The influence of CPTED on the subjective safety of pedestrians of the Diezerstraat in Zwolle

A study about the influence of Crime Prevention Through Environmental Design measurements on the subjective safety of pedestrians in the Diezerstraat in Zwolle

Bachelor's thesis Spatial Planning and Design

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Colophon

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Summary

Zwolle is becoming less criminal at a slower pace than other cities in the Netherlands. The Diezerstraat is the main commercial area of the city of Zwolle, where flows of people fluctuate per hour. Fluctuating flows of people have proven to be an important trigger for criminal activities and do mostly occur in commercial areas. The people using the area are the possible victims of these criminal activities. The Diezerstraat in Zwolle is an area used by large amounts of people. That is why it is important to investigate if the people in this street do feel safe. Besides, in existing literature, CPTED (Crime Prevention Through Environmental Design) has mainly been connected to objective safety, resulting in a knowledge gap regarding the connection of CPTED with subjective safety. The aim of this study is to investigate the influence of CPTED measurements on the subjective safety of the pedestrians of the Diezerstraat in Zwolle. Pedestrians are the only allowed users of the Diezerstraat during opening times of the shops and therefore are the target audience of this study. Two methods of data collection are used in this research: observations and surveys. The observations are focused on analysing the environment of this study and are designed as a spatial analysis. Resulting from the spatial analysis, the Sassenstraat contains only a few of the CPTED measurements, while the Diezerstraat contains all of the CPTED measurements observed. The Sassenstraat can, therefore, be used as a control condition to measure influence. From the survey can be concluded that only the CPTED implementation camera surveillance has a positive influence on the subjective safety of pedestrians in the Diezerstraat. All other measurements do not significantly differ between the two streets, so are not of any influence. So, CPTED measurements barely influence the subjective safety of pedestrians in the Diezerstraat in Zwolle.

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1. Introduction

In this chapter, the background of this thesis is explained. Besides, the concepts used are explained and both the theoretical and social relevance of the study are lined out. The research problem is explained in the second section. The third section contains the central research question and the secondary questions. The fourth section lines out the structure of this thesis.

1.1. Background

Crime in the city of Zwolle became less during the past year, although the city rose from the 81st place to the 65th in the national crime ranking of most criminal municipalities (Van Lare, 2019). In other words, Zwolle is becoming less criminal at a slower pace than other municipalities. The areas of a city most sensitive to criminal activities are commercial areas, because of the fluctuating flow of people (Concoran et al., 2019). The city centre of Zwolle is an important commercial area for the city of Zwolle to which the municipality pays a lot of attention analysing and improving to keep the area vital (Gemeente Zwolle, 2017). The Diezerstraat and the Sassenstraat are two of the shopping streets in the centre of Zwolle, containing shops and restaurants. This research is focused on the Diezerstraat, the main shopping street. The Sassenstraat is used as a control condition. Because commercial areas are more sensitive to criminal activities than other areas, measurements have been implemented in many of these areas in order to reduce and prevent crime. According to the Crime Prevention Through Environmental Design (CPTED) theory, public space in urban areas can be designed by urban planners in a way it prevents criminal activities from happening, resulting in improved objective and subjective safety (Reynald, 2015). Information about the influence of CPTED is essential to planners to be able to design an environment in which its users feel safe. Though many studies about the influence of CPTED on the objective safety of urban areas have been conducted, only little attention is paid to the subjective safety of the people in safety. Piroozfar et al. (2019) state that, even though some research and statistics have been provided in the past years, still more evidence about the effects of CPTED on objective and subjective safety is required. Existing datasets can be used to measure the effects of CPTED on objective safety, so this study focuses on collecting data to give insights into the effects of CPTED on the subjective safety of users of commercial areas. It is societally important to collect information about the subjective safety of the users of the Diezerstraat to prevent people from being scared to enter the area in which they can find the services they need. When people do not feel safe in a particular area, the area will be used less frequently, resulting in decreasing social control (Jacobs, 1961). A decrease in social control will trigger criminal activities. More criminal activities result in a lower safety level. A lower level of safety results in a lower level of well-being and a decrease in the quality of life (Savahl et al., 2014; Cozens & Love, 2015).

The Diezerstraat and the Sassenstraat are the two streets compared in this study. The influence of CPTED measurements on the subjective safety of the pedestrians in the Diezerstraat is measured. Control conditions are necessary to measure influence. The Sassenstraat is used as control condition, because it contains fewer CPTED measurements than the Diezerstraat, as observed in this study. The two streets can be compared because they contain several similar spatial design aspects: shops, restaurants, older buildings, new buildings, cameras, road signs and both streets end at the same square.

1.2. Research problem

This study aims to investigate whether the Diezerstraat and the Sassenstraat, two of the main shopping streets of the inner city of Zwolle, contain the spatial features which CPTED describes as crime preventing, and if these features influence the feeling of subjective safety of the pedestrians. Because the municipality of Zwolle is becoming less criminal at a slower pace than other municipalities of the

Netherlands, Zwolle is an interesting case to investigate (Van Lare, 2019). According to Corcoran et al. (2019), commercial areas can be seen as a group of risky facilities regarding crime. Commercial areas have limited operating hours and are most frequently visited during the day. Therefore the flows of people differ from hour to hour, which attracts criminals (Corcoran et al., 2019). The focus therefore is on the measuring the influence of CPTED on the subjective safety in the Diezerstraat by using the Sassenstraat as a control condition.

1.3. Research questions

The central question of this study is:

To what extent do the Crime Prevention Through Environmental Design measurements territoriality, surveillance, activity support and image influence the subjective safety of pedestrians in the Diezerstraat in Zwolle?

To be able to draw an answer to the central question, the following secondary questions are considered needed:

1. Under which conditions do Crime Prevention Through Environmental Design measurements have a positive effect on crime prevention and how do the measurements relate to subjective safety?
2. Which Crime Prevention Through Environmental Design measurements are implemented in the Diezerstraat and Sassenstraat in Zwolle?
3. Which Crime Prevention Through Environmental Design measurements influence the subjective safety of pedestrians of the Diezerstraat more compared to the influence of the CPTED measurements in the Sassenstraat?

The first secondary question functions as an information background to base the design of the data collection instruments and the findings upon needed and gathered in secondary questions 2 and 3. Secondary questions 2 and 3 will produce the results needed to answer the central question.

1.4. Structure of the thesis

The next parts of this thesis are structured in the following way: the theoretical framework in which the theories and concepts used in this study can be found in chapter 2. Added to this is the methodology of the research: which methods of data collection and data analysis are used and the ethics are discussed in chapter 3. Chapter 4 contains the results of the data collected. After the results, the conclusions drawn in this study can be found in chapter 5 and recommendations for further research are given. Chapter 6 lines out a reflection on the research process. Finally, chapter 7 contains a discussion about the data collected and the conclusions drawn.

2. Theoretical framework

A lot of research has been done about crime and its relation to the built environment. This chapter lines out the central theories of this study. First of all, in 2.1 will be zoomed in into the behaviour we would like to understand in this study: crime. Then in 2.2, based on the understanding of criminal behaviour, researchers focused on connecting the spatial design of certain areas to the influence on crime. In 2.3, the influence of CPTED on subjective safety is explained. In 2.4, the conceptual model can be found and chapter 2 ends with the conclusion and answer to 2.5.

2.1. Crime

At the base of the theories used lies the undesired behaviour of crime. Crime is defined in this study as behaviour of offenders the users of public space see as a threat to their safety. For example: robbery, raid and shoplifting. Crime is a broad concept and understanding crime is challenging, because committing a crime is influenced by many components. One of these components is the context, the spatial, as well as the social environment (Malleson et al., 2013). For this research, the spatial environment influencing criminal behaviour plays a central role. The design of space triggers particular behaviour, and so the undesired behaviour of crime (Reynald, 2015). If space can be designed in a way it triggers criminal behaviour, it can also be designed to prevent criminal behaviour. The link between the environmental design and crime has been a subject of research for many years (Reynald, 2015). Based on the information collected, theories focussing on preventing and reducing crime have been established. Crime Prevention Through Environmental Design (CPTED) is one of these theories explaining six factors that influence criminal behaviour (Cozens et al., 2005). The CPTED theory is further explained in 2.2.

