the decline are higher. Even drugs and alcohol did decline according to this method. This indicates that, in the case of drugs and alcohol offenses, the highest rates were registered in the year 2011. This method also indicates that 2011 is not the year with the least recorded crimes. In addition, the higher scores also indicate that the decline in crime was not very consistent and that the crime rates fluctuated in the period 2006-2011.

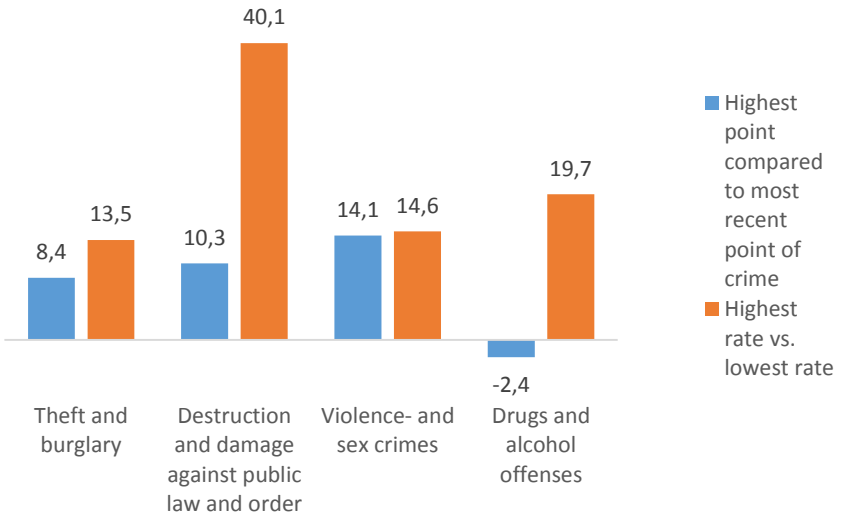

Figure 7: Magnitude of the crime decline since 2006, Rotterdam, 2011. Source: (processed data from) Police Rotterdam

4.2 Fluctuations in the crime decline

The second aspect of the crime decline in Rotterdam that will be discussed are the fluctuations in the crime decline between 2006 and 2011. This section describes the trends of the four types of crime separately. Figure 8 shows the development of the different types of crime in this period. The number of crime is shown as the total crime that is reported by the police. Theft and burglary crimes is the most reported type of crime. This is consistent with the national developments of crime (Akkermans & van Rosmalen, 2012). These developments show that property crimes are the most frequent in the Netherlands, followed by vandalism offenses and then violence- and sex crimes. Drugs and alcohol offenses are a far less common crime in the Netherlands.

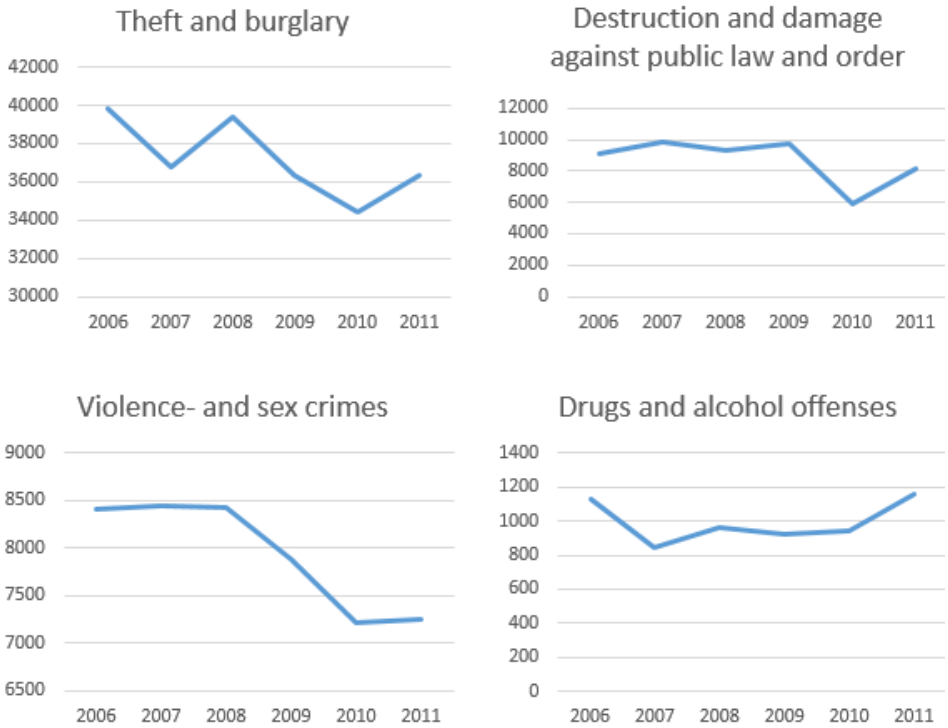

Figure 8: Fluctuations in the crime decline since 2006, Rotterdam, 2011. Source: (processed data from) Police Rotterdam

When looking to the development of the types of crime in the period 2006-2011, it is striking that not one of the trend lines is approximately the same. In addition, not a single type of crime has a consecutive decline in this period. As a matter of fact all the trend lines fluctuate. Violence and sex crimes has the most consistent crime decline. Noteworthy to mention is that all the types of crime that were declining in 2010 have been more reported in 2011. Almost all the types of crime were less reported, except for drugs and alcohol offenses in 2011 than in 2006.

4.3 Extensiveness of the crime decline

This section describes the crime decline in Rotterdam by including the thirteen districts. This leads to the question of how extensive the crime decline in Rotterdam was seen from a geographical point of view during the period 2006-2011. Meaning that the development of the four types of crimes in the thirteen districts of Rotterdam are taken into account. Differences and similarities among the trends in crime can be discussed based on the outcomes. Figure 9 shows the trend for the types of crime in the thirteen districts of Rotterdam during the period 2006-2011. The districts differ in size, number of inhabitants and composition, which could affect the number of crime in a district. Index numbers are used in figure 9 to prevent that one of those or other factors influence the numbers. These numbers will provide for the opportunity to discuss similarities and differences in the crime decline in the districts of Rotterdam.

Trends in theft and burglary crimes

The trends that were observed in the previous paragraphs of this chapter are also observable for theft and burglary crimes in all the city districts. For almost all the districts counts that there was a significant crime decline between 2006 and 2007. Subsequently, crime was more reported in almost all the city districts in the period 2007-2009. The crime rates declined after this period until the year 2010 whereupon the crime was again more reported in almost all the city districts, except for Charlois. Striking was the development of the theft and burglary crimes in the districts Hoek van Holland and Pernis. The development of Hoek van Holland is striking due to the strong fluctuations between 2006 and 2011. The development of Pernis is noteworthy, because theft and burglary crimes strongly increased in this district. This could possibly be explained due to the fact that Pernis and Hoek van Holland are districts with a relative low number of citizens and a low number of reported crimes between 2006 and 2011. Therefore have the changes in crime rates a more significant effect than in districts with a larger number of reported crimes. The district that had the strongest decline is Kralingen-Crooswijk (23%), followed by Stadscentrum (20%), Noord (19%), Charlois (17%), Delfshaven (11%), Feijenoord (11%), Hoek van Holland (8%), IJsselmonde (2%) and Overschie (1%). There was no crime decline in the remaining districts.

Trends in destruction and damage against public law and order

The crime decline of destruction and damage against public law and order developed are relatively similar in the districts of Rotterdam. In the period 2006-2009, the development of the destruction and damage against public law and order crimes fluctuated approximately between index scores of 80 and 120. There are three outliers, namely Hoek van Holland (156) in a negative manner and Overschie (80) and Kralingen-Crooswijk (80) in a positive manner. The crime rates in all the city districts declined after 2009, whereupon it increased in 2011. In this year, the index scores of almost all the districts are lower than the scores in 2006, except for the score of Hoek van Holland (103). The district that had the strongest decline is Kralingen-Crooswijk (37%) followed by Hillegersberg-Schiebroek (28%), Overschie (24%), Stadscentrum (13%), Feijenoord (11%), Noord (10%), Prins Alexander (9%), Charlois (7%), IJsselmonde (5%), Pernis (5%), Delfshaven (3%) and Hoogvliet (3%).

Trends in violence and sex crimes

The trends of violence and sex crimes showed a slight decline in almost all the districts of Rotterdam. Striking is the development of the violence and sex crimes in the districts of Hoogvliet, Hoek van

Holland and Pernis. The development in these districts differs from the development in the other districts. Hoek van Holland showed an increase in the year 2007, whereupon it decreased to an index score below 80 in 2008. Thereafter crime increases to index scores around or above 140. The reported violence and sex crimes in Hoogvliet increased 46 percent in the period 2006-2008. After this period, the violence and sex crimes reports dropped sharply. This resulted in that the reports of violence and sex crimes were eleven percent less reported in 2011 than in 2006. The development of violence and sex crimes in Pernis is striking, because it differed from most districts due to that it had lower index scores in the period 2006-2008. After that period it developed in approximately the same way as most of the other districts. The district that had the strongest decline is Overschie (37%) followed by Delfshaven (21%), Hillegersberg-Schiebroek (21%), Noord (19%), Charlois (18%), Stadscentrum (17%), Kralingen-Croosbeek (16%), Hoogvliet (11%), Prins Alexander (11%), Feijenoord (10%) and Pernis (9%).

Trends in drugs and alcohol offenses

The trends in drugs and alcohol offenses are more extreme than the trends in the other discussed types of crime. The reason for the extreme differences is the fact that drugs and alcohol offenses are way less reported than the other types of crime. Therefore changes in the number of reports were relatively more extreme. In some of the districts were drugs and alcohol offenses less than ten times reported in a year. Examples of those districts are Pernis, Hoogvliet and Overschie. This can also be seen in figure 9. The two districts with the most extreme fluctuation are Pernis and Overschie. In paragraph 4.1 came forward that drugs and alcohol offenses increased in the period 2006-2011. This can also been seen in figure 9. The crime rates regarding drugs and alcohol offenses increased in almost every district. The districts where a decline was observed are Hoek van Holland, Hoogvliet, Hillegersberg-Schiebroek, Pernis and Stadscentrum.

