Perceived safety in public spaces

A quantitative investigation of the spatial and social influences on safety perception among young adults in Stockholm

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June 2015
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Abstract


Human Geography, master thesis for master exam in Human Geography, 30 ECTS credits

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Language: English

Key Words: Quantitative, Safety, Young Adults, Spatial, Social, Influences, Perceived, Seasons.

From existing literature a distinction between young and older people has been established regarding safety perception in public spaces. This quantitative study focuses on the young adult group in order to further investigate the reasoning and behavioral choices young adults make in relation to using public spaces and safety perception. In order to do so, the main research question is: in what ways does safety perception affect the use of public spaces by young adults? Using the quantitative method of surveying and statistical analysis, several hypotheses were developed and answered. The main outcome from the statistical research is that within the young adult group, there are several groups that have significantly different opinions and behavior regarding safety perception. Seasonal influence, mostly based upon the lack of daylight, is stronger among women than men. Women feel significantly safer during the summer than men. This increased feeling of safety among women during the summer has a positive influence on the use of public spaces by this group. Seasonal influences and darkness have significantly less effect on frequent visitors to the city of Stockholm and people that have lived for a relatively long time in Stockholm. This confirms the statements of the existing literature regarding men and women in relation to safety perception.
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1. Introduction

By offering publically accessible space which connects other areas of the city, public spaces are vital for the existence of a well-functioning city. However, the quality and attractiveness of public spaces can differ, as well as the intention of the space by urban planners. The way people perceive space determines the way space is used. One of the major factors that influences people’s behavior is sense of safety. If people feel unsafe in an area, the behavior of people and sense of comfort is changed. The way people perceive their safety can tell a lot about the way people make use of certain parts of the city. This information can be used for future urban planning projects regarding public spaces, in order to make places feel more safe, comfortable and popular. Raising awareness about factors that people find most important regarding their safety in public spaces in combination with looking at reported crime data can determine if there is a correlation between actual crimes and the perception people have about crime. Collecting data about perceived safety levels regarding day and night time can also show which environmental factors are most important in building a general sense of safety.

Public space is a concept that can be interpreted in different ways. For this thesis, public spaces will be treated as spaces that are publicly accessible (either privately or publicly owned). The sense of safety will be derived from the literature and compiled into a conceptual model. Building a theoretic model containing the elements of safety that people value when using public spaces will offer the platform for the quantitative study. The target group of this study will be young adults, mainly because young adults tend to be more active in the nightlife scene, and therefore making use of public space both during day and night time, which could give an insight in the influence of daylight on safety perception.

A survey from the Swedish National Council for Crime Prevention (Brå, 2014), states that men are less likely to worry about crime in general than women. Additionally, the younger age groups tend to worry less than people in the older age groups. Using young adults for this study may offer more insight into the reasons why this group worries less than older people, and the divide between young women and men could be looked at into detail.

The selected areas for research are determined by looking at their environmental properties; spatial features that are most relevant regarding safety of visitors of public spaces will be taken into account when selecting research areas for this study. The existing literature regarding safety in public spaces mentions for example the presence of streetlights (Shenassa et al, 2006). For a city as Stockholm where darkness plays a big role during the winter months, the importance of streetlights will most likely be one of the factors people value a lot in this study. What this means is that the origin of studies must be acknowledged and taken into account when conducting a similar study; environmental factors are of great importance, some more than others depending on the research area.

To determine the value and effects safety has on the use of public spaces the following research question has been made:

*In what ways does safety perception affect the use of public spaces by young adults?*

Additionally, several sub questions will help formulate hypotheses, in order to make statistical research possible.
1.1 Aim
The aim of this thesis is to look into the perception of safety of public spaces among young adults in Stockholm. Using quantitative methods to gain empirical results, statistical analysis can offer insight regarding the factors that affect the perception of safety. The selected target group for this study has the qualities to have an opinion about the selected public spaces both during the day and night, due to the assumption that young adults would make use of public spaces in the city both during day and night time. The results of this study could offer potential solutions to the planning of (urban) public spaces that would increase the perceived safety, by applying the factors that become apparent in this study. People’s sense of safety can affect day to day activities and change the way people live their lives. The outcomes of this thesis could show insight into environmental factors that affect public spaces negatively and which consequently, makes people avoid them. If these environmental factors can be changed, certain public spaces of the city can be made more attractive and will increase the general perceived safety among people. Additionally, registered crimes in public spaces and their locations will be compared to the places that are perceived as dangerous, from the empirical study, to see if there is a correlation between factual and subjective information.
2. Theoretical framework

2.1 Introduction
This chapter discusses the information from previous studies on the topic of safety perception and public spaces. The goal of this chapter is to clarify concepts, theories and questions that might arise from the literature. Additionally, this chapter is the groundwork for the quantitative research and eventually the results chapter of this thesis. Having a theoretical framework is essential and needed for conducting either quantitative or qualitative research. The information from the previous studies will be transformed into a conceptual model, which will contain the elements that revolve around safety perception in public spaces. The conceptual model for this thesis will be discussed at the end of this chapter, after discussing the factors that influence safety perception.

2.2 Public spaces
Public spaces are built to offer places to socialize, work and travel through. It is a broad concept that suggests ‘openness’ of space; open for anyone who wishes to make use of it. There are quite a lot of definitions of public space, such as “space that is not controlled by private individuals or organizations, and hence is open to the general public” (Mehta, 2014, p. 54). For this thesis, ownership of the space is not that relevant. What’s more relevant is the use and accessibility of the space by the public, for example, a park can be owned privately but still be open to the public, in this thesis this would still be classified as a public space. When discussing public spaces in a city, one could claim that almost everything in the city is public space, including the roads crossing through the city. This thesis limits itself to squares, plazas, parks, fields, harbor areas and sidewalks. This means that privatized areas that are nowadays considered to be public spaces, for example malls, are not considered part of public space within this thesis.

The history of the public space is related to democracy, stemming from the old Greek agora. The first public spaces were meant to function as places where society came together to make decisions. It was a space created for the people in order to voice their opinion on governmental issues. Additionally it was also a market space, which led to the specialization of products and trade between these products. The market space, a public space, was a medium for the trade of specialized goods. The original idea of public spaces was to offer a space to bring people together for business and social activities. Nowadays public spaces such as parks and squares are still used for such purposes. Flea markets, food markets and clothing markets are the example of businesses conducted in public spaces. Public spaces usually also offer some sort of platform for social activities such as playgrounds, benches and tables for picnics, sport areas (such as goal posts on grass fields) and walking paths (Mehta, 2014). According to Thomas (1991) public spaces have four major functions nowadays: they function as a space for public life to flourish (1), as a place for different social groups to interact or coexist (2), to facilitate a space for the display of symbols and images in society (3) and to tie other urban spaces together (4). The last function mentioned by Thomas (1991) is the only one that is not related to social matters, but instead to urban design. However, the three other functions show how important public spaces are for society to express itself. Public spaces offer a social platform shared by different social groups for people to connect and share information which is an important feature of expressing democracy (Mehta, 2014; Arendt, 1958).

There are several categories to determine the quality and attractiveness of public spaces, one of them being safety. Safety is considered the most important factor when valuing public spaces, because the perceived safety of an area by the individual has a strong influence in the decision by the individual to make use of the space, or to avoid it (Mehta, 2014, p. 60). The perceived safety within public spaces of an individual is dependent on several factors, such as: perceived security, maintenance of the area, visibility in the area, the presence of green (bushes, trees, grass, flowers etc.), the presence of water, streetlights, the number of people visiting the area, and time of day.
A public space that is perceived as safe could potentially be experienced as comfortable. The individual perceives the area as non-threatening, which positively influences the level of comfort the person experiences (Mehta, 2014, pp. 60-61). However the comfort level of a public space is not necessarily defined by the level of safety. Different seasons, for example, define the use of the space and for a large part influence the level of comfort. Sunlight is an important actor in relation to the use of public spaces. During warm months, people tend to make more use of public spaces than in colder months, because the temperature and environment allows people to do so. Recreational facilities such as benches, playgrounds and water fountains become attractive and usable when it is warm and sunny outside, adding to the esthetic value of the public space (Mehta, 2014). Even though public space is open for everyone to make use of, certain groups that are making use of the space can make people, such as youths, homeless people or drug addicts hanging around in that area which would make it less attractive for elderly for leisure activities. So even though public space in its definition claims to be accessible for everyone, areas tend to divide themselves into ‘go’ and ‘no-go’ areas.

2.3 Safety and darkness

Within the study done by Shenassa et al. (2006), the perceived safety of the neighborhood of the respondents was determined by asking if the respondents felt safe returning to their dwellings in the dark. The factor of night time could be further expanded within this study by asking respondents if there are differences between safety perception during different seasons (for example: one could feel safe in a park during the summer because of the longer availability of daylight, but this does not mean the individual would feel safe in the same park during winter time when daylight is more limited). In a study from Bennett et al. (2007) about neighborhood safety and physical activity, the difference between men and women was discussed; the level of own safety was determined by asking the participants if they felt comfortable walking alone in their neighborhood during day- and night time. Bennett et al. (2007) concludes that safety perception depends on the time of day. The time of day plays an indispensable role when studying the safety perception among individuals. Women appear to have an increased sense of feeling unsafe during night time compared to men (Bennett et al., 2007; Shenassa et al., 2006).

In a night time setting people are more likely to be attentive to other people and their surroundings, shaped by the fear the something might happen to them. Public spaces that are well lit are less likely to be perceived as unsafe, mostly because light gives people the ability to get an idea and overview of a space. If a space is not well lit and visibility is limited, an increased sense of feeling unsafe is triggered (Brands et al., 2015, p. 442). However, a well-lit area is also associated with less potential crime that could occur; people feel that sufficient lighting will force crime to move elsewhere and that well-lit areas therefore create a sense of safety (Brands et al., 2015, p. 449).

In a literature study from Maruthaveeran & Konijnendijk van den Bosch (2014) lighting was mentioned as an important factor that affects the perceived safety. However, the study made clear that the presence of lighting in a public space does not necessarily guarantee a feeling of safety among visitors. Physical attributes of spaces combined form the perceived safety; lighting and lots of green in an area (such as high bushes) combined made people feel less uncomfortable. People seem to be more comfortable with low cut green areas, which gives visitors more visibility of the entire area (Lindgren & Nilsen, 2011, pp. 202-203). There are also exceptions to the general rule that some form of lighting works positively in an individual’s safety perception: one case showed that walking through a park with dark paths felt safer than when these paths were accommodated with streetlights, because the darkness made the individual feel less visible, and thus less likely to become a victim of a crime (Maruthaveeran & Konijnendijk van den Bosch, 2014, p. 4). Related to darkness,
the time of day stands in relation to esthetic and safety perceptions; an area that during day time (when there is plenty of daylight) is perceived as disorderly will be perceived even more disorderly during night time (Liempt, van et al., 2015, pp. 407-408). The difference between day and night time, regarding types of crimes, is that fear of night time crimes are mostly sexual assault crimes while fear of day time crimes is much more diverse (Maruthaveeran & Konijnendijk van den Bosch, 2014, p. 13). It must be noted here that there is a difference between men and women and the fears about different types of crimes; for example, women are more likely to worry about sexual assault crimes than men (Brå, 2014; Maruthaveeran & Konijnendijk van den Bosch, 2014).