Crime is closely connected to safety. The more criminal activities take place in space, the lower the safety of that place (Cozens & Love, 2015). When the design of public space is used effectively, it leads to more safety and a reduction of fear. Safety can be subdivided into two types: safety based on numbers of incidents and activities (objective) and safety based on the experience of people (subjective). This study focusses on the subjective safety in public space and how the design of the public space influences the subjective safety of its users. If the subjective safety in public space is low and crime high, it has consequences for the users of that space. A reduction of crime leads to higher well-being and an improvement in the quality of life (Savahl et al., 2014; Cozens & Love, 2015).

2.2. CPTED

Crime Prevention Through Environmental Design (CPTED) is defined in this study as the architectural design of public and private space of both residential and commercial areas in a way crime will be prevented or reduced, consisting of the six factors that influence behaviour: territoriality, surveillance, access control, activity support, image/management and target hardening (Reynald, 2015; Chang, 2011; Cozens et al., 2005). The main goal of implementing CPTED measurements is to reduce and prevent crime resulting in a higher objective and subjective safety. This research focusses on the implementation of CPTED measurements in public space. The six CPTED measurements are defined as follows:

Territoriality: the sense of ownership. Every square meter of land has its legitimate users and land-owners secure their pieces of land by symbolic or real barriers, for example, by plants or by constructing a gate (Reynald, 2015). As a result, non-legitimate users like criminals will not enter the area easily.

Surveillance: a concept that comes in three ways: natural, organized and mechanical (Cozens et al., 2005). Natural surveillance is based on the idea that the public space is designed in a way that people can keep an eye on each other (Cozens & Love, 2015). Organized surveillance is also executed by people, but is provided and organized by the owners of public space, usually the municipality, security guards,

for example (Cozens et al., 2005). Mechanical surveillance: a way of watching people through non-natural devices, like cameras to register movements and street lanterns to enlighten the street during night times (Cozens & Love, 2015; Reynald, 2015). Surveillance results in keeping an eye on others and, therefore, criminal behaviour is less likely to occur.

Access control: focusses on regulating access to potential targets for crime and creating a higher risk-perception to prevent criminals to strike (Cozens et al., 2005). When access to areas in unregulated, crime rates are usually higher.

Activity support: aimed at making people use public space as intended. This is achieved by designing the public space, it influences the behaviour of people in the desired direction (Cozens et al., 2005; Reynald, 2015). As a result, undesired behaviour, i.e., crime, will be prevented from happening. An example of this could be road signs.

Image/management: the way a place is taken care of and is controlled. Maintenance is an important factor, because it makes a place radiate safety and control which wards of criminals from that area (Reynald, 2015). If a place has a bad image, the place is more likely to attract criminal activities. This is called the broken windows effect, which means that if the physical environment contains disorders (like broken windows as a result of bad maintenance), it becomes a trigger for other criminal activities to take place (Parker, 2018).

Target hardening: mainly focused on making it harder for criminals to commit a crime (Cozens et al., 2005). This could be achieved by, for example, installing window locks or burglar alarms.

2.3. The influence of CPTED on subjective safety

CPTED measurements cause a lower level of crime in public space. A lower level of crime causes a higher level of safety (Cozens et al., 2005). Safety can be divided into objective and subjective safety. CPTED influences both objective and subjective safety, but the focus lies on the subjective safety, as explained before. Subjective safety is the personal experience of safety of an individual (Wang & Yang, 2001). If the number of criminal activities decreased, the fear people experience while using public space will also decrease. A decrease in fear leads to an improvement in the quality of life and personal well-being (Savahl et al., 2014; Cozens & Love, 2015). So, if crime is reduced or prevented by CPTED, the subjective safety of the users of public space is perceived to be higher.

2.4. Conceptual model

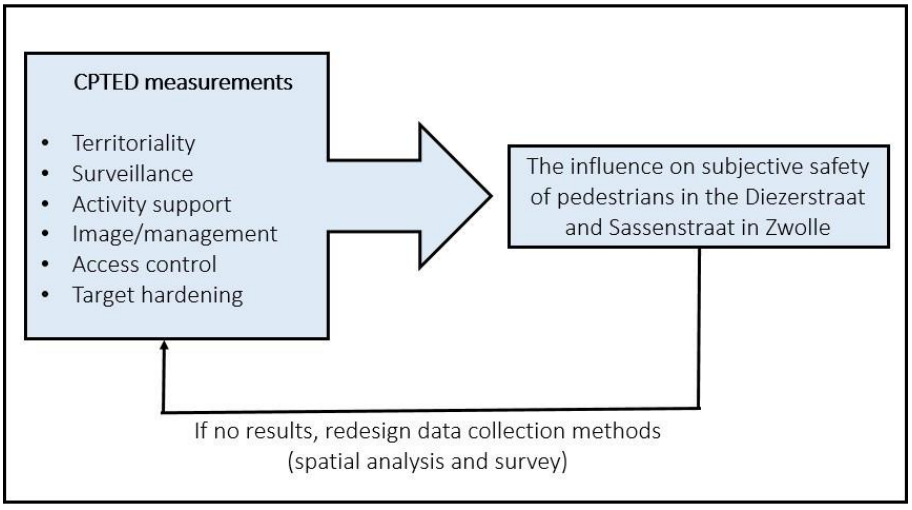

Figure 1 Conceptual model (Source: self-made)

The conceptual model is visualized in figure 1. The structure of the model is subdivided into the independent variables, which are the CPTED measurements and dependent variable, which is the influence on the subjective safety of pedestrians of the Diezerstraat and Sassenstraat in Zwolle. The concepts are derived from the theories explained above. The arrows explain the research steps of this study. These are further explained in 3.2.

2.5. Conclusion

All in all, much research has been done about understanding the relationship between space, crime and safety. Because of the theoretical framework elaborated in this chapter, the first secondary question can be answered: Under which conditions do Crime Prevention Through Environmental Design measurements have a positive effect on crime prevention and how do the measurements relate to subjective safety?

It can be concluded that, if crime levels are high, safety levels are low. To improve the safety of a place, the underlying behaviour of crime must be understood. The CPTED theory is based on studies that focus on the understanding of crime. CPTED measurements implemented in space reduce and prevent crime and therefore create a higher level of safety (Cozens et al., 2005). In both public and private space in residential as well as commercial areas, CPTED measurements can be implemented.

Subjective safety is perceived to be higher when an individual makes use of a space in which CPTED measurements are implemented. Higher subjective safety results in a lower level of experiencing fear and an improvement in the quality of life and personal well-being (Savahl et al., 2014; Cozens & Love, 2015).

3. Methodology

Central to this chapter are the methods of data collection and data analysis. Starting with the central question, the methods used for collecting the data needed to answer that question are selected. Then, the data collection instruments are designed and it is explained how the data collection instruments are used. Besides the instruments, the ethical considerations about the data collection and data analysis are established. Finally, the methods of data analysis are chosen and explained.

3.1. Method selection

The central question to this study is: 'To what extent do the Crime Prevention Through Environmental Design measurements territoriality, surveillance, activity support and image influence the subjective safety of pedestrians in the Diezerstraat in Zwolle?'.

The question consists of several parts for which different types of data are needed. First of all, it is the theoretical concept of Crime Prevention Through Environmental Design that comes into play. To establish a theoretical framework covering all information needed as a base for this study, the first secondary question was set up.

The second part of the data needed for answering the central question is information about the spatial environment. To cover this part of the information, the Diezerstraat, as well as the Sassenstraat, are analysed by observations designed as a spatial analysis, see figure 2 for the locations. No participants are needed for this observation, because only the environment is of importance. The spatial analysis is also used to check if the Sassenstraat does contain fewer CPTED measurements than the Diezerstraat to function as the control condition for this research. The observed spatial features have also been processed in the survey to answer the third secondary question and are used to enhance the interpretation of the data-analysis of the survey. More about the setting and the design of the spatial analysis are explained in 3.2. This part of the data collection is connected to the second secondary question of this study.