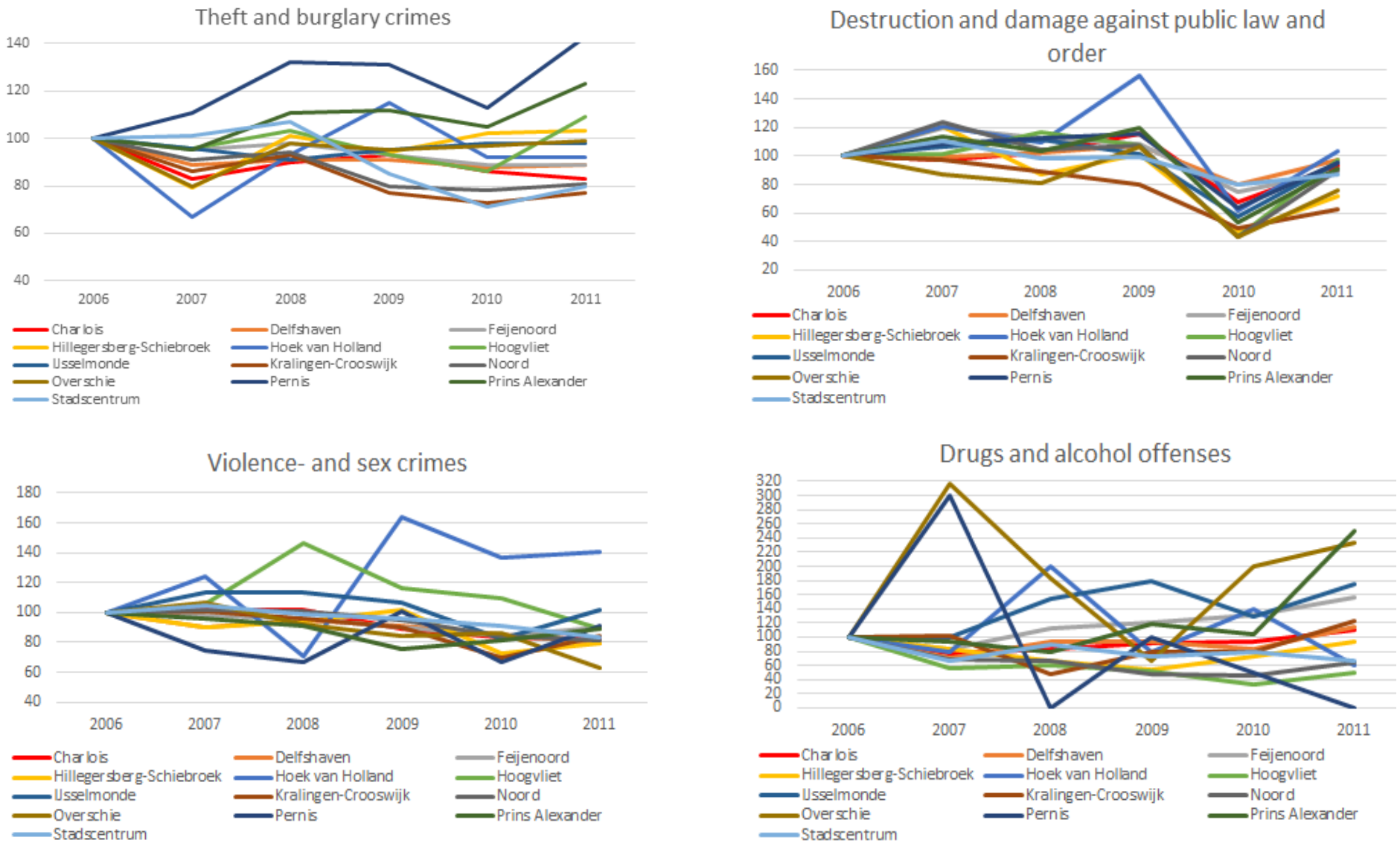

Figure 9: Trends in the different types of crime since 2006, Rotterdam, 2011. Source: (processed data from) Police Rotterdam

4.4 Conclusion

This chapter addressed the question: *What is the variation in crime rates and how have the crime rates developed in the districts of Rotterdam between 2006 and 2011.* The crime rates declined with 10,1 percent in Rotterdam in the period 2006-2011. The development of crime fluctuated in the period 2006-2011, but the crime rates were lower in 2011 than in 2006. The district with the most reported crime was Stadscentrum. The adjacent districts and Prins Alexander were districts with a higher number of reported crime than the districts that were farther situated from the city center. Another indication of the results is that theft and burglary crimes is the most reported crime of the four types that are examined in this research. This type of crime was even on its lowest point way more reported than the other types of crime in the period 2006-2011. The second most reported crime was destruction and damage against public law and order crimes followed by violence and sex crimes, and drugs and alcohol offenses. The last mentioned type of crime showed to be way less reported than the other types of crime.

The crime rates declined between 2006 and 2011. Although there was a difference in the magnitude of the crime decline. Violence and sex crimes declined the most of the types of crime that were distinguished in this research. The second most declined type of crime was destruction and damage against public law and order followed by theft and burglary crimes. Drugs and alcohol offenses increased between 2006 and 2011. The decline in crime was not consistent and fluctuated for the types of crime. The development of the types of crime in the districts of Rotterdam showed a different pattern per type of crime.

The most consistent type of crime was destruction and damage against public law and order in the city districts. This type of crime had the smallest range of the decline (in percentage points). The range of the crime decline for destruction and damage against public law and order was of 31 percent, followed by theft and burglary crimes (66 percent), violence and sex crimes (78 percent) and drugs and alcohol offenses increased with a range of 250 percent. The large range of drugs and alcohol offenses could be explained by the low number of reports regarding this crime. Therefore, the differences are more significant than changes in the number of the other types of crimes.

5. Variation and development of neighbourhood disorder in Rotterdam between 2006 and 2011

This chapter describes the variation and development of neighbourhood disorder in the districts of Rotterdam during the period 2006-2011. It addresses the third research question: *What is the variation in neighbourhood disorder and how has neighbourhood disorder developed in the districts of Rotterdam between 2006 and 2011?* Worth mentioning is that there is no data about the year 2010. No surveys were held for the Neighbourhood Profile among the citizens of Rotterdam in that year. Important statistics about the development and variation in neighbourhood disorder will be given in this chapter to provide for an answer for the above mentioned research question. In order to provide for an answer a closer look will be taken into the development of neighbourhood disorder, social disorder and physical disorder. The development of neighbourhood disorder will be discussed in section 5.1. Section 5.2 describes the development of social disorder and the development of physical disorder will be described in section 5.3. Section 5.4 describes the magnitude of the change in disorder in the districts of Rotterdam. Finally, the research question will be answered in section 5.5 and this section will contain the conclusion of this chapter.

5.1 Development of neighbourhood disorder in Rotterdam

When safety got the priority in the municipal policy of Rotterdam in 2001, one of the targets of that policy was to make Rotterdam cleaner and more undamaged. Neighbourhood disorder is measured as the percentage of the citizens that thought that disorder was a problem in their neighbourhood. The development of the percentage of the citizens that perceived neighbourhood disorder to be a problem in their neighbourhood is shown in figure 10.

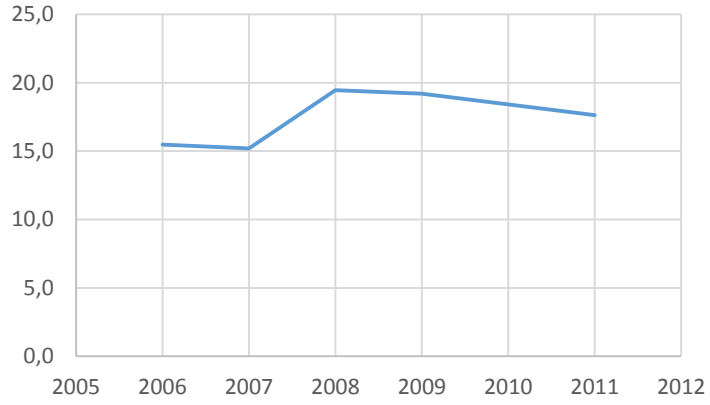

Figure 10: Development of disorder since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

Figure 10 shows that the perceived disorder fluctuated in Rotterdam between 2006 and 2011. From 2006 to 2007 disorder in the neighbourhood was slightly less perceived to be a problem. The citizens of Rotterdam who perceived disorder as a neighbourhood problem increased in 2008. In the period 2009-2011, disorder in neighbourhoods were steadily less perceived to be a problem per year. 15,5 percent of the citizens of Rotterdam thought that neighbourhood disorder was a problem in 2006. This percentage increased to 17,6 percent in 2011. Meaning that the perceived neighbourhood disorder increased between 2006 and 2011.

Figure 11 shows the development of neighbourhood disorder in the districts of Rotterdam. The districts Charlois, Delfshaven, Feijenoord and Stadscentrum seems to be districts in which disorder is

relatively more perceived than in the other districts. It could be seen as striking, that these districts also showed to be districts with relatively more reported crime. The average number of citizens who perceived neighbourhood disorder in Rotterdam was 17,4 percent in the period 2006-2011. Kralingen-Crooswijk and Noord are other districts where disorder was more perceived than the average. Noteworthy, these districts are adjacent to the earlier mentioned districts. Just as in the case of crime rates, the districts that are situated adjacent to the city center are districts with a higher level of disorder. A cause for this observation could be the higher immigrant concentration, concentrated disadvantage and population density in these districts. In the theoretical framework was mentioned that structural characteristics matter in relation to neighbourhood disorder (Sampson & Raudenbush, 1999). The mentioned structural characteristics were found to be correlated with neighbourhood disorder.

In the remaining districts disorder was the least perceived to be a neighbourhood problem. These districts are situated at the outskirts of Rotterdam. In addition, these districts have the lowest number of citizens, except for Prins Alexander which is the district with the largest number of citizens in Rotterdam. Stadscentrum was the district with the most perceived disorder in 2006 and Delfshaven is the district with the most perceived disorder in 2011.

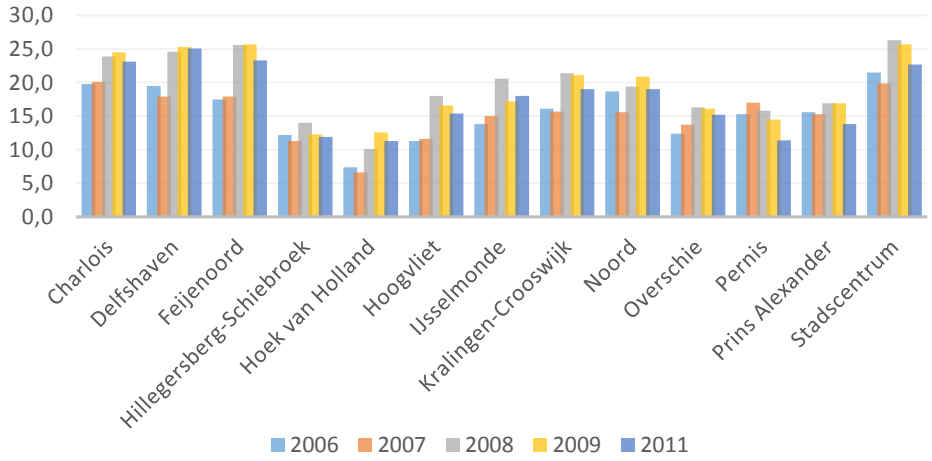

Figure 11: Development of disorder in the districts since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

5.2 Development of social disorder in Rotterdam

This section will take a closer look into the development of social disorder in Rotterdam. The indicators for social disorder are drug nuisance, loitering, drunken people and harassment of people who are passing by. Social disorder in neighbourhoods is related to human behavior. This means that it is perceived to be a neighbourhood problem when a resident sees somebody committing one of the above mentioned actions and the consequences of these actions (e.g. drugs needles). As a result, social disorder is less perceived to be a neighbourhood problem than the general level of disorder that is perceived in a neighbourhood. Social disorder has often a temporary nature, while physical disorder is visible until it is fixed or removed, such as graffiti on the walls of a building or litter next to the container. Figure 12 shows the development of social disorder in Rotterdam.