2.4 Security and maintenance

Feeling secure in a public area can be achieved by having surveillance cameras or police patrolling the area, but by overdoing this, the idea that the area instead is unsafe might arise, and the police and visible security in the area are needed because otherwise crime would prevail (Mehta, 2014, p.60). There is a connection between visitors of the public space and security; if there are enough people within the public space, a form of self-securitization is created where people keep an eye on each other and on potential cases of law-breakers. This would mean that the visible ‘organized’ security is not needed and perhaps even unwanted. Maintenance of public spaces regards the cleanliness of an area, including proactively preventing vandalism or repairing damaged property in the public space. Vandalism, such as graffiti or broken attributes in the area, is an important factor that determines the esthetic value of an area; vandalized areas are less attractive and keeps people away (Shenassa et al., 2006, p. 1015; Perkins et al., 1992, p. 29). The broken window theory can be applied here: if small crimes such as vandalism are prevented, people perceive the area as neat and orderly, and worse crimes will have less of a chance happening (Gau et al., 2014, p. 579).

There is a relation between vandalism and a ‘fear of disorder’ among people. Perceived vandalism or unlawfulness gives people the idea that there is no control in the area and that people visiting the public space are vulnerable to (witnessing) crime themselves (Gau et al., 2014, p.580). This fear of crime is a concept that is mostly initiated and spread by media reports and through stories that people hear from other people. Even though these stories might for a part be untrue, they still have a strong effect on the way people perceive public spaces (Brands et al., 2015, p. 440). Feeling unsafe can manifest itself in many ways, for example starting to feel physically ill, uneasy with increased awareness of being in an unsafe environment, or the preventative instinct by estimating the potential danger and avoiding the unsafe area. There are many emotions that come into play regarding fear or crime. People learn from other people or from watching the news that bad things happen, in some parts of a city more than in other places. People make mental notes of these learning moments and remember what they’ve seen or heard when they are about to pass by similar areas (Brands et al., 2015, pp. 440-443).

Expanding further on the broken window theory, the lack of a well maintained public space is linked to increase the uneasiness people experience in an area. Additionally, a public space that has visible security in the form of surveillance camera’s or police patrolling is found to be safer and therefore more attractive. However the presence of security in the form of policemen has two sides to it (Mehta, 2014). On the one hand people find policemen in public space comforting and contributing to the perception of safety of an area, on the other hand people relate policemen to trouble or potential danger. People start to wonder if the public space secured by policemen is a potential danger area, and it starts to have the counter effect of what was actually desired in the first place with visible security in the area (Brands et al., 2015, pp. 450-451; Gau et al., 2014, pp. 580-581). The alternative to official security within public spaces is securing space by community. This form of security is employed by the people that make use of the public space for recreational, social or business purposes; it is the basic concept of keeping an eye on each other, and therefore leaving
little room for crime to happen. The environment in which crime could potentially manifest itself also depends on the location and type of public space. A park for example, characterizes itself by lots of green in combination with ill lit areas. Spaces such as these are difficult to monitor with surveillance cameras and are probably better secured by the visitors of the space itself (Schroeder & Anderson, 1984; Mehta, 2014, pp. 60-62).

2.5 Environmental effects on safety

Environmental factors, which are decided when planning and building public spaces, such as streetlights, green areas and general visibility in the area form the atmosphere of an area. For example, a park with lots of small paths and lots of green during the day can create a romantic atmosphere, but this same park could be perceived as dangerous during the night if it lacks the needed streetlights for people to see what is going on around them. The amount of trees, bushes and maintenance of green areas can influence the perceived safety of people and the preferences for visiting or stay clear of a public area (Kuo et al., 1998, p. 33-35). These environmental factors are created during the planning stage of the area, and therefore have the first and direct influence in creating a sense of safety.

The design of a public space is done with a specific purpose in mind. On the one hand public spaces can be quite inviting, with benches alongside a park trail for example. On the other hand, often times benches are designed in such a way that people cannot lie down on them, to prevent unwanted people or groups from making use of them (The Guardian, 2014). These new urban design methods are applied in spaces that have had reports of homeless people, and try to make it impossible for the homeless to survive in the newly designed spaces. When looking at the outcome of these new designs fewer homeless people will be present in the new areas. One could question the outcomes of these ‘defensive urban design’ methods, because it does not address the actual problem of homelessness, it just moves the problem to other spaces. However, some aspects of defensive urban design do contribute to clearing certain public spaces from beggars and homeless people, which adds to potential increased safety levels among individuals visiting the public spaces. A study conducted by Ferraro & LaGrange (1992) discusses the biggest fears regarding crimes that could potentially happen to the respondents. The interaction with a beggar is measured within the study, concluding that women are more likely to be afraid of being approached by a beggar on the streets (Ferraro & LaGrange, 1992, p. 241). The broken window theory mentioned before has a major influence on the way people perceive their environment and therefore, their own safety. Areas that contain graffiti drawings are associated with a lack of maintenance and surveillance. Vandalism in the form of graffiti can give people the idea that these kinds of illegal activities are not prevented or addressed, which could lead to questioning their own safety. There are many cases in which the spreading of ‘green’ in public spaces can lead to a decrease in vandalism and crime. For example, in a certain area of Philadelphia, the cleaning up and planting new trees and grass fields in previously empty spaces helped reduce crime by 90%. This example shows that the methods used within the broken window theory can be applied to different situations and achieve similar goals, by applying ‘natural security’. Similar to providing plenty of trash bins which prevents people from throwing trash on the ground, the planting of trees, grass and flowers prevents people from vandalizing or spraying graffiti on walls (Kuo et al., 1998, p. 31). A study conducted by a Dutch research firm concludes that young people actually prefer green spaces to non-green spaces. According to the research firm stichting wAarde, young people like green spaces because it allows them to ‘find peace and to clear their heads’, and that green areas reduce their stress levels (NRC, 2015). The firm does not report on perceived safety within green spaces such as parks or forests, and implementing new green in urban areas would not be a good idea if its visitors would not feel safe. The presence of green and the presence of too much green is a difficult discussion, but nevertheless important when looking at the
perceived safety among visitors (Maruthaveeran & Konijnendijk van den Bosch, 2014; Lindgren & Nilsen, 2011).

2.6 What does it mean to feel unsafe?

Feeling unsafe and being unsafe are two different concepts, which can differ from each other. Being unsafe refers to facts regarding crime; if there are a lot of registered offenses in a particular area, the area can be classified as unsafe. It is important to stress the objectivity of this concept, there are no individual perceptions or feelings that have anything to do with ‘being unsafe’ (Ruijsbroek et al., 2015, pp. 39-40). Feeling unsafe, however, is an emotional concept. For example, an individual can get the idea that an area might be unsafe, while according to the facts the area is perfectly safe.

Feeling unsafe is a concept that can consist of many factors and emotions. The fear of becoming a victim of a crime (for example being mugged) is different than the fear (or anxiety) of witnessing public harassment, or seeing vandalized parts of an area (Ruijsbroek et al., 2015, p. 40; Pain, 2000). It must be noted here that even though fear can be classified into many categories, the way fear is perceived and experienced by the individual can differ from person to person, which is exactly why this is a sensitive topic.

Experiencing fear in public spaces has several negative effects on the individual, one of which is especially relevant for this thesis: ‘fear of the other’. The fear of crime and anxiety towards other negative experiences has a negative impact on the levels of trust that an individual has towards other people (Ruijsbroek et al., 2015, p. 40). The impacts that perceived fear can have on people and the declined trust of ‘the other’ could result in a decrease in social cohesion. As stated in the beginning of this chapter, the main goal of public spaces was to offer a space for people to get together and socialize. However, the perceived fear of individuals in public spaces could put social cohesion at risk (Stafford et al., 2007). The relation between social cohesion and perceived fear levels correlates negatively, which means that if social cohesion levels are high in a certain area, people are less likely to feel unsafe. The levels of social cohesion in public spaces are dependent on the time of day and seasons of the year; people are more likely to socialize in public spaces when it is light outside and warm (during the spring/summer months) (Mehta, 2014, p. 61). Maruthaveeran & Konijnendijk van den Bosch (2014) classify fear or anxiety in public spaces under two categories: social related fears and physical related fears. The first category discusses the before mentioned ‘fear of the other’; seeing strangers litter or vandalize a part of an area have strong effects on one’s safety and the fear of the other, these are examples of social related fears. Physical related fears are caused by the environment, such as darkness (lack of lighting), the presence of green in an area, and the overall esthetic value of an area. Maruthaveeran & Konijnendijk van den Bosch (2014) state that social related fears are more important than physical related fears, however one could argue that these categories cannot be judged separately. The fear that someone might hurt an individual might be a social related factor, but this fear could become especially relevant when the individual travels through an area that is perceived as unsafe by the individual, which would be a physical related factor (Ferrero & LaGrange, 1992; Bromley & Stacey, 2012).

The consequences of feeling unsafe can have negative effects on an individual’s personal life, but also on the health of the individual. Someone that has to deal with a lot of areas that make an individual feel unsafe has elevated stress levels, which deteriorates the overall health (Stafford et al., 2007).

2.7 Conceptual model

The before-mentioned theory on which factors influence safety perception such as: darkness, the esthetic value and maintenance of an area, the amount of green in an area, each play vital roles in shaping one’s safety perception. However, it is necessary to note that these factors shape a network
and influence each other in the process that is safety perception of the individual. For example, ‘darkness’ alone does not mean much if it is not put into some sort of context. A dark park is something people are able to relate to, and are therefore able to create an idea of safety about. A conceptual model takes the most relevant conclusions from the theoretical chapter and illustrates the relationship between different actors and/or processes. The use of a conceptual model in this thesis is to clarify the factors that could potentially have an influence on the degree of perceived safety by young adults.