The third and final part of data needed for the answer to the central question is data about the influence of CPTED on the subjective safety of pedestrians in the Diezerstraat, compared to the Sassenstraat, which contains fewer CPTED measurements. At the base of the answer to this part of the central question lies a cause-effect relationship. To measure causation, a quantitative research design is necessary (Punch, 2014). Therefore, the data used in this study is quantitative. The cause, in this case, is the CPTED and the effect is the influence it has on the subjective safety of pedestrians in the Diezerstraat and Sassenstraat in Zwolle. The pedestrians of the Diezerstraat and Sassenstraat are relatively large groups. In both streets, the same data collection is needed to be able to compare both streets to each other to measure the influence of the CPTED measurements. Because the samples of both streets are large and the data is quantitative, a survey as an instrument for data collection suits this study best. It is not possible to observe this part of the data of this study, because it contains feelings and opinions of the pedestrians in both streets. This part of the data collection is connected to the third secondary question of this research.

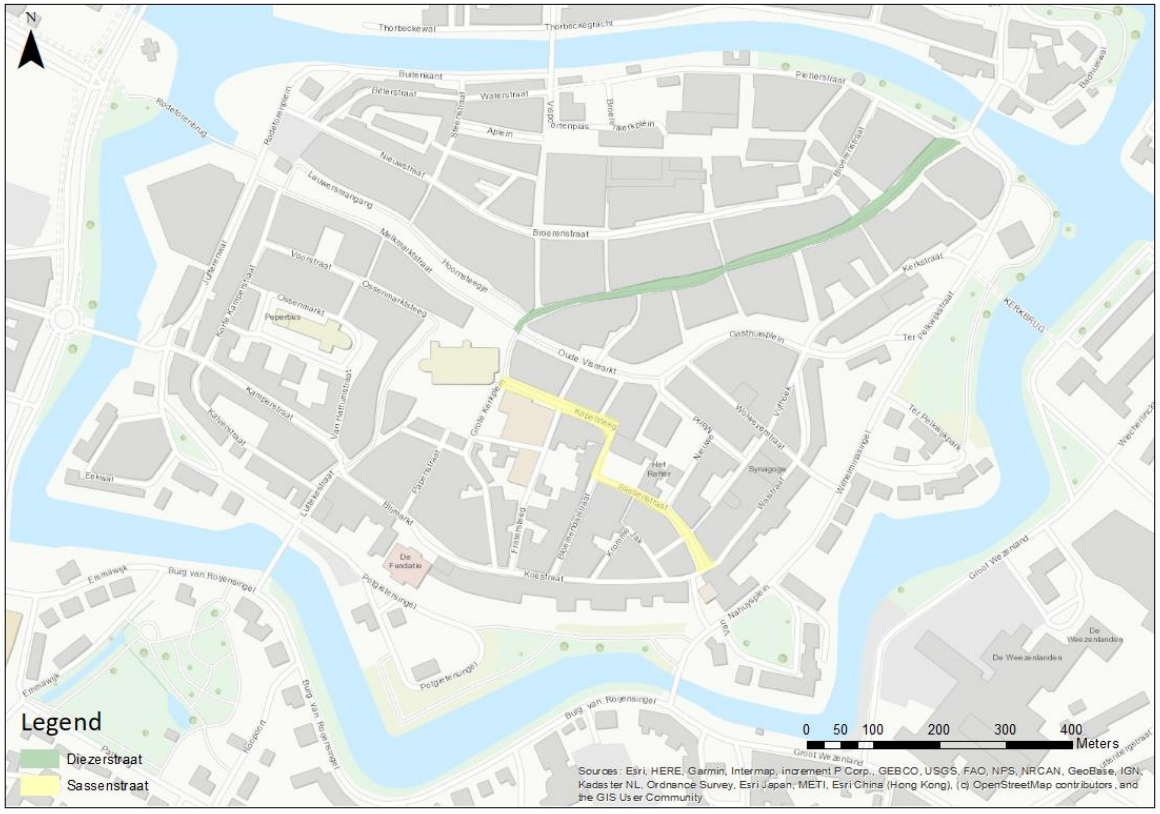

Figure 2 Diezerstraat and Sassenstraat Zwolle (source: Esri, 2019)

3.2. Method design

For this study to data collection instruments are designed. A spatial analysis based on observations and a survey. The spatial analysis and the survey are conducted in both the Sassenstraat and the Diezerstraat to be able to measure the influence of CPTED on the subjective safety of pedestrians in the Diezerstraat compared to the Sassenstraat.

3.2.1. The spatial analysis

In 2.2. the six CPTED measurements are explained. Based on these measurements, the spatial analysis was designed. From the six of the measurements, only four are used in the spatial analysis. Target hardening and access control are left out, because target hardening can hardly be measured by only observation and access control is very close to territoriality and therefore left out. The difference of influence is too little to also observe access control.

The four basic principles of the CPTED on which the spatial analysis is based are territoriality, surveillance, activity support and image/ management. The observation checklist of the spatial analysis is designed by using the examples given in the used literature for each measurement. Articles explain the content of the CPTED measurements by giving a description and examples of how these measurements look like in space. The four variables tested in the spatial analysis were chosen, because they are visible in space and thus can be tested by observation by the researcher. The observation is conducted at two different days (Monday 4-11-2019 and Tuesday 26-11-2019) at two different moments (morning at 4-11-2019 and afternoon at 26-11-2019) to prevent the data from moment-dependent errors. Moment-dependent errors mean that space can change over time and that something observed the one day might be gone the other observation day (Clifford et al., 2016).

Therefore it is essential to analyse a place more than one time. The spatial analysis and its results can be found in appendix 1.

3.2.2. The survey

The questions of the survey are based on the same four CPTED measurements as the spatial analysis. The survey produces the necessary information about the subjective safety of pedestrians in the Diezerstraat in Zwolle.

The same survey has been conducted in both the Sassenstraat and the Diezerstraat. As a result, the influence of CPTED measurements on the subjective safety of both streets can be compared. The data is collected in a natural setting: the users of the Diezerstraat are approached in this shopping street and asked whether they would like to participate in a survey about their experience of safety in relation to the spatial design of the shopping street. The researcher conducts the survey in the Sassenstraat and the Diezerstraat in Zwolle on November the 4th, 7th and 26th during the opening times of the shops (see map on figure 2). The survey is digital and filled in on a tablet, because paper will not be easy to fill in without a table. When conducting the survey, the researcher will move through the entire Sassenstraat and Diezerstraat. The survey is not conducted at only one spot, because this might affect the results (Clifford et al., 2016). All the people walking past are asked to participate. The participants are told that the survey will not be too long and comprehensible, so only a few minutes are needed. Here, the ethics described in 3.3 come into play. The survey can be found in appendix 2.

3.3. Ethics

For the spatial analysis, no participants are observed. For the survey, respondents are approached by the researcher. Therefore, it is important to consider the ethics that may be addressed. The participants are told that the survey is anonymous and that the information gathered is used for a Bachelor's thesis. The respondents are more informed about the purposes of the research if needed. When approaching the respondent, the researcher needs to take into account that the respondent might have traumatic experiences regarding the research subject, for example, the user of the shopping street has been robbed before. The respondents should, therefore, know that they have the right to refuse to participate or stop participating in the research whenever they want. In case of a traumatic situation, the respondent might not want to participate, so the respondent are warned about the subject and content of the survey. As a result, the respondent can decide whether to or not to participate in this study. In case of a traumatic experience, participation in this study is discouraged. If desired, the respondent can receive the final findings of the research.

The survey asks as little personal information as possible. No name, address or phone numbers are asked. Only the age category and gender are asked for. This results in data that is as anonymous as possible. The survey can be filled in by every pedestrian in the Diezerstraat and Sassenstraat.

After finishing this study, the data will be deleted completely. The invalid cases are deleted before starting the data analysis.

3.4. Data analysis

This study contains two different methods of data analysis. The data resulting from the spatial analysis is interpreted separately from the data resulting from the survey, because the data from the spatial analysis will not be statistically analysed. The spatial analysis data functions as a background for the survey design and the reasoning of the conclusions drawn from the results of the survey. The survey will be analysed using SPSS, because of the large dataset it produces. Below, the analysis per data collection instrument is explained more detailed.