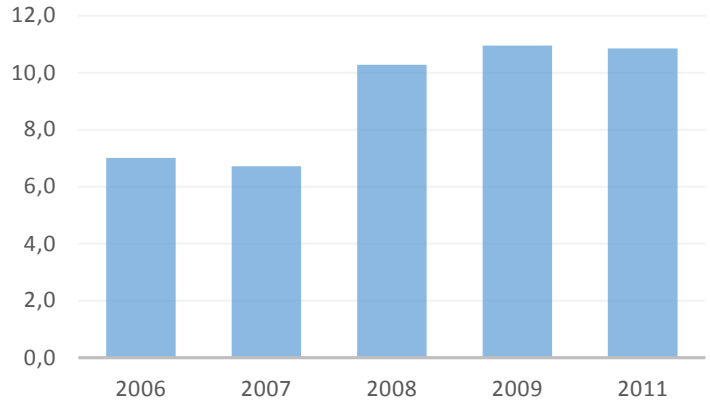

Figure 12: Development of social disorder since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

The percentages of citizens that perceived social disorder to be a neighbourhood problem varied between 6.8 percent and 10,9 percent in the period 2006-2011. Social disorder was less perceived to be a neighbourhood problem from 2006 to 2007. It increased to percentages that fluctuated between 10,3 percent and 10,9 percent in the years after 2007. This means that the perceived social disorder has increased in the period 2006-2011.

The development of the indicators of social disorder in Rotterdam is presented in figure 13. When taking a closer look into the development of the indicators of social disorder, it is clear that loitering is the most perceived as a neighbourhood problem. Drunken people in the streets is second most perceived as a neighbourhood problem followed by drug nuisance and the harassment of people in the streets. All the indicators are increasingly perceived to be a neighbourhood problem, except for drug nuisance in the period 2006-2011. Drug nuisance was less perceived in 2011, where the other indicators were more perceived to be a neighbourhood problem. However, the percentage of citizens who thought that drugs nuisance is a neighbourhood problem is still higher in 2011 than in 2006.

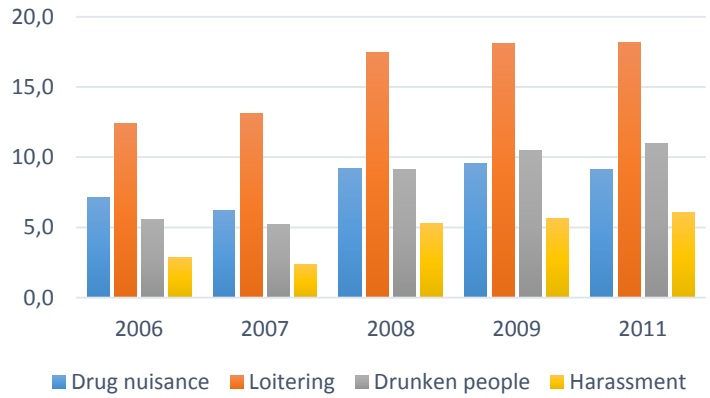

Figure 13: Development of indicators of social disorder since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

5.3 Development of physical disorder in Rotterdam

This section describes the development of physical disorder in Rotterdam. Figure 14 shows the development of physical disorder in Rotterdam in the period 2006-2011. From this figure can be

derived that physical disorder is more perceived to be a neighbourhood problem than social disorder. The percentage of citizens that thought that social disorder is a neighbourhood problem fluctuated between 6.8 percent and 10,9 percent in this period. This percentage is higher for physical disorder where the percentages vary between 19,7 percent and 24 percent. A reason for the higher levels of perceived physical disorder could be the visibility of physical disorder. Physical disorder is visible until it is fixed or removed. Physical disorder was the most perceived to be a neighbourhood problem in 2008. The development of the perceived physical disorder declined after 2008 till 2011. Although, the level of perceived physical disorder was higher in 2011 than in 2006. This means that the perceived physical disorder has increased in this period.

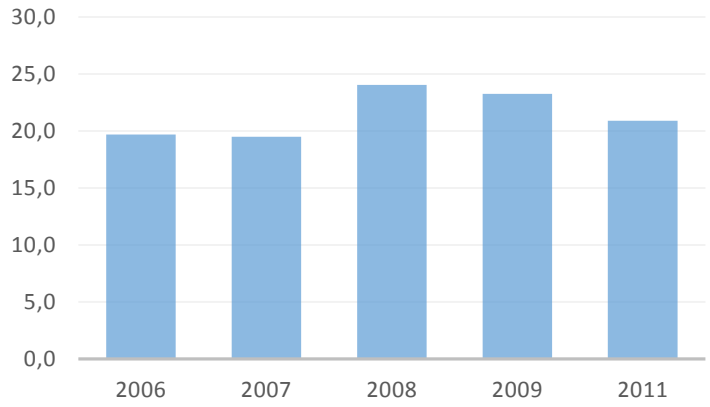

Figure 14: Development of physical disorder since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

When looking at the indicators of physical disorder in Rotterdam, the indicator that showed to be the most perceived as a neighbourhood problem is dog dirt. The development of the indicators of physical disorder in Rotterdam is presented in figure 15. Pollution on the streets is second most perceived as a neighbourhood problem followed by litter next to the container, holes in the pavement, destruction of phone booths, tram and bus stops, graffiti on the walls, urinating in the public and broken street furniture. Striking is the development of litter next to the container and urinating in the public. Both indicators were remarkably more perceived to be a neighbourhood problem after 2007. Litter next to the container became due to this increase the third most perceived as a neighbourhood problem between 2006 and 2011. Another point that is worth mentioning is the development of dog dirt. This indicator had the biggest decline between 2006 and 2011. The differences with litter next to the container and pollution on the streets has been strongly reduced.

Figure 15: Development of indicators of physical disorder since 2006, Rotterdam, 2011. Source: (processed data from) Directie Veiligheid Rotterdam

5.4 Magnitude of the change of disorder

This section is about the percentage changes in which disorder is perceived to be a neighbourhood problem in the districts of Rotterdam in the period 2006-2011. The percentage changes gives an overview in which disorder is more or less perceived to be a problem according to the citizens of Rotterdam. The percentage change of neighbourhood disorder is calculated by measuring the most recent level of disorder (2011) against the level of neighbourhood disorder in 2006. Table 2 shows the percentage changes of disorder, social disorder and physical disorder in the districts of Rotterdam with respect to 2006.

Table 2 shows that disorder is more perceived to be a neighbourhood problem in almost all the districts of Rotterdam. The perceived disorder had the strongest increase in the district Hoek van Holland. The increase of the observation of disorder in this district is 52,7 percent. In section 5.1 was shown that Hoek van Holland was the district with the least perceived disorder in 2006. Nonetheless, after the increase of disorder, Hoek van Holland is still the district with the least perceived disorder in 2011. Other districts in which disorder increased significantly are Hoogvliet (36%), Feijenoord (33,1%), IJsselmonde (30,6%), Delfshaven (28,7%) and Overschie (22,5%). Disorder is less perceived to be a neighbourhood problem in the districts Hillegersberg-Schiebroek, Prins Alexander and Pernis. The decline in disorder was the strongest in Pernis with a decline of 25.5 percent followed by Prins Alexander with 11,5 percent and Hillegersberg-Schiebroek with 2,5 percent. The level of disorder increased 17,1 percent on average in the districts of Rotterdam in the period 2006-2011. Noteworthy to mention is that the district Stadscentrum due to a relatively small increase of disorder dropped from the district with the most perceived disorder to the district with the third most perceived disorder.

	Disorder	Physical disorder	Social disorder
Charlois	+16,7	+8.9	+51,5
Delfshaven	+28,7	+12.6	+67,9
Feijenoord	+33,1	+23.8	+61,8
Hillegersberg-Schiebroek	-2,5	+0.6	+19,4
Hoek van Holland	+52,7	+18,8	+196,7
Hoogvliet	+36,3	+25,5	+107,5
IJsselmonde	+30,4	+16,6	+60,4
Kralingen-Crooswijk	+18,0	+12,8	+60,5
Noord	+18,0	-1,7	+26,1
Overschie	+22,5	+13,1	+178,3
Pernis	-25,5	-8,3	+40,4
Prins Alexander	-11,5	-1,4	+27,5
Stadscentrum	+5,6	+6,5	+16,2

Table 2: Percentage change of disorder in the districts with respect to 2006, Rotterdam, 2011: Source (processed data from) Directie Veiligheid Rotterdam.

Table 2 shows that the changes in the extent that physical disorder is seen as a neighbourhood problem are less big than that of disorder as a whole. The district in which physical disorder increased the most is Hoogvliet. Physical disorder was 25,5 percent more perceived to be a neighbourhood problem in this district than in 2006. The only other district that also had an increase of physical disorder of at least 20 percent is Feijenoord (23,6%). Physical disorder was less perceived to be a neighbourhood problem in three districts. These districts are Pernis (-8,3%), Noord (-1,7%) and Prins Alexander (-1,4%).

The decline in physical disorder is not big in these districts, but this could be expected due to the fact that disorder in general increased in the period 2006-2011. The perceived physical disorder increased 9,8 percent in the districts of Rotterdam in this period.

The percentage changes of social disorder are more extreme than the changes in disorder and physical disorder in the districts of Rotterdam. Social disorder has been more perceived to be a neighbourhood problem in all the districts of Rotterdam. Outliers in a negative manner are Hoek van Holland (196,7%), Overschie (178,3%) and Hoogvliet (107,5%). The percentage of residents that thought that social disorder is a neighbourhood problem doubled or almost tripled in these districts. The changes in these districts are bigger than in other districts, because these three districts had the lowest levels of disorder in 2006. Districts with a relatively smaller increase of social disorder are Prins Alexander (27,5%), Noord (26,1%), Hillegersberg-Schiebroek (19,4%) and Stadscentrum (16,2%). The perceived social disorder increased 70,3 percent on average in the districts of Rotterdam in the period 2006-2011.

5.5 Conclusion

This section gives an answer to the third research question: *What is the variation in neighbourhood disorder and how has neighbourhood disorder developed in the districts of Rotterdam between 2006 and 2011?* The disorder in neighbourhoods has been more perceived to be a neighbourhood problem in the period 2006-2011. The development of neighbourhood disorder fluctuated and the highest level of disorder was observed in 2008. The four districts with the most perceived disorder are Charlois, Delfshaven, Feijenoord and Stadscentrum. Other districts with an above average perceived disorder are Kralingen-Crooswijk and Noord.

The percentages of citizens that perceived social disorder to be a neighbourhood problem varied between 6.8 percent and 10,9 percent in the period 2006-2011. Social disorder has been more perceived to be a neighbourhood problem in this period. 6,8 percent of the citizens of Rotterdam thought that social disorder was a neighbourhood problem in 2006. This increased to 10,3 percent in 2011. Loitering was the most perceived to be a neighbourhood problem of the indicators of social disorder followed by drunken people on the streets, drug nuisance and harassment.