2.7.1 Personal characteristics
The individual’s characteristics consisting of age, gender, daily occupation and the amount of times they travel through the selected research area within a given time will, for a large part, shape an individual’s view on their own safety in public spaces (Bennett et al., 2007; Brands et al., 2015). Using arrows in the conceptual model the relations between the main factors are illustrated. Although this research limits itself to young adults, it is known that older people do not share the same safety perceptions as younger people (Brå, 2014). This shows that age matters when looking at characteristics of public spaces, regarding safety perception. Another example on how feelings of safety are shaped by gender: in general men feel safer than women, and fears are not shared among the two groups. Women have a greater fear of becoming a victim of crime in general compared to men, yet statistically men are more often the victims of these crimes (Brå, 2014). People’s occupation for a large part determines their movement through space. Women feel safer in cars in public spaces, so a woman that uses the car to get to and from work has a different experience of public space than someone that travels to work by bicycle or by foot (Valentine, 1990). Then again, experience of being in public spaces only determines so much: someone who travels by foot through a public space might be less scared of its characteristics than someone who travels by car through the same area because they are not in direct contact with the area. This factor stands in relation to the frequency with which individuals travel through public spaces.

![Conceptual Model](image)

**Figure 2.1**: Conceptual model by the author, based on literature from the theoretic framework
2.7.2 Perception public space

The characteristics of public spaces are shown in the top right of the conceptual model. With green infrastructure, the characteristics of the area regarding green spaces are meant. The way green areas can manifest themselves could have a direct influence on the perceived safety. It needs to be noted here that the characteristics of public spaces in the top right square in the conceptual model, influence each other as well; the amount of green in an area does not determine by its own the degree of perceived safety, it is dependent on other factors such as presence of lighting (Maruthaveeran & Konijnendijk van den Bosch, 2014).

The time of day determines for a large part the amount of people travelling through the city center: some moments during the day are busier than others. Rush hour for example has many people travelling from their homes to their workplace. When looking at a city center such as being done with this study (the city center of Stockholm), the days itself could also potentially play a role; presumably weekdays have a different ‘audience’ travelling through the city center, while in the weekends this ‘audience’ might be a bit more diverse, with shoppers and leisure seekers. Depending on other factors mentioned in the conceptual model, such as the time of day, crowdedness could play a role in the way safety is perceived by individuals. Large areas with lots of people could be perceived as safe because the people in the area would keep an eye on each other (securing by community) (Mehta, 2014, p. 60). However someone else might find large areas with lots of people in them unsafe, due to the possibility to become a victim of theft or other crimes, and would prefer smaller areas with fewer people.

Within the existing literature, there is some controversy regarding the securing of public spaces, and how people perceive this process. What becomes clear from the literature is that securing a space is not as simple as it might sound. The presence of policemen patrolling an area to keep it safe might appeal to some, and not to others. While some might find it comforting that the police are keeping an eye on everyone, others might feel that the presence of policemen indicates that the area is not safe and that this active patrolling is apparently needed (Mehta, 2014, p. 60; Brands et al., 2015).

The cleanliness of an area, together with the maintenance of green facilities plays a big part in how the community treats the area. The maintenance factor within the conceptual model has its roots from the broken window theory, and how a well-maintained area leads to fewer opportunities for crimes or disorder. The broken window theory however does state that the opposite might also occur; an area that is ill-maintained and has vandalized parts, makes it easier for offenders to act out in the area (Gau et al., 2014). There is not a universal model for maintaining a public space and expecting there to be no crime or disorder, but there are simple ways to reduce chances on crime which come from the broken window theory. Well maintained green areas, such as flower gardens in parks and the trimming grass fields, give people the idea that the government cares about the esthetics of the area (Brands et al., 2015). By adding ‘maintenance of the area’ to the conceptual model, this factor could give an insight in the value of young adults acknowledge towards esthetic values and general perception of public spaces, and how they reflect on this process within safety perception.

Other than the time of day that plays a role in the safety perception of an individual in public spaces, seasonal changes also have an impact on the way people perceive space around them. People tend to feel safer during the summer times, when there is more daylight which for a lot of people means it is safe. During darker periods of the year, such as fall and winter season, people tend to not be as active in public spaces (Maruthaveeran & Konijnendijk van den Bosch, 2014, p. 5). The seasonal changes differ quite a lot from country to country (and thus from city to city). In Stockholm the amount of daylight during the summer months (June, July and August) amounts to an average of
about eighteen hours per day. In the winter months (December, January and February) the amount of daylight amounts to an average of about seven hours per day in Stockholm (Visit Sweden, 2015). The difference between the winter- and summer months is quite big, therefore it is assumed that the relevance of the effects of seasons on the perception of safety in public spaces, coming from the literature, will have a similar impact on the safety perception among young adults in Stockholm (if not more).

Related to seasons and (lack of) daylight is the availability of streetlights in public spaces. It would be easy to assume that streetlights are always associated with having a positive effect on the perceived safety of individuals in public spaces, however according to Lindgren & Nilsen (2011) this is not always the case. The study does not deny the positive effects streetlights can have on safety perception, instead Lindgren & Nilsen (2011) point out that streetlights alone don’t have very much value, information wise. The combination of certain types of green facilities with streetlights can have the opposite effect on an individual, and instead of feeling safe, the individual feels unsafe and would rather avoid said area. Additionally the characteristics of the area overall play a more important role in safety perception than just a singular factor which is ‘availability of streetlights’, meaning that all of the factors mentioned under the ‘perception public space’ category together form an image for the individual (Burgess et al., 1988; Mehta, 2014).

Public space is a concept that embraces many different locations with different characteristics. Even within certain categories of public spaces a wide variety can be found; when someone mentions ‘parks’ as an example of public space, there are still a lot of questions to determine what the person meant with ‘parks’, such as: what is the size of the park? Is a certain amount of green required for it to be a park? Is it still considered to be a park when it allows light traffic to pass through the space? These questions show that there is not a cookie cutter recipe for public space, and therefore the way people perceive these varieties of public space needs to be treated carefully. The individual characteristics of studied spaces need to be taken into account. The environment outside of the public space can have an influence on the safety perception of the public space itself, meaning that even though the public space itself has all the qualities to appear ‘safe’, if the environment surrounding the public space does not supplement these qualities then people will feel less at ease (Mehta, 2014, p. 60).

There is a difference between perceiving safety when being by one’s self and being in a group (for example commuters sharing the same route). Preferences can differ from individual to individual, but in general people prefer to travel through public spaces in the company of others than alone. This moving through space can alter the way people perceive the space around them. If someone travels through an area in a group, the person will most likely have less awareness of potential unsafe characteristics of the area than someone who travels through an area by themselves (Brands et al., 2015).

2.7.3 Degree of perceived safety

The abovementioned factors all have influence on the perceived safety, which is shown by the arrows illustrated in the conceptual model (figure 2.1). The personal characteristics of an individual (for a large part) determine the way someone sees the characteristics of public spaces, and the way they feel about these characteristics. For example, women tend to recognize potential danger earlier than men, and therefore tend to worry more about becoming a victim than men (Brå, 2014; Maruthaveeran & Konijnendijk van den Bosch, 2014; Valentine, 1989). The characteristics of public spaces in their turn have an effect on perceived safety, as they function as a sort of filter or requirement list for an individual to either feel safe or unsafe. However, the individual characteristics (such as age, gender etc.) also have a direct influence on safety perception; older people tend to feel
more unsafe than younger people. It must be noted that the relations drawn here are not static or mutually exclusive; instead both the individual characteristics and characteristics of public spaces are closely connected.

The outcomes from the theoretical framework chapter, resulting in the conceptual model, will be used for formulating questions in the survey. The posing of relevant questions in the survey is of importance regarding the hypotheses within this thesis, and eventually the answering of the main research question. The discussing of the different hypotheses will be discussed in chapter 3 paragraph 3.2.
3. Methodology

3.1 Introduction
Within this chapter the method(s) applied in this thesis will be discussed, as well as the sub questions that are created in order to eventually answer the main research question. Additionally, the target group of this study and the research area are explained, so that a detailed image of the study is given. The research area chosen for this study is also explained and illustrated. This chapter will conclude itself by discussing the survey in detail.

3.2 Sub-questions & hypotheses
In order to be able to answer the main research question of this thesis: “in what ways does safety perception affect the use of public spaces by young adults”, several sub questions are needed so that different topics in this study are covered. However, the sub questions will not be answered directly. In order to perform quantitative research, hypotheses are needed for statistical testing. A hypothesis is a statement, based on previous studies or assumptions of the researcher, which links two (or more) aspects within a study together, to see if there is a connection between the two aspects. Usually statistical data is gathered regarding both variables in the hypotheses, and the appropriate statistical tests (related to the variables) are applied in order to determine whether or not the hypothesis is found to be significant. Judging from the outcome of the statistical testing, a hypothesis is either accepted or rejected. The rejection of a hypothesis does not mean that the result of the hypothesis is not interesting or wrong; however it does mean that no further scientific conclusions can be made using that hypothesis as a source.

Below three sub-questions and their respective hypotheses can be found. Together the answers to the hypotheses and the sub-questions will contribute to formulate an answer for the main research question that will be answered in the concluding chapter of this thesis.

1. In what ways does safety perception differ between men and women?
   - Women perceive public spaces as less safe than men
   - Environmental factors (such as the presence of trees, bushes, water etc.) in an area are more important to women than men regarding safety perception

2. Which factors seem to be the most important with reference to safety perception in general (by both men and women)?
   - Women experience night time as more threatening to their safety than day time compared to men
   - Different seasons have a direct influence on the safety perception for both men and women

3. How can public spaces be improved in order to grow a positive sense of safety among the visitors?

In what ways does safety perception differ between men and women?
The first sub-question targets the difference between men and women in regard to safety perception. From the Swedish National Crime Survey (Brå, 2014) it becomes clear that women are more afraid to become victims of crime than men. This sub-question offers a platform to confirm this among young adults and to look at possible factors that influence this difference. The first hypothesis covers that particular aspect, by stating that women’s safety is more influenced by crime perception than it is for men. The second hypothesis brings more insight in the value of the presence of environmental factors; perhaps both men and women among the young adult target population
don’t value environmental factors at all, which then has an impact on the way urban planning has its influence on safety creation in public spaces.

Which factors seem to be the most important with reference to safety perception in general (by both men and women)?
The second sub-question does not make a distinction between men and women and takes the participation group as a whole. By asking the participants what they think are the most important aspects about safety in public spaces, in the form of several multiple answer questions on the survey, information about perceptions and experiences can be gained relatively easy. From the literature it became clear that the lack of daylight can have a negative influence on people’s safety perception. The winter months in Stockholm substantially deprive its inhabitants of daylight, which makes the nights a lot longer than in the summer months. The first hypothesis for this sub question confirms or denies the effect daylight has on safety perception among the target population for this research. For this hypothesis women are taken separately to prove or disprove the significance of daylight. The second hypothesis takes the influence of daylight on safety perception and takes it to the seasonal level; if people feel less safe during night times, would they feel less safe during winter months than in the summer months?