3.4.1. Spatial analysis

The result of the spatial analysis is a list of features that do or do not have been implemented in this shopping district to base the survey on and enhance or explain the results of the survey. The observation results of the spatial analysis can be found in appendix 1. As can be seen, the observations in the Sassenstraat resulted in more 'no's' than the Diezerstraat, as already expected. This means that the Sassenstraat can indeed be used as a control condition to measure influence in the Diezerstraat. The outcome of this analysis is discussed in sections 4.2 and 4.3.

3.4.2. Survey

The data resulting from the survey should line out the influence of CPTED on the subjective safety of pedestrians in the Diezerstraat compared to the influence CPTED has in the Sassenstraat. Because the Sassenstraat contains fewer CPTED measurements than the Diezerstraat, it is expected that the CPTED measurements have a more significant influence on subjective safety in Diezerstraat than in the Sassenstraat. The survey can be found in appendix 2. The survey helps to answer the main question by measuring the difference of influence of CPTED on the subjective safety of pedestrians between the Diezerstraat and Sassenstraat.

The survey data is analysed using SPSS. The following variables (table 1) will be analysed using SPSS:

	Variable	Type	(in)dependent	Analysis method
1	Gender	Nominal	Independent	SPSS
2	Age category	Ordinal	Independent	SPSS
3	Safety perception	Ordinal	Independent	SPSS
4	Group/Alone	Nominal	Independent	SPSS
5	Previous experiences	Nominal	Independent	SPSS
6	Diezerstraat/Sassenstraat	Binomial	Independent	SPSS
7	Safety in general	Ratio	Dependent	SPSS
8	Cameras	Ratio	Dependent	SPSS
9	Organized surveillance	Ratio	Dependent	SPSS
10	Social control	Ratio	Dependent	SPSS
	Maintenance	Ratio	Dependent	SPSS
11	- Green			
12	- Street lanterns			
13	- Street furniture			
14	- Buildings			
15	- Art			

Table 1: data analysis

The analysis of the survey is executed in SPSS by using a two-independent sample t-test after checking for normality and central limitation (Moore & McCabe, 2005). Why the two-independent sample t-test was chosen, will be explained in the following steps. A t-test requires data of over 30 cases or normally distributed data. Besides, the tested variables must be ratio-variables. These are variables seven up until fifteen of table 1.

The Diezerstraat and the Sassenstraat are two unpaired samples, because the surveys in both streets are filled in by different participants (Moore & McCabe, 2005). The significance level used is 0,05. The descriptive statistics of the entire dataset corrected for 'geen idee' (no idea) can be found in appendix 3.1. 6 cases were deleted. Seventy-four cases are left.

Before choosing a test, the aim of the data analysis must be clear. Two streets, the Diezerstraat and the Sassenstraat should be compared regarding the influence of CPTED measurements on the subjective

safety of pedestrians in those streets. The analysis of the data resulting from the survey is executed in steps. First, the dataset was corrected for cases ‘no idea’, because these cases would make the data analysis invalid. Errors in the execution of the test would occur if these cases would not be deleted. Second, the dataset is checked for normality. The Kolmogorov-Smirnov test is used for testing the normality of the dataset. If the outcome of the test is insignificant, the dataset would be normally distributed. If that is the case, linear regression would fit the analysis of the dataset best. If the Kolmogorov-Smirnov test is significant, the dataset is not normally distributed. Then, the t-test would fit the dataset best. Both regression and t-tests require ratio-variables. For this study, using a t-test for analysing the dataset is the best choice, because the Kolmogorov-Smirnov test is significant. The t-test is executed in SPSS and the results of the data analysis are interpreted in chapter 4.

4. Results

In this section, the results of the spatial analysis and the survey conducted in the Sassenstraat and the Diezerstraat are analysed and discussed. As a result of the data analysis, the influence of CPTED measurements on the subjective safety of pedestrians in the Diezerstraat is measured. First, the results of the spatial analysis are discussed per street. Second, the survey is analysed in SPSS and its results are discussed.

4.1. Spatial analysis

The schemes resulting from the observations made in the spatial analysis can be found in appendix 1.

4.1.1. Sassenstraat

The Sassenstraat is tested in the same way as the Diezerstraat to confirm the control condition. The Sassenstraat contains approximately half of the observed CPTED measurements. The features are analysed per theoretical concept. Because space is continuously changing and the observations are just one moment in time, some features were present the one day, but were not the other day (Clifford et al., 2016).

Territoriality: The legitimate owner is the municipality in this case, because the Sassenstraat is public space. It is the responsibility of the municipality to guarantee the safety of the users of the street.

Surveillance: The sightlines of the street are clear and unobstructed. Not all buildings are oriented at the street. During the first observation, there were no security guards in the street. During the second observation, a police car drove slowly through the street. The street contains street lanterns and cameras.

Activity support: The street contains road signs instructing users on how to use the street. Social activities are not stimulated, because there was no space designed to meet other people, except for the restaurants. No opportunities for social activities are implemented in the street e.g. benches, small square, etc.

Image/management: the natural and non-natural parts of the area are not well maintained, because the natural parts contain a lot of weeds and the non-natural parts look weathered. During the first observation, one corner of the street was covered with trash. During the second, it was not. There were no broken objects.

4.1.2. Diezerstraat

The spatial analysis of the Diezerstraat is obtained to answer the second sub-question. The Diezerstraat contains all CPTED elements of the observation. Nothing changed in the street between both dates.

Territoriality: each square meter is public space and therefore, the municipality of Zwolle is the owner.

Surveillance: there are no obstructions in the sightlines and the buildings are oriented at the street. Security guards walk through the street and police cars drive around. Street lanterns and cameras are placed.

Activity support: road signs are present instructing people on how to use the street. Besides, there are benches at small squares in the street, where the street is a little widened, stimulating social activities.

Image/management: the natural and non-natural parts are well maintained. It looks neatly. No trash is on the ground and there are no broken objects.

4.1.3. Conclusion

The spatial analysis provides the answer to the second secondary question: Which Crime Prevention Through Environmental Design measurements are implemented in the Diezerstraat and Sassenstraat in Zwolle?

From the spatial analysis follows that the Diezerstraat contains all of the observed CPTED measurements observed in the analysis. The Sassenstraat contains approximately half of the observed CPTED measurements in the analysis. This means that the Diezerstraat can be used to measure influence and the Sassenstraat can be used as the control condition.

4.2. Survey

The aim of the survey is to explain the difference in the influence of CPTED measurement between the Sassenstraat and the Diezerstraat. The Sassenstraat is the control condition and the Diezerstraat is the sample that measures the influence of CPTED measurements on the safety perception of the pedestrians. The survey provides the information to test if the average influence of the CPTED measurements in the Sassenstraat and the Diezerstraat differs and in which street the influence is higher.

4.2.1. Kolmogorov-Smirnov test

In the analysis, the variable 'Diezerstraat' means that 1 is the Diezerstraat and 0 is not the Diezerstraat. 0 is the Sassenstraat. The full dataset contains 74 cases after deleting the invalid ones.

	Diezerstraat	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Influence_cameras	0	,148	36	,044
	1	,176	38	,005
Influence_guards	0	,155	36	,029
	1	,177	38	,004
Influence_social_control	0	,139	36	,075
	1	,160	38	,015
Influence_maintenance_green	0	,119	36	,200*
	1	,158	38	,018
Influence_maintenance_lanterns	0	,287	36	,000
	1	,203	38	,000
Inluence_maintenance_street_furniture	0	,141	36	,068
	1	,203	38	,000
Inluence_maintenance_buildings	0	,218	36	,000
	1	,194	38	,001
Influence_maintenance_art_objects	0	,161	36	,020
	1	,191	38	,001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 2: Kolmogorov-Smirnov test for normality (source: SPSS)

As can be seen in table 2, all variables are significant for the Diezerstraat and most also for the Sassenstraat at a significance level of 0,05. Therefore a multiple linear regression cannot be applied to this dataset. The two-independent sample t-test is the test fitting this dataset best, because both

samples contain >30 cases and therefore the normality requirement of the t-test can be left out (Moore & McCabe, 2005).

4.2.2. Two-independent sample t-test

The two-independent sample t-test is executed. Full SPSS-output is added in appendix 3. See table 3 for the results of the two-independent sample t-test.