The percentages of citizens of Rotterdam that perceived physical disorder to be a neighbourhood problem varied between 19,7 percent and 24 percent. The perceived physical disorder fluctuated in the period 2006-2011. However, physical disorder has been more perceived to be a neighbourhood problem in the end of this period. 19,7 percent of the citizens of Rotterdam that physical disorder was a neighbourhood problem in 2006. This increased to 20,9 percent in 2011. Dog dirt is the indicator that is most perceived to be a neighbourhood problem followed by pollution on the streets, litter next to the container, holes in the pavement, destruction of phone booths, tram and bus stops, graffiti on the walls, urinating in public and broken street furniture.

Disorder has increased in the period 2006-2011. Although, the percentage of citizens who thought that disorder is a neighbourhood problem declined after 2008. Disorder is more perceived to be a neighbourhood problem in almost all the districts. The district with the biggest increase of disorder is Hoek van Holland. Districts in which disorder declined are Hillegersberg-Schiebroek, Prins Alexander and Pernis. Disorder increased 17,1 percent on average in the districts of Rotterdam in the period 2006-2011. The differences in physical disorder were less extreme, but this also increased in almost all the districts. Pernis, Noord and Prins Alexander are the only districts in which physical disorder declined. Social disorder increased in every district. The outliers are Hoek van Holland, Hoogvliet and Overschie.

6. Results

The fourth research question will be addressed in this chapter: *What is the relationship between neighbourhood disorder and crime in the districts of Rotterdam between 2006 and 2011?* The hypotheses that are formulated in the theoretical framework will be tested in this chapter. In the previous chapters the conclusion is that the crime rates declined in the period 2006-2011. Furthermore disorder has been more perceived by the residents in the same period. This chapter examines to what extent disorder and crime correlate with one another. The relationship between neighbourhood disorder and crime will be tested through correlational analyses. The relationship between disorder and crime will be tested in section 6.1. Section 6.2 contains the conclusions of this chapter and the answer to the research question.

6.1 Neighbourhood disorder and crime

This section is about the relationship between neighbourhood disorder and crime. According to Skogan (1990) neighbourhood disorder is a cause of crime. Others think that disorder and crime are correlated by mediator variables such as fear of crime or social control (Geis & Ross, 1998; Xu et al., 2005; Gault & Silver, 2008). There is agreement among scholars about the fact that disorder and crime are correlated.

This analysis will examine if disorder and crime are also correlated in the districts of Rotterdam in the period 2006-2011. In the theoretical framework the Broken Windows Theory is mentioned. This theory suggests that minor forms of public disorder (such as broken windows) could lead to severe crime and a downward spiral of urban decay. This makes residents fearful and causes them to retreat to their homes. Wilson and Kelling (1982) suggest *'that untended behavior leads to the breakdown of community controls'*. This gives room to criminals to operate freely in this neighbourhood. The Broken Windows Theory has besides disorder and crime two other key variables. These variables are fear of crime and social control. In the analysis of the relationship between disorder and crime are these variables included, because they could influence the relationship between them.

In section 3.3.2 the Cronbach's alpha of the variables is presented. It seems apparent that when all the types of crime are pooled, the Cronbach's alpha is too low for these variables to be one scale for crime. As a result, crime will be examined per crime type separately. Meaning that the neighbourhood disorder, fear of crime and social control will be examined in relation to:

- Theft and burglary crimes
- Destruction or damage against public law and order
- Violence and sex crimes
- Drugs and alcohol offenses

Hypotheses 1-6 will be tested in this section. The analysis of the hypotheses will give an answer to the research question and a representation about the mutual correlations between the variables of the Broken Windows Theory. Table 3 gives an overview of the results of the Spearman's rho test between the variables of the Broken Windows Theory. Due to the cross sectional design of this research a causal effect cannot be concluded. We can only discuss the correlation between crime and disorder.

	Statistics	Disorder	Physical disorder	Social disorder	Fear of crime	Social control
Disorder	Correlation Coefficient Sig. (1-tailed)					
Physical disorder	Correlation Coefficient Sig. (1-tailed)					
Social disorder	Correlation Coefficient Sig. (1-tailed)					
Fear of crime	Correlation Coefficient Sig. (1-tailed)	,865*** ,000	,861*** ,000	,841*** ,000		
Social control	Correlation Coefficient Sig. (1-tailed)	-,684*** ,000	-,681*** ,000	-,682*** ,000	-,632*** ,000	
Theft and burglary crimes	Correlation Coefficient Sig. (1-tailed)	,426*** ,000	,399*** ,001	,386*** ,001	,503*** ,000	,023 ,430
Destruction or material damage against public law and order	Correlation Coefficient Sig. (1-tailed)	,385*** ,001	,360*** ,000	,372*** ,000	,425*** ,000	,067 ,301
Violence and sex crimes	Correlation Coefficient Sig. (1-tailed)	,602*** ,000	,605*** ,000	,583*** ,000	,632*** ,000	-,254* ,022
Drugs and alcohol offenses	Correlation Coefficient Sig. (1-tailed)	,702*** ,000	,656*** ,000	,690*** ,000	,688*** ,000	-,357*** ,000

Table 3: Spearman's rho test between the variables of the Broken Windows Theory (N=63).
** Correlation is significant at the 0.05 level (1-tailed).*
*** Correlation is significant at the 0.01 level (1-tailed).*
**** Correlation is significant at the 0.001 level (1-tailed).*

The results of the Spearman's rho test in table 3 shows that disorder is correlated with the four types of crime that are being used in this research. The correlation coefficients between disorder and the types of crime are all significant and positive. This implies that neighbourhoods with a high level of disorder are more likely to have a higher level of crime than neighbourhoods with a low level of disorder and vice versa. Based on the results in table 3 can be derived that disorder has the strongest correlation with drugs and alcohol offenses (r = ,702). The second strongest correlation has disorder with violence and sex crimes (r = ,602) followed by burglary and theft crimes (r = ,426). The lowesr correlation is between destruction and damage against public law and order crimes (r = ,385).

In this research, physical and social disorder are also separately examined to see which of the two types has the strongest correlation with crime. Table 3 shows that both the types of disorder are positively correlated with crime. Social disorder, however is slightly stronger correlated to crime than physical disorder. Social disorder has the strongest relationship with drugs and alcohol offenses (r = ,690) followed by violence and sex crimes (r = ,583), theft and burglary crimes (r = ,386) and destruction and damage against public law and order (r = ,372). Physical disorder has the same order of correlation related to the types of crime. This means that physical disorder is also the strongest correlated with drugs and alcohol offenses (r = ,656) followed by violence and sex crimes (r = ,605), theft and burglary crimes (r = ,399) and destruction and damage against public law and order crimes (r = ,360).

It is noteworthy that disorder is the strongest correlated to the types of crime that are registered to a lesser extent. Drugs and alcohol crimes were of the four types of crimes the least registered followed by violence and sex crimes during the examination period. The Spearman's rho test about the relationship between disorder and crime showed that there is a significant relation between disorder and crime. Hypothesis 1 expects that neighbourhood disorder and crime are positively correlated. The outcomes of the Spearman's rho test show that this is also the case in Rotterdam. Therefore can hypothesis 1 be confirmed.

The theoretical framework indicates that neighbourhood disorder and fear of crime are correlated. This correlation is also apparent based on data in table 3. Strong correlations are found between

neighbourhood disorder and fear of crime. The relationship between disorder and fear of crime has a correlation coefficient of ,865. Meaning that neighbourhoods with a high level of disorder are more likely to have a higher level of fear of crime than neighbourhoods with a lower level of disorder and vice versa. Physical disorder and social disorder are also examined in relation to fear of crime. Both the types of disorder have also a strong significant correlation with fear of crime. The relationship between physical disorder and fear of crime has a correlation coefficient of ,861 and the relationship between social disorder and fear of crime has a correlation coefficient of ,841. Physical disorder has a slightly stronger correlation with fear of crime than social disorder. The results of the Spearman's rho test show that disorder is correlated with fear of crime. Hypothesis 2, can therefore be confirmed.

A lot is written about the relationship between social control and disorder in this thesis. The literature shows that social control and disorder are correlated to one another. When disorder increased in neighbourhoods social control decreases in that neighbourhood (Markowitz et al., 2001. The Spearman's rho test could not determine whether social control is a cause of disorder, but it could test the correlation between disorder and social control. Hypothesis 3 expects that the relationship between social control and disorder is negative. Table 3 confirms this assumption. There is indeed a negative correlation between social control and disorder. The correlation coefficient of this relationship is -,684 and is significant at the 0.1% level. The results of the Spearman's rho test also show that physical disorder and social disorder have significant correlations with social control. The difference between the two types of disorder is minimal, because the relationship of social control and physical disorder has a correlation coefficient of -,681 whilst the relationship between social disorder and social control has a correlation coefficient of -,682. The results of the Spearman's rho test show a significant negative correlation between disorder and social control, which means that hypothesis 3 can be confirmed.

The literature states that fear of crime makes people retreat to their homes (Wilson & Kelling, 1982). As a result, the interaction between neighbors will diminish. This lowers the social control in a neighbourhood. To see if this assumption is correct, is the relationship between fear of crime and social control is examined in this research. The assumption is that when people are more fearful of crime, the neighbourhood shows a lower level of social control. Hypothesis 4 is related to this relationship. The results of the Spearman's rho test indicate that there is a significant negative correlation between fear of crime and social control. The correlation coefficient of this relationship is -,632. This means that hypothesis 4 can be confirmed.

A result of the increase of fear of crime and the decrease of social control in a neighbourhood is that crime will increase, because criminals will get more room to operate in this neighbourhood (Wilson & Kelling, 1982). People do not correct misbehavior and do not monitor the public space. This could lead to that criminals getting away with their actions unpunished. Hypothesis 5 concerns the relationship between fear of crime and crime. Table 3 indicates that there is a significant relationship between fear of crime and crime. The correlation coefficients of the relationship between fear of crime and the different types of crime are all significant at the 0,1% level. The strongest correlation was found between drugs and alcohol offenses and fear of crime (,688) followed by violence and sex crimes (,632), theft and burglary crimes (,503) and destruction or material damage against public law and order (,425). This means that the results of the Spearman's rho test confirm hypothesis 5.

The last hypothesis concerns the relationship between social control and crime. This relationship is expected to be a negative relationship. The lack of social control is often seen as a cause for crime (van Stokkum & Toenders, 2010; Xu et al., 2005; Markowitz et al, 2001). The Spearman's rho test partially

supports this hypothesis, because social control had a significant correlation with drugs and alcohol offenses (-,357) and violence and sex crimes (-,254). These correlations are in the expected direction. The Spearman's rho test was unable to find a significant correlation between social control and theft and burglary crimes, and destruction or material damage against public law and order.