How can public spaces be improved in order to grow a positive sense of safety among the visitors?
The third sub-question takes the answers from the previous sub-questions and hypotheses, and formulates goals to improve public spaces in regard to the perceived safety. The outcomes from the previous hypotheses, together with the outcomes of the surveys, form a way for the third sub question to be answered by analyzing the feedback given from the respondents in the surveys. One section of the survey is dedicated to map questions, in order to offer respondents a way to voice their feelings of being unsafe and to determine if there are areas that stand out as being specifically unsafe. The map questions ask the respondents to fill in where they feel most unsafe during certain times of the day or during different seasons. Additionally, the respondents are then asked why they would feel unsafe in these particular areas. The marked areas by the respondents will result in several heat maps, which show the most marked spots (the most unsafe areas) with red/yellow colors and the least marked spots (the safer areas) as dark blue spots (figure 3.2). Using the spatial data from the heat maps in combination with the reasons given why these particular areas are perceived as unsafe will offer the respondents an easy way to state their feelings of safety perception.

In addition to the in-depth statistical tests that are needed to accept or reject the hypotheses, descriptive statistics will be discussed in detail as well. Descriptive statistics contain information about the target group and will tell the reader more about the individuals that participated in the survey, such as median/average age, the amount of men and women participating and other relevant information regarding personal characteristics of the participants in this study.

3.3 Quantitative research: survey and statistics
The research question and topic usually dictate which kind of methods should be applied in order to successfully complete a study. For the topic of this thesis, quantitative methods are chosen. From the existing literature on this topic several important factors in regard to safety perception among individuals manifest themselves. Using quantitative methods, in the form of a survey, a relatively large amount of data can be collected and transformed into a database. The information stored in this database can then be subjected to numerous statistical tests, in order to verify or reject the hypotheses. The strength of quantitative research is that it gives the researcher the ability to make statements about relations between different actors, by applying statistical testing on the
information gathered from existing databases or from surveys (‘t Hart et al., 2009). The quantitative research for this thesis will be able to offer insight in the relation between individuals, how public spaces are perceived and which factors contribute the most to feeling safe in public spaces. Using relatively large amount of data gathered from the surveys in SPSS, generalizing statements can be made regarding the population (not just about the respondents), if the respondents are a representative part of the larger population (which needs to be tested and proven). The data from the respondents, which will be taken into the statistical testing procedure for this thesis, is focused on young adults.

3.4 Target group
The target group for this thesis is young adults. From the literature and available statistics it becomes clear that there is a difference between younger and older people regarding safety perception. Older people tend to perceive areas and their own situation as less safe compared to younger people (Brå, 2014; Maruthaveeran & Konijnenbink van den Bosch, 2014, p.3; Mehta, 2014, pp. 81-82). This thesis will look into further into what the thought process is amongst younger people which makes them feel safe, and if there are differences in perceptions among young women and men in safety perception. For this thesis, young adults are considered to be between the age of 18 and 30 years old.

For this thesis, a distinction and a definition of the concept ‘young adults’ is needed, due to the representativeness that is required in order to make valid statements about the gathered data from the survey. Representativeness is essential in quantitative research because it allows the researcher to make statements that are not limited to the respondents of the study, but the larger population the respondents represent (‘t Hart et al., 2009, p. 108). This means that for this study, statements regarding young adults in general (if found representative) can be made, instead of being limited to making statements about the relatively small group of respondents to the survey. The concept for this process is called ‘external validity’; making sure the population is validated (representative) which will determine the strength of the statements made further on in the analysis chapter of this thesis. The population validity will be tested using information gathered from the third and last part of the survey. This part of the survey contains information about the respondents, while maintaining anonymity. Using the answers on the basic questions regarding gender and achieved educational level, and comparing them to the statistical database of Sweden (Statistiska Centralbyrå/Statistics Sweden, 2015), the gathered information of the respondents can be validated.

3.5 Research area
The outcomes of the theoretical framework, concluding with the conceptual model, dictate the factors that influence the safety perception of an individual in public spaces. Aside from using this conceptual model as the basis for the quantitative research, the outcomes from the theoretical chapter will also be used to choose a research area. Because of the many environmental and spatial factors that influence safety perception, choosing the right research area is vital for the thesis. The area that has been selected is what could be considered the city center of Stockholm. The area has the size of four squared kilometers and an outline of 8,36 kilometers. Inside the boundaries of the selected area the central station, the relatively crowded main square of Stockholm at Kulturhuset, Skeppsholmen, Kungsträdgården, a part of Djurgården, and Gamla Stan can be found (figure 3.1).
The area containing the central station and the crowded main square are both characterized by big open spaces, underground passages and big streets. Additionally the presence of unknown individuals in these areas could pose a threat on the safety perception, during both day- and night time. Skeppsholmen is a small peninsula on which several museums and offices are located. It is expected that this area will have fewer visitors than Djurgården, mainly because of the geographical location of Skeppsholmen and the limited services it has to offer. Djurgården is a relatively green peninsula with lots of trees, bushes, grass fields and water. The area contains a lot of museums and is rather popular in the summer among tourists and the Stockholm inhabitants themselves. Djurgården and Skeppsholmen could be seen as connected with each other through a ferry that travels from the south of Gamla Stan to the two peninsulas. Kungsträdgården is an area which is located east of the main square. It is officially marked as a public park, yet it also has the characteristics of a square, because of its open spaces, relatively few trees and bushes normally associated with a park and geographical shape (Kungstradgarden.se, 2015). Kungsträdgården is well connected with the rest of the city, and could very well be marked as the most center located park in Stockholm. The park holds many events, especially during the summer. Gamla Stan is the old city center of Stockholm, which is nowadays mainly focused on tourists. The main streets of Gamla Stan contain many cafés, restaurants and tourist merchandise shops. The area has small streets and most of them are ill-lit.

The selected research area fits the environmental factors described in the conceptual model, in order to facilitate the optimal way of asking respondents about their perception in said factors (figure 2.1, page 13). Even though the research area fits all the criteria found relevant in the literature (see the Theoretical Framework chapter, page 12), the characteristics of the very center of Stockholm city need to be stressed. It is an area that contains lots of water, green spaces, and is also very urbanized. These characteristics determine the ‘ecological validity’ of this research; the environmental
characteristics of the chosen research area must be taken into consideration if this research is copied and used into a different setting (another city or region) (‘t Hart et al., 2009, p. 153-154).

3.6 Heat maps
For this research several map questions within the survey are needed. In order to make this task operational, respondents will be given the option to mark a maximum of three areas (which could be a street, a square and a part of a park) that are experienced as the least safe. The importance of daylight and how it affects people's safety perception is taken into account in the survey, and therefore the map pinpoint question will be asked for both winter and summertime. The reason to offer the respondents more than just one map is due to the sensitive nature of daylight and seasons that have an influence on safety perception (Bennett et al., 2007; Shenassa et al., 2006). In addition to the map pinpoint questions, which are rather specific, respondents are also asked to mark an area that in general they experience as least safe. This is done by splitting up the research area in different zones. Some areas within the research area are quite large, but perhaps should not be split up. For example Gamla Stan is a relatively big area, but the area itself is quite homogeneous and therefore is treated as one ‘zone’ (figure 3.1). The area near the central station of Stockholm is also quite big, but has more diversity and is therefore split up into four zones, to give people the chance to be more specific.

For the survey, the research area will be presented to the respondents in a map from Google Maps. This is done to make sure that the respondents have to spend relatively little time getting to know the map and the selected research area, because Google maps is one of the most well-known map distributors. The results from the map related questions in the survey will result into ‘heat maps’. These are maps that show information using graduate colors. The brighter areas marked on the map are experienced as unsafe, while the darker areas marked on the map are experienced as safe by the respondents (figure 3.2). Heat maps, or choropleth maps, are a way to visualize the outcomes of spatial data. The spatial data within this thesis are the locations that respondents pinpoint in relation to feeling unsafe during specific seasons and times of day.
3.7 The survey in detail
When using a survey as the main method of gathering empirical data, the way questions are posed can determine the response rate for a large part. Additionally, if the survey contains questions that are difficult to understand for the respondents, the chance to get a lower response rate is also increased. The use of jargon in surveys (such as difficult terminology for which you need some sort of background information in order to understand it) is often not appreciated, depending on the audience you’re trying to reach for response (‘t Hart et al., 2009). Questions, or for that matter entire surveys, that people cannot understand will be either skipped or filled in wrongly. The filling in of questions wrongly, or non-true, by respondents changes the usability of the data overall.

For this thesis, the survey is spread using two main methods: using online, social media methods and in-field surveying. When doing in-field surveying the researcher usually asks potential respondents if they have time to fill in a survey, after briefly explaining what the actual research is about and how the filled in surveys will be treated with strict confidentiality and anonymity (‘t Hart et al., 2009). Surveying over the internet has more flaws than in-field surveying; people can more easily decline filling in a survey because they are not directly confronted with it. Additionally, over the internet you cannot tell if people are who they claim to be in the survey. The internet forms a barrier which prevents the researcher from seeing if the respondents fit the limitations set out by the researcher, for example being in the right age group (in the case of this thesis, being between eighteen and thirty years old). However, if used right, the internet can also act as a snowball, meaning that if respondents are interested in your research, they could be inclined to share the survey with other people, from which the so called snowball effect arises (‘t Hart et al., 2009). Both using the Internet and in-field surveying as ways of gathering data using the survey method have their advantages and disadvantages, and both should be labeled differently to ensure that representativeness and the non-response rate can be calculated and determined properly.

Below, the survey used to gain empirical data will be discussed in detail, including the decision to include especially these questions. The survey was created on a website from the company ‘Qualtrics’, because it allowed the use of map related questions which added an interactive platform for respondents to voice their opinion regarding feeling safe in public spaces. The data gained from in-field reporting was later copied into digital surveys, to make map analysis possible.

3.7.1 General sense of safety – Part 1/3 of the survey
The first part of the survey is supposed to ask relatively easy-to-answer questions, to give the respondents a basic idea of what the research is about. By asking a combination of ‘yes or no’ and multiple choice questions regarding feeling safe in public spaces, the respondents were introduced to the topic, yet a distinction between respondents who sometimes feel unsafe and respondents that never feel unsafe can already be determined. The respondents who filled in that they never visit Stockholm were routed to another question asking the selected respondents why they never visit Stockholm. This question is not of great value on its own, but one of the possible answers among the multiple choice answers was “because I feel the city is too unsafe for me”, which could be a good reason for people to avoid the city. However, it must be noted here that it is expected that only very few respondents will fill in that they never visit Stockholm, as the surveying is focused on inhabitants of Stockholm and the Stockholm area (suburbs).