For interpreting the right significance level of the two-independent sample t-test, the Levene's Test for equality of variances determines if the variance in both groups can be assumed as being equal. If the Levene's Test for Equality of Variances is significant, then equal variances are not assumed (Moore & McCabe, 2005). This means that the values of the t-test have to be interpreted from that row in the table. The Levene's test is insignificant for all CPTED measurements. This means that the values of the t-test should be interpreted in the bold row of each measurement in table 3. The values of the other row are not reliable.

The t-test results in testing if the average mark given to the influence of the CPTED measurements is equal in both groups of the population. This means that, if the influence of a measurement is significant, the influence of a measurement is higher in the one street than in the other. If the t-value is negative, the relationship between the Sassenstraat and the Diezerstraat is negative: the influence is lower in the Sassenstraat than in the Diezerstraat. If the t-value is positive, the relationship is positive. In that case, the influence of a CPTED measurement is higher in the Sassenstraat than in the Diezerstraat (Moore & McCabe, 2005).

The left column of table 3 contains the independent variables of the analysis: the CPTED measurements. The two-tailed significance described in the seventh column is interpreted to determine whether a CPTED measurement influences the subjective safety of pedestrians, or not. If the influence is significant, this means that the influence is different between both streets. The t-value determines the direction of this relationship between the CPTED measurement and the Sassenstraat and the Diezerstraat, as explained above.

When looking at the significance levels of the CPTED measurements, the only one significant is the influence of cameras: 0,033. This value is below the significance level of 0,05 All other measurements are not significant. This means that only the influence of cameras differs significantly between both streets. The influence of cameras on subjective safety is higher in one of the two streets. The t-value should be interpreted to conclude in which street the influence of cameras is found to be higher. The t-value is -2,174, which indicates that the relation between the Sassenstraat, coded as 0 in the dataset, and the Diezerstraat, coded as 1 in the dataset, is negative. Therefore, it can be concluded that the influence of cameras is significantly lower in the Sassenstraat (0) than in the Diezerstraat (1). The outcomes of the t-test can be explained.

The influence of cameras on the subjective safety of pedestrians appears to be bigger in the Diezerstraat than in the Sassenstraat. When looking at the spatial analysis, it can be seen that both streets contain cameras. This contradicts the statement made that if a CPTED measurement is not present, it would have a lower influence on the subjective safety of the user of a space. During the days that the survey was conducted, the respondents in the Sassenstraat said that they did not even know cameras are present in that street. Therefore, the influence is not big on their subjective safety. Here, it is not about whether a CPTED measurement is present or not, but about whether a respondent knew if a specific CPTED measurement was present.

The influence of guards, social control and maintenance of lanterns, green, street furniture, buildings and art objects appears to be not significantly different between the two compared streets. First, the

guards were not present in the Sassenstraat on the first day of observation. The second day they were. The presence of guards in the Diezerstraat is constant. When guards are in the area, CPTED theories state that the safety of that area is higher (Cozens et al., 2005). This appears not to be a constant presence in this study, but once in a while has the same influence on the subjective safety of pedestrians. Second, social control seems to have the same influence in both streets. The Diezerstraat is the main shopping street used by many people and therefore has a higher level of social control than the Sassenstraat. What would be expected is also a higher influence on subjective safety, but this is not the case. This could be because the more people use a certain area, the more anonymous using the area becomes (Steg et al., 2013). People will be less involved in each other's actions. The less people are involved with each other's actions, the more sensitive the area is for criminal activities (Concoran et al., 2019). This might result in about the same ratio between social control and anonymity between both streets, resulting in an insignificant influence of social control on subjective safety. Third, when looking at the maintenance of the streets, both streets are in the city centre and therefore the municipality maintains the area all at once. The difference in maintenance is that the Diezerstraat has newer street furniture than the Sassenstraat, and more attention is paid to the general image of the Diezerstraat, because it is the main shopping street. One example of this could be that there was no trash in the Diezerstraat on the first day of observation, but it was in the Sassenstraat. That the influence of maintenance does not differ in influence between both streets might be, because both streets do not contain that many objects to be maintained. The influence of the maintenance of these objects in both streets on subjective safety might, therefore, be negligible.

It might be a possibility that CPTED measurements are not the primary influence on subjective safety. Pedestrians in the Diezerstraat rate their subjective safety 7,48 out of 10. So, they do feel safe. Other influences could be the enclosure of the users of a space. People have a lower perception of their subjective safety if walls are close to each other and space feels less open. Also, access to refuge places has a positive effect on subjective safety (Stamps, 2005).

4.2.3. Conclusion

The survey provides the answer to the third secondary research question: Which Crime Prevention Through Environmental Design measurements influence the subjective safety of pedestrians of the Diezerstraat more compared to the influence of the CPTED measurements in the Sassenstraat?

Only the CPTED measurement cameras has a higher influence on the subjective safety of pedestrians in the Diezerstraat compared to the Sassenstraat. This is not because the Sassenstraat does not contain cameras, but because respondents were not aware of the presence of these cameras. Therefore the influence of its presence is low.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Influence_cameras	Equal variances assumed	**2,647**	**,108**	**-2,174**	**72**	**,033**	**-1,545**	**,711**	**-2,962**	**-,128**
	Equal variances not assumed			-2,166	69,667	,034	-1,545	,713	-2,968	-,123
Influence_guards	Equal variances assumed	**1,494**	**,226**	**-1,100**	**72**	**,275**	**-,721**	**,655**	**-2,027**	**,585**
	Equal variances not assumed			-1,096	69,208	,277	-,721	,658	-2,033	,591
Influence_social_control	Equal variances assumed	**2,337**	**,131**	**-,639**	**72**	**,525**	**-,354**	**,554**	**-1,458**	**,751**
	Equal variances not assumed			-,636	68,734	,527	-,354	,557	-1,464	,757
Influence_maintenance_lanterns	Equal variances assumed	**,335**	**,565**	**-,206**	**72**	**,838**	**-,108**	**,526**	**-1,156**	**,940**
	Equal variances not assumed			-,205	69,481	,838	-,108	,528	-1,161	,944
Influence_maintenance_green	Equal variances assumed	**,259**	**,612**	**,498**	**72**	**,620**	**,339**	**,681**	**-1,018**	**1,696**
	Equal variances not assumed			,499	71,999	,619	,339	,680	-1,016	1,694
Inluence_maintenance_street_furniture	Equal variances assumed	**,019**	**,890**	**-,702**	**72**	**,485**	**-,439**	**,625**	**-1,685**	**,807**
	Equal variances not assumed			-,703	71,986	,484	-,439	,624	-1,682	,805
Inluence_maintenance_buildings	Equal variances assumed	**,277**	**,601**	**,710**	**72**	**,480**	**,398**	**,560**	**-,719**	**1,515**
	Equal variances not assumed			,712	71,524	,479	,398	,558	-,715	1,511
Influence_maintenance_art_objects	Equal variances assumed	**,228**	**,635**	**1,487**	**72**	**,141**	**1,085**	**,729**	**-,369**	**2,539**
	Equal variances not assumed			1,485	71,273	,142	1,085	,730	-,371	2,541

Table 3: Independent samples t-test (source: SPSS)

5. Conclusion

5.1. Conclusion

Finally, this chapter will provide the answer to the central question of this thesis: 'To what extent do the Crime Prevention Through Environmental Design measurements territoriality, surveillance, activity support and image influence the subjective safety of pedestrians in the Diezerstraat in Zwolle?'. The answer to this question is divided into secondary questions which have been answered in the chapters before:

1. Under which conditions do Crime Prevention Through Environmental Design measurements have a positive effect on crime prevention and how do the measurements relate to subjective safety?
2. Which Crime Prevention Through Environmental Design measurements are implemented in the Diezerstraat and Sassenstraat in Zwolle?
3. Which Crime Prevention Through Environmental Design measurements influence the subjective safety of pedestrians of the Diezerstraat more compared to the influence of the CPTED measurements in the Sassenstraat?