Almost all of the relationships between the variables that are mentioned in the Broken Windows Theory can be confirmed with the Spearman's rho test. The only relationship that could not fully be supported by the data is the relationship between social control and crime. When the results of the Spearman's rho test are added to figure 3, the result is in figure 16.

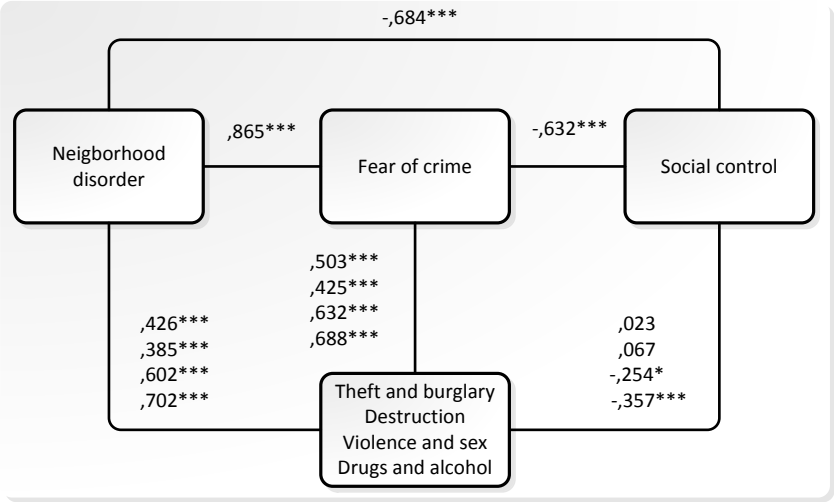

Figure 16: Relations between the variables of the Broken Windows Theory.
** Correlation is significant at the 0.05 level (1-tailed).*
**** Correlation is significant at the 0.001 level (1-tailed).*

The relations between the variables within the Broken Windows Theory with their mutual correlations are shown in figure 16. A difference with figure 3 is that crime is divided in the four types of crime that are used in this research. Some lines within figure 16 show four correlations. These correlations represent the correlation between the variables with the type of crime in the order of how the types of crimes are mentioned. For example, the correlation coefficient of ,503 between fear of crime and the types of crime is the correlation with theft and burglary, because it is the first mentioned correlation coefficient.

Figure 16 shows that neighbourhood disorder and fear of crime have strong correlations with crime. The strongest correlation between the variables of the Broken Windows Theory is measured between disorder and fear of crime. The strong correlation between fear of crime and disorder raises a question, namely is the significant relationship between neighbourhood disorder and crime a self-contained relationship or is it mediated or explained by fear of crime? In previous research is found that the relationship between neighbourhood disorder and crime is mediated by fear of crime (Markowitz, Bellair, Liska, & Liu, 2001). A partial correlation test is computed to examine the strength of the correlation between disorder and the types of crime. The results of the partial correlation test are shown in figure 17, which is presented on the next page. The lines with the correlation coefficient represent the relationship between the two variables corrected for the other variable. For example, the correlation coefficient of ,844 between neighbourhood disorder and fear of crime is corrected for theft and burglary crimes.

The correlations between disorder, fear of crime, and the types of crime change after the partial correlations test. The relationships between fear of crime, disorder and the types of crime were all significant before the partial correlations test. Two relationships remain significant with crime after the partial correlations test. This is the relationship between neighbourhood disorder and violence and sex crimes and the relationship between neighbourhood disorder and drugs and alcohol offenses. The relationship between neighbourhood disorder and drugs and alcohol offenses has the strongest correlation coefficient of ,342 with and a significance level of ,003. The relationship between neighbourhood disorder and violence and sex crimes has a slightly weaker correlation of ,220 with a significance level of ,043. This means that the relationships between neighbourhood disorder and theft and burglary crimes and neighbourhood disorder and destruction or material damage against public law and order crimes became insignificant after controlling for fear of crime. This could mean that those relationships are explained by fear of crime, but this seems not to be the case. The relationships of fear of crime with the types of crime become insignificant after controlling for neighbourhood disorder. This implies that neighbourhood disorder has a better correlation with the types of crime than fear of crime. Suggesting that neighbourhood disorder is a better predictor of crime than fear of crime, especially in the cases of violence and sex crimes and drugs and alcohol offenses. This could be an outcome of the partial correlation's test that is surprising. However, is fear of crime such a good predictor for crime? Where the crime rates are declining in the Netherlands, the development of fear of crime among citizens is consistent or even increasing in the last years (Centraal Bureau voor de Statistiek, 2013b, 2014).

Figure 17: Partial correlation test between neighbourhood disorder, fear of crime and the types of crime.

The results from the analysis, show that the variables of the Broken Windows Theory correlate with one another, based on the data from the districts of Rotterdam. The main implication of these results is that neighbourhoods of Rotterdam with higher levels of disorder, more often have higher levels of fear of crime, crime and a lower level of social control than neighborhoods with lower levels of disorder. This means that the Broken Windows Theory could explain the relationship between neighborhood disorder and crime in Rotterdam. Implying that untended disorder could lead to crime and a downward spiral of urban decay.

6.2 Conclusion

This chapter addressed the question: *What is the relationship between neighbourhood disorder and crime in the districts of Rotterdam between 2006 and 2011?* The analysis shows that neighbourhood disorder correlates with crime based on the data from the districts of Rotterdam. Neighbourhood disorder correlated with all the types of crime that are used in this research. The strongest correlation was found with drugs and alcohol offenses followed by violence and sex crimes, theft and burglary crimes, and destruction or material damage against public law and order.

The differences between the types of disorder and crime were minimal. Social disorder is in general slightly stronger correlated than physical disorder with the types of crime. Nevertheless, physical disorder was slightly stronger correlated to theft and burglary crimes, and violence and sex crimes. Whereas social disorder was slightly stronger correlated to destruction or damage against public law and order crimes, and drugs and alcohol offenses. This means that neighborhoods with a high level of physical disorder are more likely to have higher levels of violence and sex crimes, and theft and burglary crimes than neighborhoods with a high level of social disorder. The reverse applies to the other types of crime.

The relationship between neighbourhood disorder and crime is often related to the Broken Windows Theory. The mutual correlations between the variables of this theory has been examined in this chapter. Between the variables were strong significant correlations found. The only exception is between social control and the types of crime. Social control does have a significant correlation with violence and sex crimes and drugs and alcohol offenses. This implies that the Broken Windows Theory could explain the relationship between neighbourhood disorder and crime, also in Rotterdam. Meaning that untended disorder could lead to crime and a downward spiral of urban decay.

7. Conclusion, discussion, contribution, and limitations of this research

This chapter addresses the conclusion, discussion, contributions to the literature, and limitations of this research. The central research question will be answered in section 7.1 and is based on the results that were presented in the previous chapters. The results of this research in relation to the literature and the contributions that are made will be discussed in section 7.2. Section 7.3 gives recommendations. The last section is about the limitations of this research and it also contains the validity and reliability of the variables.

7.1 Conclusion

This section answers the central research question which is formulated as follows: "*To what extent does neighbourhood disorder change in the districts of Rotterdam in the period of 2006-2011 and does neighbourhood disorder explain crime changes?"* The level of disorder that is perceived by citizens has fluctuated in the period 2006-2011. Disorder was less perceived to be a neighbourhood problem in 2007 than in 2006. It did increase to its highest point in the year 2008. After 2008, the level declined every year. It was still higher than in 2006 though. The perceived disorder totally increased by 17,1 percent on average in the districts of Rotterdam. The perceived disorder increased in almost all the districts of Rotterdam. The district in which the perceived disorder did increase the most was Hoek van Holland. Here it almost tripled. On the other hand, the strongest decline of perceived disorder was in the district Pernis. The decrease of perceived disorder was also present in Hillegersberg-Schiebroek and Prins Alexander.

The results presented in this thesis show that neighbourhood disorder and crime are positively correlated. Drugs and alcohol offenses showed to have a strong correlation with disorder. Violence and sex crimes, and theft and burglary crimes showed to have a moderate correlation with disorder. Destruction or damage against the public law and order showed to have a weak correlation with disorder. The differences between the types of disorder and crime were minimal. Social disorder is in general slightly stronger correlated than physical disorder with the types of crime. Nevertheless, physical disorder was slightly stronger correlated to theft and burglary crimes, and violence and sex crimes. Whereas social disorder was slightly stronger correlated to destruction or damage against public law and order crimes, and drugs and alcohol offenses. Neighbourhood disorder showed of the variables in this research to be the best predictor of crime.

The relationship between neighbourhood disorder and crime is often related to the Broken Windows Theory. The mutual correlations between the variables of this theory has been strong significant correlations were found. The only exception is between social control and the types of crime. Social control does have a significant correlation with violence and sex crimes, and drugs and alcohol offenses. The strong correlations between the variables show that neighbourhoods of Rotterdam with higher levels of disorder, have more often higher levels of fear of crime, crime and a lower level of social control than neighborhoods with lower levels of disorder. This implies that the Broken Windows Theory could explain the relationship between neighbourhood disorder and crime, also in Rotterdam. Meaning that untended disorder could lead to crime and a downward spiral of urban decay.

7.2 Contributions to the literature

This section describes the contributions of this research to the existing literature. The results will be compared with the literature described in the theoretical framework. Much has been written about

the relationship between disorder and crime in the theoretical framework. The similarities and differences with the literature and this research will be discussed in this section.

The relationship between neighborhood disorder and crime is an unclear relationship. This research shows a linear correlation between disorder and crime. Between the types of crime and disorder are weak to strong correlations found. The weak correlation is found between destruction or material damage against the public law and order and disorder. This type of crime is not often examined in relation to disorder. This research examines to what extend neighbourhood disorder explains crime in the districts in Rotterdam. Nonetheless showed the weak correlation that a linear relationship exists between disorder and destruction or material damage against the public law and order crimes.

Moderate correlations with disorder have been found with theft and burglary crimes, and violence and sex crimes. These two types are the most examined with regard to disorder in the literature (Sampson & Raudenbush, 1999; Skogan, 1990; Xu et al., 2005). In some studies theft and burglary correlated stronger than violence and sex crimes and vice versa. This research found a stronger correlation between disorder and violence and sex crimes. This is consistent with earlier conducted studies (Boggess & Maskaly, 2014; Sampson & Raudenbush, 1999).

The strongest correlation was found between drugs and alcohol offenses and disorder. This is also a type of crime that is not much examined in relation to neighbourhood disorder. This could be due to the fact that drugs and alcohol offenses are less reported than the other types of crimes used in this research. That disorder has the strongest correlation with drugs and alcohol offenses shows that in neighbourhoods were disorder can be found, it is more likely to find drugs and alcohol offenses than the other types of crime.