The respondents are then asked about different factors that play a role in perceived safety. The factors given to the respondents stem from the theoretical framework chapter of this thesis, and can also be found in the conceptual model (figure 2.1). This question has an interactive aspect to it: respondents are asked to drag and drop the factors in specific orders, from 1 (most important) to 7 (least important). The potential downside of this question is that there already is a default order,
which means that respondents could more easily agree with the default order than their own actual opinion.

The following two questions in part one of the survey contain questions that are answered by all respondents, regardless if they have answered that they do not feel afraid in public spaces or that they have not visited Stockholm city. These are also the last two questions of part one of the survey, which means they still focus on the general sense of feeling unsafe and public spaces, without going into much detail such as looking at the research area. The sixth question in the survey is using the likert-scale method. This means that a certain statement is posed to the respondent, and it is up to the respondent to fill in to what degree they agree or disagree with said statement. The strength of these likert-scale questions is that as a researcher, several hypothetical situations can be stated. Subsequently, respondents then can choose from five possible answers they can give to these statements or situations: totally disagree, disagree, neutral, agree or totally agree. For example within the survey, some general statements were made such as: “most public areas in Stockholm are unsafe” and “I tend to avoid small/narrow streets when it is dark outside”. These statements are not too specified to a certain situation, and give the respondent a relatively clear option when it comes down to answering the question; as a respondent you either agree or disagree with these statements (most of the time). The agreeing and disagreeing on likert scale questions is rather important. Within the given options for answers, a “neutral” answer must always be presented to the respondents, because it is possible to have no affiliation with a statement or that it simply does not apply to the respondent’s situation. However, having a neutral answer within the given answers can pose a threat to getting good, meaningful results. If a lot of respondents fill in that they feel neutral towards most statements in the likert-scale questions, it becomes harder for the researcher to use the data for statistical analysis and therefore to draw conclusions (other than: most people feel neutral towards these and these statements) (de Vocht, 2010). Therefore, to gain the most usable results for statistical analysis, the researcher has to pose statements in a way to challenge the opinions of respondents. This can be done by writing a statement that is expected to be answered negatively (‘totally disagree’ or ‘disagree’) in a positive way. In a previous example the statement “most public areas in Stockholm are unsafe” was used. This is also an example of a challenging statement which is expected to get respondents to avoid the ‘neutral’ answer, and instead agree or disagree with the statement. The second statement in question six of the survey does not have the factor that it appeals to everyone; the respondents that filled in that they did not feel unsafe in public spaces most likely will not have a strong opinion on this statement. However, in relation to the outcomes of the literature regarding crowdedness and travelling within a group (of commuters or friends) through public spaces and how this affects one’s perception of self-safety, the answers given to this statement could provide some degree of insight to this topic. The statement is phrased as such: “for my own safety, I would rather walk through Stockholm with a friend /colleague than alone”. The first part of the statement (“for my own safety”) is added to make sure people would not confuse walking with a friend purely for entertainment purposes, instead of safety purposes.

The last two statements of question six are less situational, and could be applied to different contexts as well. Asking respondents about how they feel regarding public spaces in different settings, such as different seasons, gives an insight in what influences (the lack of) daylight has on safety perception. The potential link between a change of seasons and shifts in safety perception is further questioned in the last question of part two of the survey. Three statements are presented to the respondents, similar to the previous question. One of the statements offers another option for respondents to agree or disagree on, which is the weather during different seasons. The statement “during the winter it is not the darkness that makes me feel unsafe, it is the weather” puts the difference in daylight during the winter and summer aside, and instead discusses the possibility that for example snow, or warm sunny weather, has a stronger influence on safety perception. These last three statements, which form question seven in the survey, are a bit more complicated and
challenge the respondent to think about their own situation and how they would feel. This builds up to the more complicated questions in part two of the survey.

3.7.2 Feeling unsafe in the city – Part 2/3 of the survey
This second part of the survey characterizes itself with a lot of interactive elements built in the survey. The respondents are asked to identify several spots that they experience, or have experienced, as unsafe. The data that is generated from these map related questions do not contain any GPS coordinates; however they do offer data visualization in the form of heat maps. These heat maps can be used to identify certain hot spots when it comes down to unsafe public places; if a lot of respondents mark a particular area as unsafe, it could be interesting to look into the reasons why people experience this place as unsafe. Therefore respondents are also asked to give a reason why they feel that the selected areas are unsafe.

The first question of the second part starts off relatively easy, by asking the respondents to identify a particular area within the research area (which is a part of the city centre of Stockholm) that they feel is unsafe in general. The follow up question to this basic question is an ‘open question’, which asks why they selected the area in the previous question as unsafe. This means that respondents can formulate themselves why they’ve chosen this area. The choice for an open question here is because limiting the answers by giving the respondents a multiple-choice question, with answers based on findings from the literature, could prevent respondents from sharing a more valuable experience within the area.

The second map related question asks respondents to mark a maximum of three points in the research area that they would avoid after 20.00 o’clock during the winter. With this question it is important to stress the situation posed to the respondents, because if this is not clear to the reader of the survey, then the reader could possibly consider other areas to be unsafe, or to feel that none of the areas are unsafe. Other than the first map question, the second map follow up question is a multiple-choice question, but leaves room for respondents to fill in their own answer if they are not satisfied with the answers offered by the researcher. The possible answers given at this multiple-choice question are derived from the literature and can be found within the conceptual model as well (figure 2.1).

The third and last map related question of the survey is the same as the second one except the situation is changed. This time respondents are asked to mark a maximum of three points in the research area that they would avoid at 20.00 o’clock during the summer. The goal of these two questions (both the winter and the summer situation) is to see if there is a significant difference between the two seasons and the way people perceive areas as safe or unsafe. The same multiple-choice follow up question is given to the respondents, which concludes the second part of the survey.

3.7.3 Personal characteristics – Part 3/3 of the survey
The last part of the survey consists of relatively basic personal questions about the respondent. Within the third part of the survey the respondent is asked to answer questions about gender, age, occupation, highest degree obtained etc.. The data from these questions is used for the obvious comparison between men and women and how both groups perceive personal safety in public spaces (differently). The first question in the third part asks respondents to fill in their gender. The data generated from this question on its own is not that interesting; it only shows the amount of men and women who filled in the survey. However the main goal of this question is to be able to relate the data with data from other questions in the survey. In order to determine if there is a significant difference between men and women and the value of streetlights in relation to public safety, combining outcomes from several questions is needed. Another example is to test the amount of highly educated people versus lower educated people in regards to public safety; do
higher educated people feel safer than lower educated people? Or perhaps it is the other way around?

The second question in the third part asks respondents to fill in the year in which they were born. Instead of asking respondents directly how old they are, a question that allows respondents to only fill in the year in which they were born distances itself from becoming ‘too personal’ (‘t Hart et al., 2009; Chicago manual of Style, 2010). The following questions ask respondents about the highest obtained degree and their occupation. This study focuses on young adults, of whom a significant amount is student, and therefore there is not much variation in occupation. With the data from these two questions and the former questions the representativeness of the respondents can be tested. The representativeness of the respondents determines if any statistic statements can be made and if so, in what way they represent the rest of the young adults living in or near Stockholm city.

In the third part of the survey respondents are also asked if they were born in Sweden or elsewhere. These two questions don’t have the goal to try and find a difference between natives and migrants regarding safety in public spaces, but the division of natives and migrants among the respondents also determines the representativeness. If people were not born in Sweden they are asked to answer a multiple-choice plus-own-answer question in order to determine the country in which they were born.

Following the questions about the country of origin is the question that asks respondents to fill in how long they have been living in or near Stockholm. This question is a multiple-choice answer style question with four options: ‘less than a year’, ‘between 1-5 years’, ‘between 5-10 years’ and ‘longer than 10 years’. This question was added to the survey in order to determine if there is a significant relation between the amount of time lived in or near Stockholm, and the experience of public safety. At the end of the survey respondents have the opportunity to give any comments of feedback on the survey or on the topic in general. An option has been added to the survey for respondents to fill in their email address in order to receive a PDF copy of the thesis when it is finished.

3.8 Ethical issues

The ethical issues one could encounter while writing an academic piece (thesis, dissertation, paper or essay) depend on the topic and the research methods used by the researcher. Within this thesis quantitative methods are used, which are quite different than qualitative methods such as interviews or focus groups. When interviewing, one has to pay attention to what impact the researcher can have on the interviewee, which in its turn could affect the outcomes of the interview and the study itself. This is not so much the case for quantitative methods, although there are definitely some important potential ethical issues the researcher needs to take into account while using quantitative methods. When using a survey as the main method for gathering empirical data, the structure and the way questions are posed can affect the response rate and therefore the results of the study. In the case of this study questions are asked about personal information at the end of the survey, such as the age, gender and highest achieved educational level of the respondents. These are questions which if asked in a wrong way, could refrain respondents from willing to participate or fill in crucial data. When asking about the age of a respondent it is considered better to ask about the year in which they were born, instead of asking directly how old they are, the former feels less like a direct question and therefore makes it easier for (some) respondents to fill in said question. However, this thesis focuses on young adults, meaning that perhaps this issue is not that relevant within this study.

Another ethical issue that comes into play when using quantitative methods is anonymity and secrecy. When giving people a survey to fill in, the researcher expects a lot from the respondent; respondents share their feelings regarding a certain topic and are asked to fill in some personal information as well. It is the job of the researcher to state clearly that the information gathered from
the surveys is treated strictly confidential and anonymously, in order to put the mind of the respondents at ease. The survey from this study informed respondents about the intentions of the study and how their data would be handled. This information was repeated once more when respondents had to fill in some personal data (gender, age and household income), to assure the respondents that their data would be handled with care. Additionally, the respondents were offered to fill in their email address at the end of the survey to receive the final version of the thesis in PDF format.

3.9 The process of surveying

The experience of surveying in the research field within Stockholm city resulted in different response rates from day to day. On days that had great weather with a lot of sun, people were less hesitant of being approached, and were more eager to fill in the survey. Rainy and cloudy days yielded less response compared to sunny days. In hindsight this is good to know, which could help with future surveying. One of the possible factors could be that on sunny days people tend to be happier and enjoy being outdoors, which helps when asking people if they could help you out by filling in a survey.

The spreading of surveys online was done at two timeslots. The first wave with which the survey was spread out was done at the beginning of the gathering of empirical data phase. The second wave was done near the end of the allotted gathering of empirical data timeframe. The reason for a second wave of surveys was done in order to catch potential respondents that missed the first wave. However, before sending out the surveys to online platforms, a selection of possible target groups (websites) was made in order to control the spreading of the survey. Several websites with discussion forums that would potentially welcome the subject of this research were targeted; thelocal.se, reddit.com/Sweden and a Facebook group for people living near Stockholm University and the city centre of Stockholm. These websites attract a diverse group of people; people working in Stockholm, people looking for jobs in Sweden and Stockholm, and people studying in Stockholm. Because of the audience found on the selected websites, the respondents had a relatively high chance of being in the selected age group (18 years old to 30 years old) set out for this study.