The answers to these questions are in short:

1. Spatial planning implementations like CPTED measurements aim at reducing or preventing crime as the abbreviation means: Crime Prevention Through Environmental Design. Designing the environment in which people live in such a way it prevents crime from happening (Cozens et al., 2005). The implementation of CPTED measurements should result in higher subjective safety.
2. As a result of the spatial analysis can be stated that the Diezerstraat contains all observed CPTED features. The Sassenstraat, functioning as the control condition to measure the influence in the Diezerstraat, contains approximately half of the observed CPTED measurements.
3. From the statistical analysis of the survey follows that only the influence of cameras on the subjective safety of the pedestrians in the Diezerstraat is significant compared to the influence of cameras on subjective safety of pedestrians in the Sassenstraat. The influence of all other CPTED measurements is insignificant.

Based on the statements made in the literature can be concluded that the influence of CPTED measurements seems to be bigger on objective safety than on subjective safety (Cozens & Love, 2015; Piroozfar et al., 2019). To answer the central question, the influence in CPTED measurements on the subjective safety of pedestrians in the Diezerstraat is limited. Only the influence of cameras is higher in the Diezerstraat than in the Sassenstraat.

5.2. Recommendations

The average mark given to the Diezerstraat regarding its safety is a 7,48, so pedestrians do feel safe. According to the pedestrians, cameras do have a positive influence on their feeling of safety. I recommend reproducing a study like this one when criminal activities start rising in the future again. By executing a research like this one again, it can be measured which features influence subjective safety most. As a result, those CPTED measurements can be improved. If CPTED measurements are not implemented yet, it can be researched if the users of the shopping district would like them to be implemented.

Further research can be done after the influence of traffic safety in this street. In the morning still some trucks and cars deliver goods to shops and cyclist bike through the street even though this is not allowed during opening times of the shops according to the traffic signs. This might also influence the subjective

safety concerning traffic safety, because trucks obstruct the sightlines in the streets. Maybe more control over these types of traffic is needed.

For the reasoning in this research, only little can be found about spatial factors that influence the subjective safety of the users of public space. More information about this could be useful to understand behaviour of people in public spaces and would be a valuable addition to the academic literature.

6. Reflection

When looking back at performing this study, I would do many things differently the next time. First of all, I started by diving deep into the literature and reading many articles. Of course, this is important, but next time I would make myself a list of aspects I was looking for and theories I was looking for so I would read more structured. This would save much time.

It also took me a lot of time to determine the control condition necessary to measure influence in the Diezerstraat, because there is no street containing none of the CPTED measurements, but can be compared to the Diezerstraat regarding its spatial design. The design of both streets should be equal, but one of the two must contain fewer CPTED measurements. Both streets should be commercial areas and should have almost the same users. Therefore it is impossible to find a street in Zwolle that does not contain any CPTED measurement, but can be compared to the Diezerstraat by its spatial design. The Sassenstraat is considered to be the best control condition.

Besides, the way of conducting the survey was not very productive on the first day. The survey consisted of many more questions as it does now in appendix 2. Some questions did not produce information needed for answering the central question, but took a lot of time to answer because of the length of the questions. Also, the way of approaching people during the first two days was not very effective. I started asking people: 'Hello, could I ask you a question?'. Many people did not even reply and walked on. When I changed that question to: 'Hello, do you perhaps have a few minutes for my Bachelor's thesis?' people were much more willing to fill in my survey.

I was satisfied with the structure of my survey and the analysis. During the past years of my Bachelor, I saved all notes and lectures of statistics. I used this as a base of structuring my survey so the analysis would take less time. This worked out very well.

7. Discussion

In this thesis, there are many points to be discussed. In this chapter, they will be lined out.

7.1. Data collection – spatial analysis

The researcher of this thesis has performed the observations of the spatial analysis. Therefore, the observations are subjective. The observations have been performed on two different days to make sure the outcomes were no accidental outcomes. Still, two days are only 2 cases, which could be a problem, because space is always changing (Clifford et al.,2016). Many more cases are needed to draw conclusions about how the streets change over time, but for this study, the only information needed was to determine the control condition and to enhance the explanation of the survey with. For that, only information about the design of the street at this moment is needed. So, 2 cases are enough for this study to draw conclusions.

7.2. Data collection – survey

The survey has been conducted by the researcher of this thesis in both the Diezerstraat and the Sassenstraat. There are a few points to discuss concerning the survey:

The control condition of the Diezerstraat is the Sassenstraat. To be able to measure influence, it is necessary to have a control condition. Another group which can be studied in which the influence theoretically seen is zero. In Zwolle, no street does contain zero CPTED measurements. For example, take road signs. Road signs are placed in all public spaces and if they are not there, the street is not suited to be compared to the Diezerstraat, because it differs too much in its spatial design. If the two compared streets are very different, the influence on the subjective safety cannot be compared. The Sassenstraat contains only a few CPTED measurements and is, in essence, comparable to the Diezerstraat. The Sassenstraat is seen as the best-suited street to use as a control condition to the Diezerstraat.

The researcher can be prejudiced in conducting a survey. It is up to the researcher to approach people and ask to participate in the survey. To prevent errors from happening in the dataset, the researcher asked everybody walking by. Besides, the researcher did not only execute the survey standing at one spot in the streets, but by walking through the streets continuously.

Other cities in the Netherlands facing high crime rates and low subjective safety could learn from this research that CPTED measurements do not have a significant influence on subjective safety in the inner city. For reducing crime rates, they should focus on other influences of subjective safety.

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Appendices

Appendix 1: Results spatial analysis

Sassenstraat

Theoretical concept	Visualization	Presence	
		4/11	26/11
Territoriality	• Ownership of space: each square meter of land has its legitimate owner	Yes	Yes
Surveillance	• Natural: sight lines are clear and unobstructed	Yes	Yes
	• Natural: all buildings are oriented at the street (windows)	No	No
	• Organized: security guards guarantee safety	No	Yes
	• Mechanical: street lanterns enlighten the street	Yes	Yes
	• Mechanical: cameras are placed to constantly watch flows of people	Yes	Yes
Activity support	• Signs are placed to instruct people how to use space	Yes	Yes
	• Social activities are stimulated (social interaction of users)	No	No
Image/ management	• The green space in the area is well maintained	No	No
	• The non-natural parts of the area are well maintained (benches, art statues, pavements)	No	No
	• The street looks neatly (no rubbish)	No	Yes
	• There are no broken objects in the area	Yes	Yes

Diezerstraat

Theoretical concept	Visualization	Presence	
		4/11	26/11
Territoriality	• Ownership of space: each square meter of land has its legitimate owner	Yes	Yes
Surveillance	• Natural: sight lines are clear and unobstructed	Yes	Yes
	• Natural: buildings are oriented at the street (windows)	Yes	Yes
	• Organized: security guards guarantee safety	Yes	Yes
	• Mechanical: street lanterns enlighten the street	Yes	Yes
	• Mechanical: cameras are placed to constantly watch flows of people	Yes	Yes
Activity support	• Signs are placed to instruct people how to use space	Yes	Yes
	• Social activities are stimulated (social interaction of users)	Yes	Yes
Image/ management	• The green space in the area is well maintained	Yes	Yes
	• The non-natural parts of the area are well maintained (benches, art statues, pavements)	Yes	Yes
	• The street looks neatly (no rubbish)	Yes	Yes
	• There are no broken objects in the area	Yes	Yes

Appendix 2: Survey

university of groningen

Wat fijn dat u mee wilt werken aan deze enquête over de Diezerstraat. In deze enquête zullen een aantal vragen worden gesteld over uw gevoel van veiligheid in deze straat. De data verzameld in deze enquête zal worden gebruikt voor een bachelor scriptie.

Geslacht:

- ○ Man
- ○ Vrouw
- ○ Anders

Leeftijdscategorie

- ○ 0-19
- ○ 20-39
- ○ 40-59
- ○ 60-79
- ○ 80-100

Hoe veilig voelt u zich in deze straat?

- ○ Zeer veilig
- ○ Veilig
- ○ Neutraal
- ○ Onveilig
- ○ Zeer onveilig
- ○ Geen idee

Als ik in deze straat ben, ben ik vaak:

- ○ In een groep
- ○ Alleen
- ○ Geen idee

Bent u wel eens het slachtoffer geweest van een criminele activiteit in deze straat? (Denk bijvoorbeeld aan een overval, zakkenrollers, etc.)