The relationship between disorder and fear of crime is examined in the literature and this is also discussed in the theoretical framework. The conclusion of most studies regarding this relationship is that perceived disorder makes residents fearful (Brunton-Smith & Sturgis, 2011; Kohm, 2009; Skogan, 1990). The strong correlation found between fear of crime and disorder confirms that neighbourhoods with a higher level of disorder also have higher levels of fear of crime than neighbourhoods with a lower level of disorder. This outcome implies that perceived neighborhood disorder makes residents fearful. In the theoretical framework is also mentioned that some authors think differently about the effect of social disorder and physical disorder on fear of crime. Kohm (2009) found that social disorder could be linked to spatial patterns and that physical disorder does not tend to provoke fear for citizens. In contrary, Brunton-Smith and Sturgis (2011) demonstrated that visible signs of neighbourhood disorder are a highly predictive of expressed fear of crime. The results found in this research show that both the types are strongly correlated to fear of crime. However, physical disorder was slightly stronger correlated.

The relationship between neighbourhood disorder and social control is also discussed in the theoretical framework. It came forward that disorder leads to the decrease of social control. Deteriorated and decayed neighbourhoods lead to that residents do not trust their neighbors, do not have social ties and therefore do not correct misbehavior (Oh, 2003; Ross & Jang, 2000; Ross et al., 2001). This research found a strong negative correlation between social control and neighborhood disorder. That is consistent with the findings of the studies discussed in the theoretical framework, because the results of this research indicate that neighbourhoods with a higher level of disorder have a lower level of social control than neighbourhoods with a lower level of disorder and vice versa. This indicates that neighborhood disorder affects the level of social control in a neighborhood.

The Broken Windows Theory is often discussed in relation to the relationship between crime and disorder. This research showed that all the variables of the Broken Windows Theory have a linear relationship in the expected direction. Although, social control was only correlated with violence and sex crimes and drugs and alcohol offenses. This means that the Broken Windows Theory could be plausible in the cases of violence and sex crimes, and drugs and alcohol offenses. The strong correlations found between disorder, fear of crime and social control indicates that these variables are closely connected and that they could influence each other. Meaning that the correlations found in this research make it plausible that the broken windows theory could explain the relationship between neighborhood disorder and crime.

The results of the analysis confirmed nearly all the hypotheses completely, except hypothesis 6 which is partially confirmed. This means that the variables that are used in this research are connected to each other. Implying that it could be useful to take these variables into account when making policies about neighbourhood safety. Neighbourhood disorder could lead to the deterioration of a neighbourhood. Keizer et al. (2008) showed that that inappropriate behavior like broken windows or graffiti lead to other inappropriate behavior, which in turn results in the inhibition of norms. It is also shown that neighbourhood disorder could make people feel themselves unsafe in their own neighbourhood (Brunton-Smith & Sturgis, 2011; Kohm, 2009; Skogan, 1990). In earlier studies is also shown that residential stability has an relationship with disorder in neighbourhoods (Wilcox et al., 2004). In addition, it was found that local ties and attachment are linked to residential stability (Taylor, 1997). As a result could neighbourhood disorder make people retreat to their homes or move out of the neighbourhood. Disorder, fear of crime and social control are proven to be related in earlier studies (McGarrell et al., 1997; Ross & Jang, 2000). Decayed and deteriorated neighbourhoods are also less attractive for more prosperous citizens. It is shown that neighbourhoods with more concentrated disadvantage have more neighbourhood disorder (Sampson & Raudenbush, 1999). The correlations found in this research confirm the mutual relationships of the Broken Windows Theory and this makes it plausible, also in Rotterdam, that neighbourhood disorder leads to crime and a downward spiral of urban decay (Wilson & Kelling, 1982).

7.3 Recommendations

This section describes recommendations based on the findings of this research. The findings of this research showed that the Broken Windows Theory variables are closely connected to each other. Implying that when one of the variables is affected this could also affect another variable. The first recommendation is that disorder in neighbourhoods should be tackled. This means that troublesome loiterers, drunken people on the streets, people who harass other people, drugs related nuisance, vandalism and pollution in the neighbourhood should be tackled. This will not only improve the livability of a neighbourhood, but should also have positive effects on fear of crime, the degree of social control in a neighbourhood and crime. This recommendation is consistent with the current safety approach of Rotterdam for the period 2014-2018. Important topics of this approach are:

- The general level of safety should be alright;
- Citizens and entrepreneurs should feel themselves more safe in their own neighbourhood;
- Children must be able to be safe when growing in the city. Youth nuisance and juvenile delinquency should be restricted.

Fear of crime is a concept that is on the agenda of municipalities for a considerable time now. The last years, fear of crime didn't decline in the Netherlands (Centraal Bureau voor de Statistiek, 2014). It even

increased. Especially the number of citizens that feel themselves sometimes unsafe in their own neighbourhood increased with more than ten percent in the period 2008-2013. This research demonstrated that neighbourhood disorder and fear of crime are strongly correlated in Rotterdam. To reduce fear of crime, among citizens of Rotterdam, it could be useful to focus more on disorder in neighbourhoods than on crime. Being a victim of crime and neighbourhood disorder affect fear of crime (Gainey, Alper, & Chappell, 2011). However, neighbourhood disorder is more visible and more present in a neighbourhood (Gau & Pratt, 2008). The chance of being a victim of violence and sex crimes is 2 percent in Rotterdam and the chance of being a victim of theft and burglary is 13 percent in Rotterdam (Centraal Bureau voor de Statistiek, 2014). This indicates that the chances of becoming a victim of crime are not that big. Other studies showed that neighbourhood disorder leads to fear of crime (Brunton-Smith & Sturgis, 2011; Kohm, 2009). Tackling disorder in neighbourhoods should therefore have a positive effect on the fear of crime of citizens.

When the fear of crime decreases in a neighbourhood this leads to an increase of social control in that neighbourhood (McGarrell et al., 1997). Not only because people withdraw themselves less in their own homes, but also because neighbourhood disorder is connected with social control. This research demonstrates that neighbourhood disorder, fear of crime and social control are closely connected. Neighbourhood disorder also facilitates mistrust and people who live in neighbourhoods with higher levels of disorder tend to have fewer ties with their neighbors and participate less in neighbourhood organizations (Ross & Jang, 2000; Ross et al., 2001). This means that tackling disorder in neighbourhoods should have a positive effect on the social control in a neighbourhood. This should improve trust and ties among neighbors, and the participation of citizens in neighbourhood organizations. The participation and involvement of citizens with their neighbourhood is important in the safety approach of Rotterdam for the period 2014-2018 (Gemeente Rotterdam, 2013). Citizens have the opportunity to indicate which problems should be tackled in their neighbourhood. More involvement and participation of citizens with their neighbourhood should only improve the effectiveness of the safety approach of Rotterdam.

The findings of this research demonstrated that crime is correlated with the other mentioned variables. Other studies showed that neighbourhood disorder, fear of crime and a decrease of social control lead to crime (Boggess & Maskaly, 2014; Cheong, 2012; Sampson & Raudenbush, 1999; Xu et al., 2005). The decrease of neighbourhood disorder and fear of crime and an increase of social control should lead to a decline in crime rates.

Some attention should be paid to Broken Windows Policing or Order Maintenance Policing. This type of policing is a police practice involving the management of minor offenses and neighbourhood disorders in order to address community problems. After recommending that disorder should be tackled, it seems obvious to recommend Order Maintenance Policing. But the effects of Order Maintenance Policing on crime are not proven (Harcourt, 2001; Weisburd et al., 2010). Also multiple organizations are involved in the safety approach of Rotterdam, meaning that the execution of this safety approach not only lies by the police (Gemeente Rotterdam, 2013).

It is also useful to speak about improvements that can be made with future research. The units of analysis of this research are neighbourhoods and on a higher aggregative level districts of Rotterdam. The number of neighbourhoods of Rotterdam is too small to perform a regression analysis in which disorder could be controlled for more than one variable. Therefore if more neighbourhoods, for example neighbourhoods of other Dutch municipalities, would be added to the units of analysis, a regression analysis with more variables would be possible. This would result in a better indication to

which extent disorder, fear of crime and social control are strong predictors of crime in the Netherlands. It could also be insightful to include a time order to see if neighbourhood disorder in a certain year is correlated with crime in the next year. This could give insights if less/more neighbourhood disorder in a year leads to less/more crime in the next year.

7.4 Limitations

This section describes the limitations of this research, being mostly related to the chosen design of this study, and the reliability and validity of the variables. Validity refers to the quality of the measures; meaning that what is measured was indeed supposed to be measured. Reliability refers to the consistency of the measurements and the repeatability of these measurements (Brinkman, 2006). The variables that are used in this research are high on validity, but lower on reliability.

The validity of the measures used for the variables neighbourhood disorder, fear of crime, social control and the reported crimes to the police are high on validity. The data about disorder, social control and fear of crime are acquired through surveys held among citizens of Rotterdam. In the surveys questions were asked based on the interests of the different organizations involved and therefore they score high on validity. For instance, the safety monitor asked questions about safety feelings, victimization and livability, whereas the social index asked questions about social ties, participation of citizens in the neighbourhood and trust among neighbors. The reported crimes to the police are all objective changes of police performances and achievements; this ensures they are also high on validity. However, there is a dark number in the crime rates, meaning that the reported crimes do not reflect the total crime. The dark number are crimes that are not observed and registered by the police. For instance, a drug dealer who never get caught selling drugs. Nonetheless, the dark number is not preventable. Reported crimes give an implication of the crime rates and the development of the crime rates.

The measures used for the variables in this thesis are lower on reliability. The surveys that acquired data for the variables neighbourhood disorder, fear of crime and social control were held among citizens of Rotterdam. The reliability risk comprises the fact that that the willingness of the citizens from different districts or neighbourhoods to participate is not equal. Also the characteristics of the participants could differ; it could e.g. be the case that people who feel themselves safe in their neighbourhood are more willing to participate with the survey than people who don't feel safe. However, the number of participants is taken into account during the distribution of the surveys to ensure that the sample of the participating citizens was representative of the citizens of Rotterdam. Meaning that the participants of the surveys are e.g. not only rich white citizens, but also people from ethnic minorities, elderly people and so forth. Reported crimes are also lower on reliability than on validity, because there are certain aspects that are subjected to reported crimes, such as the willingness of the citizens to report crimes to the police, the willingness of police officers to document reported crimes and the efforts that police officers are willing to put in the documentation of crimes.

A limitation of this research is the use of a cross-sectional design, which hampered causal inferences. This is due to the lack of a time order in which the variables precede one another. Therefore it was only possible to measure the correlation between the variables. In addition, it was not possible to examine if disorder is a cause of crime, because it could not be established which of the two came first. The lack of a time order made it also impossible to test if the Broken Window Theory could be confirmed. Another aspect that made it impossible to draw causal inferences is the omitted variable bias. This research only examined if disorder, fear of crime, social control and crime are associated to

each other and that means that other variables that could explain crime are not taken into consideration, including socio-demographic characteristics of the districts of Rotterdam.