After collecting the data from both the online survey and the surveys conducted in the field, the amount of online surveys and in-field surveys were compared. After comparison it appeared that both methods yielded about the same amount of results; the online version yielded 64 filled in surveys and the in-field surveying yielded 43 filled in surveys. It is important to note here that the amount of surveys yielded per ‘method’ can differ, dependent on several factors: (1) the time of day in which the researcher both sends out the surveys online and does in-field surveying, (2) the message sent out online which tries to get people’s attention and willingness to cooperate and the brief presentation of the topic when surveying in the field, (3) the weather when surveying in the field and (4) the impact of being approached by a male researcher. Additionally, not every survey that was collected could be used for research, due to respondents not fitting the target group.

The time of day in which the researcher sends out the survey on selected websites and does the in-field surveying has a big impact on potential results. People usually have time to browse websites during lunch breaks or after work (of course there are exceptions). Additionally, the weekend is an important factor to take into account regarding the spread of the survey via websites; even though work is not a factor in general during the weekend, perhaps people spend more time outside or doing other activities than sitting in front of the computer. The same principle goes for surveying in the field during certain times of day; it could be beneficial to survey during rush hours, because this would technically yield the biggest potential response group. However, rush hour is often associated with people being in a hurry to get from A to B, meaning that perhaps the people travelling during rush hour do not want to take the time to fill out a survey.
The second factor that had influence during this research is the way the survey is presented to people. When using a short and catchy message, people tend to get curious which could lead to potential respondents. It is therefore of importance to come up with a good presentation regarding the topic of the survey and the research, both online and for in-field surveying.

The third factor that had influence on the gathering of empirical data for this study was the weather. This factor affected only the in-field surveying, as more people were more likely to cooperate when it was sunny outside than when it was gray and/or raining. This is a relatively straightforward factor as one could imagine walking through the rain; it is not really attractive to stop and take the time to fill in several papers with questions.

The fourth factor relates to the gender of the researcher in relation to getting potential results. Even though the topic of this study is public safety, among other subjects covering the topic of ‘fear of the other’, this gender factor could be applied to all in-field survey studies. The gender of the researcher approaching people on the street could affect the willingness of people to stop and listen to what the researcher has to say.

The before mentioned factors affect the empirical data yield. Other research methods, which use a more qualitative approach, have similar factors that could affect the empirical data. However, in the case of interviewing people, it is more likely to affect the quality of the data than the quantity of the data. A male researcher interviewing a woman about a sensitive topic has a chance to get less complete or honest answers than a female researcher conducting the same interview for example (hypothetically speaking).
This chapter will discuss the first results from the empirical data that was gathered during the study. In order to be able to make any statements about any significant relations between two or more factors regarding public safety, the representativeness of the empirical data needs to be tested and confirmed. The representativeness of the gathered data will determine in what ways statements about the hypotheses in this study can be made. This is done in order to be able to make statements not only of the respondents that helped with this study, but also about the overall young adult population living in or near Stockholm city.

As stated before, the target group of this study is young adults between the age of 18 and 30. In order to calculate how large the sample size has to be for this study, it is needed to determine how many young adults within the same age group as the study are living in or near Stockholm city. The sample size of the survey determines how many young adults within the same age group as the study are living in or near Stockholm city. The total sample size of the survey is not the final amount of response needed, because not everyone fills in the survey (due to lack of time, no interest in the topic, or just does not see the survey), which is called non-response. The calculating of non-response depends on the circumstances with which the empirical data is gathered, and will be discussed within this chapter in paragraphs 4.1 and 4.2.

The Swedish bureau for statistics (SCB) offers numbers regarding the population of all the Swedish municipalities. In order to determine the amount of young adults that could potentially visit Stockholm city, it is needed to look beyond the municipality of Stockholm alone. This is why sixteen municipalities around the Stockholm city centre have been taken into account for this research. The amount of young adults (between the age of 18 -30) living in the municipalities of Upplands Väsby, Vallentuna, Järfälla, Ekerö, Huddinge, Tyresö, Täby, Danderyd, Sollentuna, Stockholm, Södertälje, Nacka, Sundbyberg, Solna, Lidingö & Sigtuna come to a total of 325.000 young adults in the year 2014 (SCB, 2015). However this is not all the information we need in order to calculate the sample size. The ‘strength’ with which statistical statements can be made needs to be determined here as well. There are several options to choose from: a 90% reliability level with a 10% error margin, a 95% reliability level with a 5% error margin and a 99% reliability level with a 1% error margin. Obviously the latter option gives the strongest reliability when it comes down to testing several variables from the survey. However the most common reliability level to pick (especially when it comes down to calculating the sample size of the survey) is 95% with a 5% error margin, which is the reliability level chosen for this study in order to calculate the sample size (Vocht, de, 2010; ’t Hart et al., 2009).

It must be noted here that different reliability levels can be applied to statistical testing in the next chapter, meaning that if two variables appear to have a significant positive or negative relation with a 95% reliability level, it might be interesting to further test if these two variables still hold this relation with a 99% reliability level.

4.1 Calculating the sample size and the minimum of responses needed
As determined earlier, the total population of which this study wants to make statistical statements about amounts to 325.000 young adults living in or near the Stockholm city area. This is a relatively large group of people; however this does not necessarily mean that the sample size of the study needs to be equally as big. When the population of a study is larger than 20.000 the outcome of the sample size formula does not change, meaning that the population for this study of 325.000 people gives the same sample size as if it were 20.000 or 60.000 people.

There are several ways of calculating the sample size; one way is to determine which reliability levels one wants to use and using those variables into the formula. Within this research
95% reliability is chosen with a 5% (otherwise written as \( \alpha = 0.05 \)) error margin. These numbers translate into other values when working with sample size formulas; 95% reliability with \( \alpha = 0.05 \) error margin results in a critical Z-value of 1.96. The critical Z-value calculation is done using a conversion table which is determined by the error margin paired with the reliability level. An error margin of 5% or \( \alpha = 0.05 \) dictates that the Z-value becomes 1.96.

The formula used to calculate the sample size is:

\[
 n = \frac{Z^2}{4E^2}
\]

- \( n \) = minimum sample size
- \( Z \) = critical Z-value with the chosen reliability level
- \( E \) = desired accuracy (also known as the error margin, which is 0.05 in this case)

\[
\frac{1.96^2}{4(0.05)^2} = 384
\]

When filling in the variables that apply for this research the following formula shows that the minimal sample size of this study is 384. This means that while accounting for non-response, the amount of surveys that needs to be sent out is 384. However, with this study the surveys are not sent out to people’s homes, instead people are asked on the streets if they have time to fill in the survey. Additionally, the survey is spread online in various forums and Facebook groups, which are not similar to the standard non-response rates and the sample size calculated. Therefore, it is needed to look at different possible non-response factors that could affect the total response yield.

There are several similarities between ‘standard’ non-response rates and the non-response rates relevant in this study. For example, posting a survey to several households in a certain neighborhood does not result in a 100% response rate. Only a small group of people is willing to take the time to fill in a survey and return it to the researcher. This same process can be seen when the survey is spread online; only a small group of people is willing to click on a link and fill out a survey. It is therefore important to make sure the researcher brings the message of the survey across in as few sentences as possible (‘t Hart et al., 2009). This way the respondent can get an idea of what the researcher’s intentions are and what the survey is about. When surveying in the field, in this case the research area of Stockholm city chosen for this study, instead of given people a brief summary of the study on paper for them to read, it is often a better choice to verbally communicate the intentions of the study in one or two sentences (‘t Hart et al., 2009). Another difference between posting a survey in paper form to households and posting it online (on a forum or Facebook group) is the frequency with which results come in. When posting a survey online, usually the message containing the survey (and a brief explanation of the study) is only viewed one or two days, or even only a few hours, before other posts ‘bury’ the survey post. This means that there is a relatively small window for the researcher to gain response. A survey on paper mailed to several households can take much longer to be filled in. Additionally the time between the respondent filling in the survey on paper and the researcher collecting the filled in survey can be much longer than respondents filling in an online survey, which after filling is automatically collected by the researcher.

The minimum amount of surveys needed to be collected is determined to be 100. This number has been chosen after taking the sample size of the survey into account, determining the factors that could influence non-response and the timeframe within which the thesis needed to be completed. The minimum of 100 responses is needed in order to make statistical statements about the larger population, which are young adults living in or near Stockholm city. The minimum of empirical data set also allows for internal testing within several groups (men and women, people who do not feel unsafe vs. people that feel unsafe, people that value environmental factors more vs. people that value the presence of other people more etc.) (‘t Hart et al., 2009). Within this study the survey has
been spread using two methods: surveying in the field and spreading the survey online on forums. Because of these two methods, two separate non-response rates have been determined. While surveying in the field there were mainly four responses from respondents when asked if they were willing to cooperate with a survey regarding public safety: some people kept on walking or said that they did not have time (1), other people stopped to listen to what the study was about but afterwards said they did not have time (2), another group was willing to participate and fill out the survey completely (3), the last group of people participated with filling in the survey but failed to complete the survey (4).

The same survey online yielded somewhat similar results as the surveys that were conducted in the field, regarding the way respondents felt about the time it takes to fill it in. Every response is captured, meaning that if someone opened the survey in their Internet browser and closed it after one minute and answering maybe one or two questions, the answers are still captured. However, the validity of these types of responses could be questioned. Perhaps the respondent was just interested in how long the survey was and found out it was too long and decided to not cooperate. The responses that captured at least 90% of the required answers were taken into account. This is done in regards to the validity of the research and the consent of the respondents and their personal answers. By abiding to the 90% rule, the respondents that decided they did not want to be part of the research and closed the survey before answering at least 90% of the required questions, it is made sure that only respondents that were willing to participate and share their information are used for this study.

4.2 Descriptive statistics: characteristics of the study

This paragraph will look into a specific part of the gathered data of the survey. By looking at the amount of men and women, the ethnicity and the average age of the people that have filled in the survey, a comparison can be made between the empirical data from this study and the statistics from the Swedish Bureau of Statistics (SCB). The reason why this is done is to make sure that the gathered data is representative for the larger population it represents. For example, if the balance between men and women is too far off from reality, weights need to be added to the variables in order to be able to make valid statements. Additionally, this paragraph will give some more detailed information about the respondents regarding their perception of own safety in public spaces and living in or around Stockholm city.