- ○ Ja
- ○ Nee

Ik beoordeel de veiligheid van deze straat over het algemeen als:

Slecht Goed

0 1 2 3 4 5 6 7 8 9 10

Cijfer

De camerabewaking heeft op mijn gevoel van veiligheid:

Geen invloed Veel invloed

0 1 2 3 4 5 6 7 8 9 10

Cijfer

De beveiliging door beveiligers, politie en bewakers in deze straat heeft op mijn gevoel van veiligheid:

Geen invloed Veel invloed

0 1 2 3 4 5 6 7 8 9 10

Cijfer

De hoeveelheid sociale controle (andere mensen die op u letten) in deze straat heeft op mijn gevoel van veiligheid:

Geen invloed Veel invloed

0 1 2 3 4 5 6 7 8 9 10

Cijfer

Het **onderhoud** van deze straat op de volgende punten heeft op mijn gevoel van veiligheid:

Geen invloed Veel invloed

0 1 2 3 4 5 6 7 8 9 10

Groenvoorzieningen

Straatverlichting

Staatmeubilair (bankjes, prullenbakken)

Gebouwen

Kunst (beelden, etc)

Ja, ik wil graag de resultaten van dit onderzoek ontvangen op de volgende email (geen antwoord verplicht).

Appendix 3: Statistical Analysis - SPSS output

3.1. Descriptive statistics output

Diezerstraat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	40	50,0	50,0	50,0
	1	40	50,0	50,0	100,0
	Total	80	100,0	100,0	

0 = Sassenstraat; 1 = Diezerstraat

Statistics

Datum

N	Valid	80
	Missing	0
Mean		15-NOV-19
Median		07-NOV-19
Std. Deviation		10 02:27:46,168
Range		22 02:34:34
Minimum		04-NOV-19
Maximum		26-NOV-19

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	36	45,0	45,0	45,0
	Vrouw	44	55,0	55,0	100,0
	Total	80	100,0	100,0	

Age_category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-19	15	18,8	18,8	18,8
	20-39	35	43,8	43,8	62,5
	40-59	15	18,8	18,8	81,3
	60-79	15	18,8	18,8	100,0

	Total	80	100,0	100,0	

Safety_perception

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neutraal	12	15,0	15,0	15,0
	Onveilig	2	2,5	2,5	17,5
	Veilig	50	62,5	62,5	80,0
	Zeer veilig	16	20,0	20,0	100,0
	Total	80	100,0	100,0	

Company_composition

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alleen	47	58,8	58,8	58,8
	Geen idee	6	7,5	7,5	66,3
	In een groep	27	33,8	33,8	100,0
	Total	80	100,0	100,0	

In_touch_with_criminal_activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ja	1	1,3	1,3	1,3
	Nee	79	98,8	98,8	100,0
	Total	80	100,0	100,0	

Statistics

Safetymark

N	Valid	80
	Missing	0
Mean		7,54
Median		8,00
Std. Deviation		1,190
Range		6
Minimum		4
Maximum		10

Statistics

Influence_cameras

N	Valid	80
	Missing	0
Mean		4,78
Median		5,00
Std. Deviation		3,142
Range		10
Minimum		0
Maximum		10

Statistics

Influence_guards

N	Valid	80
	Missing	0
Mean		5,28
Median		6,00
Std. Deviation		2,747
Range		10
Minimum		0
Maximum		10

Statistics

Influence_social_control

N	Valid	80
	Missing	0
Mean		5,99
Median		6,00
Std. Deviation		2,341
Range		10
Minimum		0
Maximum		10

Statistics

Influence_maintenance_green

N	Valid	80
	Missing	0
Mean		4,60
Median		5,00
Std. Deviation		2,928
Range		10
Minimum		0
Maximum		10

Statistics

Influence_maintenance_lanterns

N	Valid	80
	Missing	0
Mean		7,01
Median		7,00
Std. Deviation		2,202
Range		10
Minimum		0
Maximum		10

Statistics

Inluence_maintenance_street_furniture

N	Valid	80
	Missing	0
Mean		5,26
Median		6,00
Std. Deviation		2,736
Range		10
Minimum		0
Maximum		10

Statistics

Inluence_maintenance_buildings

N	Valid	80
	Missing	0
Mean		6,24
Median		7,00
Std. Deviation		2,451
Range		10
Minimum		0
Maximum		10

Statistics

Influence_maintenance_art_objects

N	Valid	80
	Missing	0
Mean		3,91
Median		4,00
Std. Deviation		3,123
Range		10
Minimum		0
Maximum		10

3.2. Explore data t-test

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	Diezerstraat	N	Percent	N	Percent	N	Percent
Safetymark	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Influence_cameras	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Influence_guards	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Influence_social_control	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
	0	36	100,0%	0	0,0%	36	100,0%

Influence_maintenance_green	1	38	100,0%	0	0,0%	38	100,0%
Influence_maintenance_lanterns	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Inluence_maintenance_street_furniture	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Inluence_maintenance_buildings	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%
Influence_maintenance_art_objects	0	36	100,0%	0	0,0%	36	100,0%
	1	38	100,0%	0	0,0%	38	100,0%

Descriptives

	Diezerstraat			Statistic	Std. Error
Safetymark	0	Mean		7,61	,243
		95% Confidence Interval for Mean	Lower Bound	7,12	
			Upper Bound	8,10	
		5% Trimmed Mean		7,68	
		Median		8,00	
		Variance		2,130	
		Std. Deviation		1,460	
		Minimum		4	
		Maximum		10	
		Range		6	
		Interquartile Range		1	
		Skewness		-,729	,393
		Kurtosis		,694	,768
	1	Mean		7,58	,123
		95% Confidence Interval for Mean	Lower Bound	7,33	
			Upper Bound	7,83	
		5% Trimmed Mean		7,56	
		Median		8,00	
		Variance		,575	
		Std. Deviation		,758	
		Minimum		6	
		Maximum		10	
		Range		4	
		Interquartile Range		1	
		Skewness		,504	,383
		Kurtosis		1,856	,750
Influence_cameras	0	Mean		4,14	,542

		95% Confidence Interval for Mean	Lower Bound	3,04	
			Upper Bound	5,24	
		5% Trimmed Mean		4,10	
		Median		5,00	
		Variance		10,580	
		Std. Deviation		3,253	
		Minimum		0	
		Maximum		9	
		Range		9	
		Interquartile Range		7	
		Skewness		-,005	,393
		Kurtosis		-1,466	,768
	1	Mean		5,68	,464
		95% Confidence Interval for Mean	Lower Bound	4,74	
			Upper Bound	6,62	
		5% Trimmed Mean		5,76	
		Median		6,00	
		Variance		8,168	
		Std. Deviation		2,858	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		4	
		Skewness		-,807	,383
		Kurtosis		-,121	,750
Influence_guards	0	Mean		4,81	,504
		95% Confidence Interval for Mean	Lower Bound	3,78	
			Upper Bound	5,83	
		5% Trimmed Mean		4,78	
		Median		5,00	
		Variance		9,133	
		Std. Deviation		3,022	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		4	
		Skewness		-,244	,393
		Kurtosis		-,927	,768
	1	Mean		5,53	,423
		95% Confidence Interval for Mean	Lower Bound	4,67	
			Upper Bound	6,38	

		5% Trimmed Mean		5,61	
		Median		6,00	
		Variance		6,797	
		Std. Deviation		2,607	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		5	
		Skewness		-,616	,383
		Kurtosis		-,304	,750
Influence_social_control	0	Mean		5,78	,429
		95% Confidence Interval for Mean	Lower Bound	4,91	
			Upper Bound	6,65	
		5% Trimmed Mean		5,89	
		Median		6,00	
		Variance		6,635	
		Std. Deviation		2,576	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		4	
		Skewness		-,621	,393
		Kurtosis		-,217	,768
	1	Mean		6,13	,354
		95% Confidence Interval for Mean	Lower Bound	5,41	
			Upper Bound	6,85	
		5% Trimmed Mean		6,26	
		Median		6,00	
		Variance		4,766	
		Std. Deviation		2,183	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		2	
		Skewness		-,901	,383
		Kurtosis		1,840	,750
Influence_maintenance_green	0	Mean		4,94	,475
		95% Confidence Interval for Mean	Lower Bound	3,98	
			Upper Bound	5,91	
		5% Trimmed Mean		4,94	
		Median		5,00	