Another limitation could be that citizens are not always able to distinguish disorder from crime (Gau & Pratt, 2008), these could blend together in the eyes of the citizens. This is not unthinkable, because crime and disorder are seen as two opposite ends of the same continuum (Sampson & Raudenbush, 1999). The variables disorder and crime are measured as two different concepts. Crime is measured as the actual crime and disorder as feelings towards indicators of disorder. However, in the measurement of disorder it could be the case that the opinion of citizens is affected by crime. For instance, citizens could see drugs trafficking and drugs nuisance as the same phenomenon. This could have led to stronger correlations between disorder and drugs and alcohol offenses. Although, residents of disordered areas may develop a sharper grasp on the distinction between routine nuisance and true danger (Gau & Pratt, 2010). Overlap between crime and disorder is probable, resulting in stronger correlations. If this is the case the outcomes of this research regarding the relationship between disorder and crime should be nuanced, but the differences with the correlations between the crime types and disorder, social disorder and physical disorder are minor. This implies that, even when some indicators that could affect the strength of the correlation are left out, the correlations don't differ much. The number of indicators also reduces the impact of an indicator on the correlation with a certain type of crime.

These limitations don't imply that this research does not have a contribution in a reliable and valid manner to this field of research. This research confirmed many relationships with regard to neighbourhood disorder and the Broken Windows Theory. In addition, this research is one of the few correlational studies that examined the relationship between neighbourhood disorder and crime in Rotterdam and possibly also in the Netherlands.

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Appendix A Description of the districts of Rotterdam

This appendix describes demographic and socioeconomic factors of the districts. The information that is used in this paragraph is derived from the Neighbourhood Monitor Rotterdam.

Figure 18: Overview of where the districts are situated (Gemeente Rotterdam, 2014)

Charlois

Charlois is situated on the southern shore of the Maas. This district consists of the following neighbourhoods: Carnisse, Heijplaat, Oud-Charlois, Pendrecht, Tarwewijk, Wielewaal, Zuidwijk and Zuidplein. This district counted 64.050 residents on a surface of ten square kilometers in 2011. Charlois consisted on average out of 44 % natives, 10% western immigrants and 45% non-western immigrants between 2006 and 2011. The biggest group of immigrants came from Suriname. The unemployment rate of the residents averaged eight percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 71 versus 29%, respectively. The average number of unoccupied houses was eleven percent in the examined period.

Delfshaven

Delfshaven is situated on the right bank of the river Nieuwe Maas. This district consists of the following neighbourhoods: Delfshaven/Schiemond, Bospolder/Tussendijken, Spangen, Oud-Mathenesse, Nieuw-Mathenesse, Nieuwe Westen and Middelland. This district counted 73.447 residents on a surface of 5,8 square kilometers in 2011. Delfshaven consisted on average of 29% natives, 11% western immigrants and 60% non-western immigrants. The biggest group of immigrants originates from Turkey. The unemployment rate of the residents averaged eight percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 77 versus 23 %, respectively. The average number of unoccupied houses was ten percent in the examined period.

Feijenoord

Feijenoord is situated on the southern shore of the Nieuwe Maas. This district consists of the following neighbourhoods: Afrikaanderwijk, Bloemhof, Feijenoord, Hillesluis, Katendrecht, Kop van Zuid, Noordereiland and Vreewijk. This district counted 71.532 residents on a surface of 6,44 square kilometers (of which 1,45 square kilometers water) in 2011. The average number of natives was 35%, 8% were western immigrants and 57% of the residents were non-western immigrants. The biggest group of immigrants originates from Turkey. The unemployment rate of the residents averaged nine

percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 77 versus 23% percent, respectively. The average number of houses that were unoccupied was ten percent in the examined period.

Hillegersberg-Schiebroek

Hillegersberg-Schiebroek is situated in the north of Rotterdam. This district consists of the following neighbourhoods: Hillegersberg Noord, Hillegersberg Zuid, Molenlaankwartier, Terbregge, and Schiebroek. This district counted 42.554 residents on a surface of 12,56 square kilometers in 2011. The average number of natives was 74%, 11% western immigrants and 15% percent of the residents non-western immigrants. The biggest group of immigrants originates from Suriname. The unemployment rate of the residents averaged three percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 1. The average number of unoccupied houses was seven percent in the examined period.

Hoek van Holland

Hoek van Holland is situated on the northern shore of the Nieuwe Waterweg where it reaches the North Sea. Hoek van Holland is therefore much more westerly situated than the majority of the districts of Rotterdam. This district consists of the following neighbourhoods: Strand en Duinen, Rijnpoort and Dorp. This district counted 9.664 residents on a surface of 14,1 square kilometers in 2011. The average number of natives was 89 %, 7% were western immigrants and 4% of the residents was non-western immigrant. The unemployment rate of the residents averaged two percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 57 versus 43% percent, respectively. The average number of unoccupied houses is four percent in the examined period.

Hoogvliet

Hoogvliet is situated at the south side of Rotterdam, along the shores of the Oude Maas, in the heart of the industrial port. Hoogvliet is divided into Hoogvliet Noord and Hoogvliet Zuid. This district counted 34051 residents on a surface of 10,73 square kilometers in 2011. The average number of natives was 67 %, 9% were western immigrants and 24% of the residents was non-western immigrant. The biggest group of immigrants originates from Suriname. The unemployment rate of the residents averaged four percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 64 versus 36% percent, respectively. The average number of unoccupied houses is eight percent in the examined period.

IJsselmonde

IJsselmonde is situated in the southeast corner of Rotterdam. This district consists of the following neighbourhoods: Beverwaard, Groot IJsselmonde, Lombardijen and Oud IJsselmonde. This district counted 58430 residents on a surface of 13,12 square kilometers in 2011. The average number of natives was 59 %, 9% were western immigrants and 32% of the residents was non-western immigrant. The biggest group of immigrants originates from Suriname. The unemployment rate of the residents averaged six percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 67 versus 33% percent, respectively. The average number of unoccupied houses is five percent in the examined period.

Kralingen-Crooswijk

Kralingen-Crooswijk is situated in the east of Rotterdam. This district consists of the following neighbourhoods: de Esch, Kralingen West, Kralingen Oost, Kralingse Bos, Nieuw Crooswijk, Oud Crooswijk, Rubroek and Struisenberg. This district counted 49880 residents on a surface of 12,9 square

kilometers in 2011. The average number of natives was 52 %, 13% were western immigrants and 35% of the residents was non-western immigrant. The biggest group of immigrants originates from Morocco. The unemployment rate of the residents averaged six percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 75 versus 25% percent, respectively. The average number of unoccupied houses is nine percent in the examined period.

Noord

Noord is situated in the north of Rotterdam. This district consists of the following neighbourhoods: Agniesebuurt, Bergpolder, Blijdorp, Blijdorpsepolder, Liskwartier, Oude Noorden and Provenierswijk. This district counted 50495 residents on a surface of 5,37 square kilometers in 2011. The average number of natives was 50%, 12% were western immigrants and 38% of the residents was non-western immigrant. The biggest group of immigrants originates from Morocco. The unemployment rate of the residents averaged seven percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 69 versus 31% percent, respectively. The average number of unoccupied houses is nine percent in the examined period.

Overschie

Overschie is situated in the north of Rotterdam. This district consists of the following neighbourhoods Kleinpolder, Landzicht, Noord Kethel, Overschie, Schieveen and Zestienhoven. This district counted 50495 residents on a surface of 15,8 square kilometers in 2011. The average number of natives was 67%, 9% were western immigrants and 24% of the residents was non-western immigrant. The biggest group of immigrants originates from Suriname. The unemployment rate of the residents averaged five percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 59 versus 41% percent, respectively. The average number of houses that were unoccupied is eight percent in the examined period.

Pernis

Pernis is situated between the ports of Rotterdam. This district counted 4789 residents on a surface of 1,6 square kilometers in 2011. The average number of natives was 85%, 7% were western immigrants and 8% of the residents was non-western immigrant. The unemployment rate of the residents averaged two percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 35 versus 65% percent, respectively. The average number of unoccupied houses is seven percent in the examined period.

Prins Alexander

Prins Alexander is the most eastern part of Rotterdam. This district consists of the following neighbourhoods: Het Lage Land, Kralingseveer, Nesselande, Ommoord, Oosterflank, Prinsenland, 's Gravenland and Zevenkamp. This district counted 92640 residents on a surface of 20,24 square kilometers in 2011. The average number of natives was 71%, 10% were western immigrants and 19% of the residents was non-western immigrant. The biggest group of immigrants originates from Suriname. The unemployment rate of the residents averaged four percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 62 versus 38% percent, respectively. The average number of unoccupied houses is five percent in the examined period.

Stadscentrum

Stadscentrum is situated in the middle of Rotterdam. This district consists of the following neighbourhoods: Cool, CS Kwartier, Dijkzigt, Nieuwe Werk, Oude Westen, Stadsdriehoek. This district counted 30243 residents on a surface of 4,81 square kilometers in 2011. The average number of

natives was 48%, 16% were western immigrants and 36% of the residents was non-western immigrant. The largest group of immigrants originate from Suriname. The unemployment rate of the residents averaged four percent between 2006 and 2011. The ratio between rental homes and owner-occupied houses is 62 versus 38% percent, respectively. The average number of unoccupied houses is eleven percent in the examined period.

Appendix B Overview of the variables

This appendix provides an overview of the variables. Table 4 gives an overview of the variables that were used in this research: the domain they belong to, how they were measured and used in the analyses and to which period the data refer.

Predictor domain	Underlying indicators	Variable description	Period
Theft and burglary crimes	Mugging	Total registered cases of mugging	2006-2011
	Pickpocketing	Total registered cases of pickpocketing	2006-2011
	Shoplifting	Total registered cases of shoplifting	2006-2011
	Theft/burglary property	Total registered cases of theft/burglary property	2006-2011
	Theft/burglary box/garage/barn/shed	Total registered cases of theft/burglary box/garage/barn/shed	2006-2011
	Theft out of/from motor vehicles	Total registered cases of theft out of/from motor vehicles	2006-2011
	Theft on/off/from other vehicles	Total registered cases of theft on/off/from other vehicles	2006-2011
	Theft of (light) mopeds and bicycles	Total registered cases of theft of (light) mopeds and bicycles	2006-2011
	Theft of motor vehicles	Total registered cases of theft of motor vehicles	2006-2011
	Raid	Total registered cases of raid	2006-2011
	Other property crimes	Total registered cases of other property crimes	2006-2011
Destruction and damage against public law and order	Destruction or material damage	Total registered cases of destruction or material damage	2006-2011
	Discrimination	Total registered cases of discrimination	2006-2011
	Publicly violence (person)	Total registered cases of publicly violence	2006-2011
	Undermining of the public order	Total registered cases of undermining of the public order	2006-2011
Violence- and sex crimes	Maltreatment	Total registered cases of maltreatment	2006-2011
	Threat	Total registered cases of threats	2006-2011
	Sexual offense	Total registered cases of sexual offenses	2006-2011
	Murder, manslaughter	Total registered cases of murder, manslaughter	2006-2011
Drugs and alcohol offenses	Drug/alcohol nuisance	Total registered cases of drug/alcohol nuisance	2006-2011
	Drug trafficking	Total registered cases of drug trafficking	2006-2011
Social disorder	Drug nuisance	% of citizens who thought that drug nuisance is a neighbourhood problem	2006-2011
	Loitering	% of citizens who thought that loitering is a neighbourhood problem	2006-2011
	Drunken people	% of citizens who thought that drunken people in the streets is a neighbourhood problem	2006-2011
	Harassment	% of citizens who thought that being harassed on the streets is a neighbourhood problem	2006-2011
Physical disorder	Graffiti on walls and buildings	% of citizens who thought that graffiti on walls and buildings is a neighbourhood problem	2006-2011
	Destruction of phone booths, bus- and tram stops	% of citizens who thought that the destruction of phone booths, bus- and tram stops is a neighbourhood problem	2006-2011
	Litter next to the container	% of citizens who thought that litter next to the container is a neighbourhood problem	2006-2011
	Urinating in public	% of citizens who thought that urinating in public is a neighbourhood problem	2006-2011
	Holes or cracks in pavement	% of citizens who thought that holes or cracks is a neighbourhood problem	2006-2011
	Dog dirt on the streets	% of citizens who thought that dog dirt is a neighbourhood problem	2006-2011
	Pollution on the streets	% of citizens who thought that pollution on the streets is a neighbourhood problem	2006-2011
	Broken or destroyed street furniture	% of citizens who thought that broken or destroyed street furniture is a neighbourhood problem	2006-2011