It must be noted here that with the variables tested in this paragraph, the term “population Stockholm” will be used. For this study, this term refers to the municipalities closest to the city centre of Stockholm. These municipalities are: Upplands Väsby, Vallentuna, Järfälla, Ekerö, Huddinge, Tyresö, Täby, Danderyd, Sollentuna, Stockholm, Södertälje, Nacka, Sundbyberg, Solna, Lidingö & Sigtuna.

A total of 103 responses were recorded and deemed usable for this study. The selection of usable surveys was done by looking at the age of the respondents, if the respondent did not fit the 18-30 years old age group the response was not taken into account regarding the statistical analysis. Additionally, respondents that failed to fill in at least 90% of the questions on the survey were not taken into account either.
4.2.1 Gender
The amount of men and women that have participated with the survey differ somewhat to the statistics of the population given by SCB\(^4\) (2015). The amount of male respondents amounts to 52,4% and the amount of female respondents amounts to 47,6. The gender distribution is more equal when looking at the statistics of the population of Stockholm, with both groups being almost equally represented (figure 4.1). The calculation of the representativeness of the category gender in relation to the statistical database of the population of Stockholm (SCB) will be determined in paragraph 4.3.

Figure 4.1 Gender distribution respondents compared to target population

4.2.2 Age
The average age of the respondents is quite similar to that of the population of Stockholm (figure 4.2) (SCB\(^3\), 2015). The average age of the respondents is 24,8 years old. The average age of the young adult population of Stockholm is 24,6 years old. It is not common to talk about age and to use a decimal number, however when calculating the representativeness it is needed. The representativeness of the variable age will be discussed in paragraph 4.3.

Figure 4.2 Age distribution respondents compared to target population

The age groups created for this study were needed in order to determine the representativeness. By looking at the average ages of the two groups it is obvious that the two groups are very similar, however for statistical determination if the two groups are in fact similar, division in age groups is needed. The way the different ages are divided into groups does not matter, as long as both the respondent group and the population of Stockholm group have the same division (18-21 years old, 22-26 years old, 27-30 years old in this case).

4.2.3 Ethnicity
The ethnicity of the respondents differs somewhat from the population in Stockholm. This could be because of the groups chosen within the Swedish Statistical Database (SCB\(^2\), 2015), using the statistics regarding ethnicity of the group 15 to 34 year olds. This is a group that takes more ages into account than the group of the survey (18 to 30 year olds). It is therefore expected that there are some deviations between the respondents and the population of Stockholm. Using these statistics, it can be determined if the respondent group is still representative regarding ethnicity or not. The amount of people with the Swedish nationality is higher within the respondent group than in the population Stockholm group (figure 4.3). This automatically lowers the amount of migrants in the respondent group, which could affect the representativeness of the ethnicity variable.

![Figure 4.3 Ethnicity respondents and population comparison](image)

<table>
<thead>
<tr>
<th>Ethnicity respondents and population</th>
<th>Respondents survey</th>
<th>Population Stockholm (15-34 years old)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrants</td>
<td>27.18%</td>
<td>36.02%</td>
</tr>
<tr>
<td>Swedes</td>
<td>72.82%</td>
<td>63.98%</td>
</tr>
</tbody>
</table>

4.2.4 Amount of time lived in or near Stockholm

One of the last questions asked to the respondents was regarding the amount of time lived in or near Stockholm. The data gathered from this question could form the basis for further analysis between respondents that have stayed in or near Stockholm for a short period of time (up until now) and respondents who have lived for a longer period of time in or near Stockholm.

It becomes clear that a large part of the respondents to the survey has lived longer than ten years in or near Stockholm. The smallest group among the respondents has lived for a period of five to ten years in or around Stockholm. The fact that a lot of respondents have lived in or near Stockholm for longer than ten years, and that relatively very few people have lived in Stockholm for five to ten years indicates quite some diversity among the respondents. This, in turn could result in different opinions regarding public safety among the respondents, if the time lived in Stockholm has any effect on safety perception. It must be noted here that the respondents themselves had the freedom to decide what they define as living “in or near Stockholm”, there were no boundaries given or a map of which the respondents had to choose from. This has been done in order to give more freedom to the respondent in relation to thinking about safety perception.

4.2.5 Employment status of respondents

The majority of the respondents within this survey are students (figure 4.5). This outcome is not very surprising as the target group for this study is between the age of eighteen and thirty years old, which is a common age to be studying. The second largest group, following the students, is the group that is employed full time. The balance between the two largest groups, with students representing about 53% of the respondents and the full time job group representing with about 38%, is quite even. The other 9% consists of people either looking for a job, or doing volunteer work and having a part time job.
4.2.6 Education level

Among the respondents there is a relatively even distribution regarding highest degree obtained. The respondents were asked to fill in which level they had obtained, resulting in the Bachelor’s degree being the biggest group (figure 4.6). Looking at the target group for this study, being eighteen to thirty year olds, it is to be expected that there are so few people who have completed grundskola as the highest obtained degree. The second biggest group consists of the people that have obtained the gymnasiesskola degree, and are either working or studying to obtain a Bachelor’s degree. Even though education level will not be tested for representativeness in the next paragraph, this variable could be used to test if there is a difference among the young adults in safety perception with education level being the variable tested for significance.
4.2.7 Public spaces and feeling unsafe
The first question of the survey discussed safety perception in a general way, asking the respondents if they ever felt unsafe in public spaces. About half of the respondents tend to answer that they occasionally feel unsafe when walking alone outside, and the other half does not feel unsafe at all (table 4.1). However, this does not mean that half of the respondents cannot be used when analyzing questions regarding public safety and feeling unsafe. This almost perfect division of the respondents shows that there is not one universal opinion about safety perception.

Table 4.1 General safety perceptions respondents

<table>
<thead>
<tr>
<th>Do you ever feel unsafe when walking alone outside?</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>54</td>
<td>52.4</td>
</tr>
<tr>
<td>No</td>
<td>49</td>
<td>47.6</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.3 Representativeness
In the previous paragraph several characteristics of the respondents were described, and compared to the population of Stockholm. Descriptive statistics have the goal to give an image of the gathered empirical information and compare this data to the existing statistical data, which in the case of this study comes from the Swedish Statistical Database (2015). Three of the descriptive statistical variables that were mentioned in the previous paragraph will be tested for representativeness. These variables are: gender, age (divided into age groups) and ethnicity. These variables were chosen by looking at what possible factors could influence the perception of safety and can be compared to the existing statistical database. Factors such as occupation or educational level were not able to be compared due to the different structure of the existing statistical database compared to the gathered empirical data for this study (such as different educational categories, age groups etc.). The three variables gender, age and ethnicity are also three variables that focus on the characteristics of the respondents.

The testing for representativeness is done previous to the in depth analysis, because the representativeness gives meaning to the in depth analyses; if the population is not representative, any statistical statements made regarding the study will have little to no meaning.

In order to test the three selected variables for representativeness, a certain statistical test needs to be selected, which is the Chi square (Goodness-of-fit) test. This test requires data to be transformed (if necessary) into percentages, in order to compare percentages from the existing population with the gathered date in this study. This means that absolute numbers cannot be compared, and have to be transformed into groups and have percentages assigned to the groups. The outcomes of the goodness-of-fit tests are summarized in table 4.2, and will be discussed in this paragraph.
4.3.1 Gender
The percentages of the respondent group and the population of Stockholm are relatively close to each other, which could indicate that representativeness is quite likely. After applying the Goodness-of-fit test the significance level outcome of 0.601 is higher than the set number of 0.05 which means that there is no significant difference between the respondents and the population of Stockholm. With 95% reliability it has been determined that the variable ‘gender’ is representative and can therefore be used for making statistically generalizing statements.

4.3.2 Age
In the survey, respondents were asked to fill in the year in which they were born. In order to calculate the age of the respondents in a quick and efficient manner, the year that the respondents filled in was deducted from 2015. However, before the Goodness-of-fit test could be applied, the different ages needed to be categorized into age groups. This is relatively easy and common to do when studying people within a large age target group (for example 18-65 year olds), and becomes a little more difficult when focusing on a smaller target age group, which is the case for this thesis. It was decided that the target age group of 18-30 year olds was to be divided into three groups. The first group consisted of 18 to 21 year olds, the second group 22 to 26 year olds and the last group 27 to 30 year olds. The groups do not consist of equal amount of ages, however as long as the population of Stockholm group is also divided into identical groups this difference in ages among the groups should not matter.

The age groups from the respondents differ somewhat from the age groups of the population of Stockholm; but without testing little can be said regarding these differences. After applying the Goodness-of-fit test it appears that with a significance level of 0.388 the variable age of the respondents does not differ significantly from the population of Stockholm. This means that the age variable can be used for making statistically generalizing statements as well.

4.3.3 Ethnicity
The population of Stockholm does not consist of solely people of Swedish decent. This means that in order to have an overall representative sample population, this group needs to fit the characteristics of the larger population. The variable ethnicity in this research may not be used for further in depth analysis, but it is important to use as many variables as possible to determine the overall representativeness of the sample population, which includes testing ethnicity for representativeness. The amount of Swedes is higher among the respondents of the survey than the population of Stockholm (figure 4.3). After testing the variable ethnicity with the Goodness-of-fit test, ethnicity among the respondents does not significantly differ from the population of Stockholm, with 95%

<table>
<thead>
<tr>
<th></th>
<th>Sample Population</th>
<th>Stockholm Population</th>
<th>Chi square outcome</th>
<th>Significance level (if &gt;0.05 then sample doesn’t differ significantly from population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male:</td>
<td>52.4%</td>
<td>Male:</td>
<td>49.8%</td>
</tr>
<tr>
<td></td>
<td>Female:</td>
<td>47.6%</td>
<td>Female:</td>
<td>50.2%</td>
</tr>
<tr>
<td>Age (divided into age groups)</td>
<td>16-21 y/o:</td>
<td>17.82%</td>
<td>16-21 y/o:</td>
<td>19.65%</td>
</tr>
<tr>
<td></td>
<td>22-26 y/o:</td>
<td>45.54%</td>
<td>22-26 y/o:</td>
<td>38.88%</td>
</tr>
<tr>
<td></td>
<td>27-30 y/o:</td>
<td>36.63%</td>
<td>27-30 y/o:</td>
<td>41.46%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Swedish:</td>
<td>72.81%</td>
<td>Swedish:</td>
<td>63.48%</td>
</tr>
<tr>
<td></td>
<td>Migrants:</td>
<td>27.19%</td>
<td>Migrants:</td>
<td>36.52%</td>
</tr>
</tbody>
</table>

reliability. The term ‘migrants’ used in table 4.2 refers to people that were not born in Sweden, and have migrated to Sweden.