		Variance		8,111	
		Std. Deviation		2,848	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		5	
		Skewness		-,098	,393
		Kurtosis		-,925	,768
	1	Mean		4,61	,487
		95% Confidence Interval for Mean	Lower Bound	3,62	
			Upper Bound	5,59	
		5% Trimmed Mean		4,59	
		Median		5,00	
		Variance		9,002	
		Std. Deviation		3,000	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		4	
		Skewness		-,319	,383
		Kurtosis		-,988	,750
Influence_maintenance_lanterns	0	Mean		6,94	,402
		95% Confidence Interval for Mean	Lower Bound	6,13	
			Upper Bound	7,76	
		5% Trimmed Mean		7,16	
		Median		7,50	
		Variance		5,825	
		Std. Deviation		2,414	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		1	
		Skewness		-1,597	,393
		Kurtosis		2,409	,768
	1	Mean		7,05	,341
		95% Confidence Interval for Mean	Lower Bound	6,36	
			Upper Bound	7,74	
		5% Trimmed Mean		7,28	
		Median		7,50	
		Variance		4,430	
		Std. Deviation		2,105	

		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		2	
		Skewness		-1,928	,383
		Kurtosis		5,207	,750
Inluence_maintenance_street_furniture	0	Mean		5,17	,432
		95% Confidence Interval for Mean	Lower Bound	4,29	
			Upper Bound	6,04	
		5% Trimmed Mean		5,21	
		Median		5,50	
		Variance		6,714	
		Std. Deviation		2,591	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		3	
		Skewness		-,507	,393
		Kurtosis		-,363	,768
	1	Mean		5,61	,450
		95% Confidence Interval for Mean	Lower Bound	4,69	
			Upper Bound	6,52	
		5% Trimmed Mean		5,67	
		Median		6,00	
		Variance		7,705	
		Std. Deviation		2,776	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		2	
		Skewness		-,831	,383
		Kurtosis		,133	,750
Inluence_maintenance_buildings	0	Mean		6,56	,373
		95% Confidence Interval for Mean	Lower Bound	5,80	
			Upper Bound	7,31	
		5% Trimmed Mean		6,73	
		Median		7,00	
		Variance		4,997	
		Std. Deviation		2,235	
		Minimum		0	
		Maximum		10	

		Range		10	
		Interquartile Range		2	
		Skewness		-1,418	,393
		Kurtosis		2,596	,768
	1	Mean		6,16	,416
		95% Confidence Interval for Mean	Lower Bound	5,32	
			Upper Bound	7,00	
		5% Trimmed Mean		6,29	
		Median		7,00	
		Variance		6,569	
		Std. Deviation		2,563	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		3	
		Skewness		-1,243	,383
		Kurtosis		1,513	,750
Influence_maintenance_art_objects	0	Mean		4,61	,535
		95% Confidence Interval for Mean	Lower Bound	3,53	
			Upper Bound	5,70	
		5% Trimmed Mean		4,59	
		Median		5,00	
		Variance		10,302	
		Std. Deviation		3,210	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		7	
		Skewness		-,219	,393
		Kurtosis		-1,380	,768
	1	Mean		3,53	,497
		95% Confidence Interval for Mean	Lower Bound	2,52	
			Upper Bound	4,53	
		5% Trimmed Mean		3,42	
		Median		3,00	
		Variance		9,391	
		Std. Deviation		3,065	
		Minimum		0	
		Maximum		10	
		Range		10	
		Interquartile Range		6	

	Skewness	,262	,383
	Kurtosis	-1,209	,750

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Diezerstraat	Statistic	df	Sig.	Statistic	df	Sig.
Safetymark	0	,244	36	,000	,907	36	,005
	1	,263	38	,000	,816	38	,000
Influence_cameras	0	,148	36	,044	,884	36	,001
	1	,176	38	,005	,896	38	,002
Influence_guards	0	,155	36	,029	,930	36	,025
	1	,177	38	,004	,934	38	,028
Influence_social_control	0	,139	36	,075	,942	36	,057
	1	,160	38	,015	,922	38	,011
Influence_maintenance_gree	0	,119	36	,200*	,956	36	,166
n	1	,158	38	,018	,912	38	,006
Influence_maintenance_lante	0	,287	36	,000	,812	36	,000
rns	1	,203	38	,000	,800	38	,000
Inluence_maintenance_street	0	,141	36	,068	,946	36	,080
_furniture	1	,203	38	,000	,892	38	,002
Inluence_maintenance_buildi	0	,218	36	,000	,858	36	,000
ngs	1	,194	38	,001	,851	38	,000
Influence_maintenance_art_o	0	,161	36	,020	,900	36	,003
bjects	1	,191	38	,001	,894	38	,002

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

3.3. T-Test for two independent samples

T-Test

Group Statistics

	Diezerstraat	N	Mean	Std. Deviation	Std. Error Mean
Influence_cameras	0	36	4,14	3,253	,542
	1	38	5,68	2,858	,464
Influence_guards	0	36	4,81	3,022	,504

	1	38	5,53	2,607	,423
Influence_social_control	0	36	5,78	2,576	,429
	1	38	6,13	2,183	,354
Influence_maintenance_lanterns	0	36	6,94	2,414	,402
	1	38	7,05	2,105	,341
Influence_maintenance_green	0	36	4,94	2,848	,475
	1	38	4,61	3,000	,487
Inluence_maintenance_street_furniture	0	36	5,17	2,591	,432
	1	38	5,61	2,776	,450
Inluence_maintenance_buildings	0	36	6,56	2,235	,373
	1	38	6,16	2,563	,416
Influence_maintenance_art_objects	0	36	4,61	3,210	,535
	1	38	3,53	3,065	,497
Safetymark	0	36	7,61	1,460	,243
	1	38	7,58	,758	,123
Safety_perception	0	36	2,00	,828	,138
	1	38	1,97	,492	,080

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Influence_cameras	Equal variances assumed	2,647	,108	-2,174	72	,033	-1,545	,711	-2,962	-,128
	Equal variances not assumed			-2,166	69,667	,034	-1,545	,713	-2,968	-,123
Influence_guards	Equal variances assumed	1,494	,226	-1,100	72	,275	-,721	,655	-2,027	,585
	Equal variances not assumed			-1,096	69,208	,277	-,721	,658	-2,033	,591
Influence_social_control	Equal variances assumed	2,337	,131	-,639	72	,525	-,354	,554	-1,458	,751
	Equal variances not assumed			-,636	68,734	,527	-,354	,557	-1,464	,757
Influence_maintenance_lanterns	Equal variances assumed	,335	,565	-,206	72	,838	-,108	,526	-1,156	,940
	Equal variances not assumed			-,205	69,481	,838	-,108	,528	-1,161	,944
Influence_maintenance_green	Equal variances assumed	,259	,612	,498	72	,620	,339	,681	-1,018	1,696

	Equal variances not assumed			,499	71,999	,619	,339	,680	-1,016	1,694
Inluence_maintenance_street_furniture	Equal variances assumed	,019	,890	-,702	72	,485	-,439	,625	-1,685	,807
	Equal variances not assumed			-,703	71,986	,484	-,439	,624	-1,682	,805
Inluence_maintenance_buildings	Equal variances assumed	,277	,601	,710	72	,480	,398	,560	-,719	1,515
	Equal variances not assumed			,712	71,524	,479	,398	,558	-,715	1,511
Influence_maintenance_art_objects	Equal variances assumed	,228	,635	1,487	72	,141	1,085	,729	-,369	2,539
	Equal variances not assumed			1,485	71,273	,142	1,085	,730	-,371	2,541
Safetymark	Equal variances assumed	8,486	,005	,120	72	,905	,032	,268	-,503	,567
	Equal variances not assumed			,118	51,966	,907	,032	,273	-,515	,579
Safety_perception	Equal variances assumed	6,157	,015	,167	72	,868	,026	,157	-,287	,340
	Equal variances not assumed			,165	56,395	,870	,026	,159	-,293	,346