Fear of crime	Feels unsafe in their own neighbourhood	% citizens who are feeling themselves unsafe in their own neighbourhood	2006-2011
Participation	Employment or school	Proportion of jobseekers of the total workforce. % of people aged between 16-22 years that is going to school of the total of youth without a basic qualification.	2008-2012
	Social contacts of citizens	% of residents that have at least weekly contact with friends and family. This contact may consist of a meeting, a phone call or e-mail. Social isolation.	2008-2012
	Social and cultural activities	% of residents that sports at least one time per month; % of residents that goes out at least one time per month; % of residents that visits at least one time per month the theater, a concert or practices a creative hobby.	2008-2012
	The social commitment of citizens	% of residents who helps someone who is long-term sick or in need of help; % of residents that who does volunteers in one or more organizations; % of residents that had an active contribution to the livability of the neighbourhood in the past twelve months.	2008-2012
Social ties	Mutations	% of removals in the neighbourhood; % of residents that lives shorter than 2 years in the Netherlands; % of residents that lives longer than ten years in the same house (in the case of new built houses counts 90 percent of the age of that house)	2008-2012
	Experiencing bonding	% of residents who feels themselves at home in the neighbourhood and thinks that the neighbors interact well with each other; % of residents that feels themselves responsible for the neighbourhood and commits themselves to the neighbourhood; % of residents that has confidence in the (district) council	2008-2012
Satisfaction with the neighbourhood	Satisfaction with the neighbourhood	% of residents that is satisfied with living in the neighbourhood	2008-2012

Table 4: List of all the variables

Appendix C Table belonging to figures in chapter 4

	2006	2007	2008	2009	2010	2011
Charlois	6955	6149	6516	6686	5836	5964
Delfshaven	6494	5908	6127	6131	5606	5818
Feijenoord	6038	6010	6077	5809	5264	5503
Hillegersberg-Schiebroek	2603	2305	2531	2504	2298	2454
Hoek van Holland	584	504	566	760	524	582
Hoogvliet	2282	2234	2522	2243	1787	2360
IJsselmonde	4462	4506	4408	4424	3961	4412
Kralingen-Crooswijk	5235	4708	4868	4170	3607	3996
Noord	4835	4655	4633	4102	3679	3966
Overschie	1284	1113	1211	1232	1099	1165
Pernis	215	225	247	261	191	255
Prins Alexander	5503	5486	5877	6045	5041	6243
Stadscentrum	10935	11116	11481	9590	8212	8883
Rotterdam	57425	54919	57064	53957	47105	51601

Table 5: Total crime rates in the districts, Rotterdam, 2006-2011. Source: (processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Theft and burglary crimes						
Theft/burglary property	4607	3992	4235	3929	3934	4061
Theft/burglary box/garage	2768	1985	1861	1697	1540	1389
Pickpocketing	2546	2686	2667	2092	2069	2277
Mugging	1663	1450	1308	1143	1104	1196
Theft of motor vehicles	1832	1550	1446	1526	1397	1265
Theft out of/from motor vehicles	9900	8648	10430	9500	8306	8203
Shoplifting	2827	2826	2798	3239	3317	3477
Theft on/off/from other vehicles	821	1037	987	894	886	844
Theft of (light) mopeds and bicycles	4296	4234	5219	4337	3624	4730
Raid	238	284	333	320	270	281
Other property crimes	8286	8063	8126	7675	7965	8738
Total	41790	38762	41418	38361	36422	38472

Table 6: Crime rates of theft and burglary crimes, 2006-2011, Rotterdam. Source (processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Destruction or material damage against the public law and order crimes						
Destruction or material damage	7641	8430	8104	8381	4581	7101
Publicly violence	825	929	823	905	755	665
Undermining public order	590	476	374	399	536	371
Discrimination	25	29	20	27	37	7
Violence and sex crimes						
Mistreatment	4321	4595	4579	4137	3726	3737
Murder, manslaughter	456	411	430	365	394	355
Sexual offense	689	618	552	515	544	522
Threat	2937	2821	2860	2872	2545	2641
Drugs and alcohol offenses						
Drugs trafficking	1099	815	946	921	927	1122
Drugs/alcohol nuisance	27	34	17	7	20	33

Table 7: Crime rates of violence and sex crimes, and drugs and alcohol offenses, 2006-2011, Rotterdam. Source: (processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Theft and burglary						
Charlois	100	83	90	93	86	83
Delfshaven	100	89	91	91	88	89
Feijenoord	100	95	98	93	89	89
Hillegersberg-Schiebroek	100	79	101	94	102	103
Hoek van Holland	100	67	93	115	92	92
Hoogvliet	100	96	103	93	86	109
IJsselmonde	100	96	91	95	98	98
Kralingen-Crooswijk	100	86	93	77	73	77
Noord	100	91	94	80	78	81
Overschie	100	80	98	95	97	99
Pernis	100	111	132	131	113	143
Prins Alexander	100	95	111	112	105	123
Stadscentrum	100	101	107	85	71	80

Table 8: Index rates (2006=100), burglary and theft crimes, 2006-2011, Rotterdam. Source: (Processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Destruction or material damage against the public law and order crimes						
Charlois	100	97	102	116	68	93
Delfshaven	100	99	102	108	80	97
Feijenoord	100	120	113	109	75	89
Hillegersberg-Schiebroek	100	121	87	101	46	72
Hoek van Holland	100	121	110	156	62	103
Hoogvliet	100	101	117	108	43	97
IJsselmonde	100	106	112	101	58	95
Kralingen-Crooswijk	100	97	89	80	49	63
Noord	100	124	104	107	43	90
Overschie	100	87	81	106	43	76
Pernis	100	109	113	116	64	95
Prins Alexander	100	114	103	120	54	91
Stadscentrum	100	111	98	99	80	87

Table 9: Index rates (2006=100), Destruction or material damage against public law and order, 2006-2011, Rotterdam. Source: (Processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Violence and sex crimes						
Charlois	100	102	102	89	83	82
Delfshaven	100	90	95	91	85	79
Feijenoord	100	98	96	90	84	90
Hillegersberg-Schiebroek	100	90	94	102	73	79
Hoek van Holland	100	124	71	164	137	141
Hoogvliet	100	106	146	116	110	89
IJsselmonde	100	113	113	107	82	102
Kralingen-Crooswijk	100	101	96	90	70	84
Noord	100	102	101	95	84	81
Overschie	100	107	92	84	86	63
Pernis	100	75	67	101	67	91
Prins Alexander	100	96	91	76	81	89
Stadscentrum	100	105	99	96	91	83

Table 10: Index rates (2006=100), Violence and sex crimes, 2006-2011, Rotterdam. Source: (Processed data from) Police Rotterdam.

	2006	2007	2008	2009	2010	2011
Drugs and alcohol offenses						
Charlois	100	76	83	91	93	111
Delfshaven	100	71	93	93	84	114
Feijenoord	100	83	113	120	131	157
Hillegersberg-Schiebroek	100	83	66	53	73	93
Hoek van Holland	100	80	200	80	140	60
Hoogvliet	100	56	60	52	34	50
IJsselmonde	100	100	154	180	129	174
Kralingen-Crooswijk	100	103	47	80	78	122
Noord	100	69	67	47	46	64
Overschie	100	316	183	66	200	233
Pernis	100	300	0	100	50	0
Prins Alexander	100	94	80	119	105	250
Stadscentrum	100	66	89	72	80	67

Table 11: Index rates (2006=100), Drugs and alcohol offenses, 2006-2011, Rotterdam. Source: (Processed data from) Police Rotterdam.

Appendix D Tables belonging to chapter five

	2006	2007	2008	2009	2010
Charlois	19,8	20,1	23,9	24,5	23,1
Delfshaven	19,5	17,9	24,6	25,3	25,1
Feijenoord	17,5	17,9	25,6	25,7	23,3
Hillegersberg-Schiebroek	12,2	11,3	14,0	12,3	11,9
Hoek van Holland	7,4	6,6	10,1	12,6	11,3
Hoogvliet	11,3	11,6	18,0	16,6	15,4
IJsselmonde	13,8	15,0	20,6	17,2	18,0
Kralingen-Crooswijk	16,1	15,7	21,4	21,1	19,0
Noord	18,7	15,6	19,4	20,9	19,0
Overschie	12,4	13,7	16,3	16,1	15,2
Pernis	15,3	17,0	15,8	14,5	11,4
Prins Alexander	15,6	15,3	16,9	16,9	13,8
Stadscentrum	21,5	19,9	26,3	25,7	22,7
Rotterdam	15,5	15,2	19,5	19,2	17,6
Rotterdam social disorder	7,0	6,7	10,3	10,9	10,8
Rotterdam physical disorder	19,7	19,5	24,0	23,2	20,9

Table 12: Development of disorder in the districts, 2006-2011, Rotterdam: Source: (processed data from) Directie Veiligheid Rotterdam.

	2006	2007	2008	2009	2010
Social indicators					
Drug nuisance	7,1	6,2	9,2	9,6	9,1
Loitering	12,4	13,1	17,5	18,1	18,2
Drunken people	5,6	5,2	9,1	10,5	11,0
Harassment	2,9	2,4	5,3	5,6	6,0
Physical indicators					
Graffiti	12,8	14,0	17,0	15,1	12,5
Destruction	19,7	18,4	20,3	16,4	11,6
Litter	19,9	19,9	32,3	32,3	30,8
Urinating	8,8	8,5	16,6	18,0	16,7
Holes	21,1	20,9	25,2	25,2	22,7
Dog dirt	37,7	37,3	36,4	34,6	32,9
Pollution	30,2	29,2	32,5	32,3	30,3
Broken street furniture	7,3	7,7	11,9	11,9	9,6

Table 13: Development of the indicators of disorder, 2006-2011, Rotterdam. Source: (processed data from) Directie Veiligheid Rotterdam.