All three variables that were tested for representativeness do not differ from statistics of the population of Stockholm from the SCB (2015). This means that further in-depth testing is possible, and no weights need to be added to the variables.
5. In-depth analyses of the hypotheses and heat maps

In the previous chapter it was confirmed that the respondents to the survey were representative in relation to the Stockholm population. This allows further statistical testing with other outcomes of the survey. This chapter will cover the (possible) relations between spatial, social and individual factors regarding safety perception from the hypotheses and conceptual model from chapter 2 and 3. The outcomes of these statistical tests will not only be mentioned but also discussed in the perspective of the literature; e.g. what does it mean if two variables have a significant relation?

The previously made hypotheses will be discussed systematically using descriptive statistics to clarify the relationship between the variables and the tests used. Using the results from the tests, a hypothesis is either accepted or rejected, meaning that the relation between two variables is either confirmed or denied.

This chapter consists of two parts: the statistical tests applied to the hypotheses and analysis using the literature, and the answering of the sub questions in order to be able to answer the main research question of this thesis in the concluding chapter.

The outcomes of the tests in this chapter can be found in appendix 8.4 of the thesis.

5.1 Hypothesis 1: Women perceive public spaces as less safe than men

This hypothesis is relatively straightforward and uses two variables: gender and feeling safe. These two nominal variables can be tested using a Chi-square test, which will then determine whether or not women feel less safe than men in public spaces. Earlier on in the theoretical chapter the difference in safety perception among men and women was discussed. In general, men feel safer than women in public spaces, meaning that it is to be expected that there should be a difference among the respondents regarding this hypothesis. It appears that relatively speaking women feel more frequently unsafe than men (figure 5.1). This means that among the respondents more women than men have stated that they occasionally feel unsafe in public spaces. Among the men it appears that there is quite an even balance between feeling safe and unsafe; a little more than half the male respondents have stated that they do not feel unsafe at all.

Figure 5.1 The variables gender and feeling safe compared with each other
Without statistical testing it appears that there could be a difference between men and women regarding the feeling of safety in public spaces. However, after applying the Chi-square test it appears that these two variables are not statistically significant. The Chi-square test assumes that there is no significant relation between two variables if the significance level of the test is higher than the confidence level of 0.05. This means that in order to have a significant relation between the variables, the outcome of the test needs to be lower than 0.05 (with a confidence interval of 95%). For this test, the testing of gender in relation to feeling safe, the Pearson Chi-square value of 0.833 has a significance level of 0.361 (appendix figure 4.1). This is higher than the confidence level of 0.05, which means that there is no significant relation between gender and feeling safe.

However, this does not mean the hypothesis that women perceive public spaces as less safe than men is entirely rejected, as only one variable has been tested together with gender. Among other type of questions, the survey contains a likert scale question (a question that consists of several statements with which the respondents can either disagree, have no opinion of or agree with), of which the statements together form a relatively good indication of whether or not the respondent feels safe or unsafe in public spaces. The statements used to create one variable are: “most public areas in Stockholm are unsafe”, “for my own safety, I would rather walk through Stockholm with a friend/colleague than alone”, “I tend to avoid small/narrow streets when it is dark outside” and “I tend to avoid public spaces when it is dark outside”. The data from the answers of these statements have been computed into one variable. This variable, called “feeling safe in public places” was tested with gender to find a possible significant relation. As this variable contains several questions that question the behavior of the respondents, it should be noted that the outcomes of testing this variable will say something about the (different) behavior between men and women, rather than answering the hypothesis that women perceive public spaces as less safe than men.

Before using this newly created variable, it must be tested for internal consistency. This means that the statements chosen must have similar outcomes. If people chose to totally agree with the first statement but then totally disagree with the second statement, this means that internal consistency is low. Using the Cronbach’s alpha test it is confirmed that there is a good internal consistency among the four statements, meaning that they can be merged together into one variable (appendix figure 4.2.1).

The outcome of the Independent Samples T-test shows that there is a significant difference between men and women regarding feeling safe in public spaces. The significance level of 0.035 is lower than the confidence level of 0.05 (appendix figure 4.2). This means that using the likert scale test in order to determine if there is a difference between men and women regarding feeling safe outside gives a different result than the chi-square test.

The first hypothesis (“women perceive public spaces as less safe than men”) is partly rejected, which conflicts with some of the literature found regarding this topic. Within the literature it was found that men generally feel safer than women, but among the respondents of the survey in Stockholm this is not the case. However, this does not mean that the variable gender is not suitable for further investigation; for example women could appreciate different spatial factors than men regarding their own safety. The second way to calculate this hypothesis resulted in a significant relation between gender and behavior regarding safety perception. Using the likert scale questions, this hypothesis has to be taken into account when answering the sub questions and the main question of this thesis.

5.2 Hypothesis 2: Environmental factors (such as the presence of trees, bushes, water etc.) in an area are more important to women than men regarding safety perception
The second hypothesis looks at the difference between men and women and the values given to environmental factors. Within the survey respondents were asked to rank which factors they value the most regarding their own safety in public spaces. The selection that the respondents could choose from was based on the literature discussed in the theoretic chapter of this thesis.

Figure 5.2 The outcomes of ranking the top three most important factors regarding own safety in public spaces

The respondents were able to choose from seven factors, which needed to be ranked from the most important factor (ranked number 1) to the least important factor (ranked number 7). When looking at the outcome of all respondents combined, thus taking men and women together, it appears that environmental factors are not the most important (figure 5.2). It seems that the presence of the ‘unknown other’ is more important than environmental factors such as the presence of green in the area, a lack of streetlights or even the time of day (Maruthaveeran & Konijnendijk van den Bosch, 2014).

<table>
<thead>
<tr>
<th>Which factors do you think contribute the most to feeling unsafe in general?</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of streetlights</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Too much green in the area (trees, bushes)</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Areas that are difficult to get an overview of</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>The presence of youths/groups bothering people passing by</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>The presence of beggars</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>The time of day (daytime versus nighttime)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>49</td>
</tr>
</tbody>
</table>

Table 5.1 The factors ranked as number 1 regarding safety perception by men and women (absolute numbers)
The factors that the respondents marked as most important (ranked number 1) show that there is quite some concern regarding the amount of green in public spaces (table 5.1). When looking at the absolute numbers it shows that from both the men and women a significant amount of respondents feel that too much green in an area has a negative effect on their safety perception. It must be noted that no respondent chose to put ‘presence of water in the area’ as their number 1 choice, however within the top three this factor has been chosen quite a lot (figure 5.2). After using the Chi-square test to determine if there is a significant difference between men and women, and the factors chosen to be most important regarding safety perception, it turned out that with a significance level of 0,056 there is no significant difference between men and women (appendix figure 4.3). The options chosen by men and women are too similar. Even though the outcome of the test shows that there is no difference between men and women, the descriptive statistics have shown the importance of the presence of green in public spaces, and how this affects safety perception.

The second hypothesis is rejected, as there is no difference between men and women and how they value environmental factors in their safety perception, but it could be stated that in general men and women both feel that too much green in an area is associated with possible danger and feeling unsafe.

5.3 Hypothesis 3: Women experience night time as more threatening to their safety than day time, compared to men

From the literature it became clear that night time, or lack of daylight, has a direct influence on people’s safety perception (Brands et al., 2015; Maruthaveeran & Konijnendijk van den Bosch, 2014). People’s ability to get an overview of their surroundings is limited and the association between night time and crime is often made, which could make some people feel uneasy at night (England & Simon, 2010). Among the respondents to the survey of this study, it appears that there is a difference to be found between men and women (figure 5.3). Men tend to not feel bothered by the darkness regarding their own safety perception, with 74% stating that it does not matter if it is day time or night time when talking about their own safety. When comparing the outcomes of the women to the men it appears that women tend to agree more with the posed statement “I tend to avoid public spaces when it is dark outside”.

Figure 5.3 Comparing men and women regarding the avoidance of public spaces when it’s dark outside
After using the Chi-square test it appears that there is indeed a significant difference between men and women and whether or not public spaces would be avoided during night time. The Pearson Chi-square score of 4,928 with a significance level of 0,026, shows that with 95% reliability this hypothesis is accepted (appendix figure 4.4). Women experience night time as more threatening to their safety than day time, compared to men. When taking this statement into a larger perspective, and into the research area of this study, Stockholm, this could have a major influence on the mental maps people create of the area they visit on a regular basis (England & Simon, 2010, pp. 202-203). People create their own mental maps about places they know of and visit, and several external factors influence these mental maps. However, the concept of a mental map is not static. Darkness or high crime rates can influence these mental maps and can create zones in which people would go as long as there’s daylight, but avoid when night time sets in. The outcome of this hypothesis is that women would rather avoid public spaces when it is dark outside, which could point towards a negative association to the winter season by women, regarding their own safety. The strength of the relation between the tested variables can be calculated using the Cramér’s V test. The outcome of the test shows that with a score of 0,219 there is a weak to relatively strong relation between gender and avoiding public space when it is dark (appendix figure 4.4.1). When looking at gender there is no point to calculate the direction of the relation of the variables, you are either a man or a woman. This is a variable that cannot change over time, and therefore the direction of the opinion would be irrelevant to calculate using the Kendall’s tau test. The Kendall’s tau test would be relevant when comparing the amount of time people lived in or near Stockholm to safety perception; time could influence the way people perceive their own safety in public spaces.

5.4 Hypothesis 4: Different seasons have a direct influence on the safety perception for both men and women

This hypothesis takes the outcomes of the previous hypothesis and puts it in a larger perspective; a difference between men and women has been confirmed regarding the role of daylight and safety perception, but do different seasons have a similar impact? There are several ways of determining what influences different seasons have on the safety perceptions of people. Within the survey a likert scale style question was posed to the respondents regarding the use of public spaces during different seasons. The outcomes from this question show that both men and women tend to make more use of public spaces during the summer than in the winter. This is not very surprising, however after testing this variable between men and women it does confirm that there is no significant difference between men and women regarding their opinion of use of public spaces in different seasons (figure 5.4).

Figure 5.4 Use of public space during summer and winter between men and women
Even though there is no difference to be found between men and women in the use of public spaces, the descriptive statistics show the importance of seasons. The summer is apparently much more inviting towards people to make use of parks, squares and other public spaces. About 15% of the men and women state that it does not matter if it is winter or summer regarding their use of public spaces.

In order to look further into the behavior of people in different seasons, and their perception of safety, it is needed to combine variables together. The abovementioned variable that looks into if use of public spaces is affected by seasons can be merged with another variable. In the same part of the survey, respondents are asked their opinion on the statement “I feel safer in public spaces during the summer than during the winter”. If these two variables are put together the assumption is made that feeling safe in the summer and making more use of public spaces in the summer occur together and can be used as one variable. In order to test the internal consistency for two variables the Spearman-Brown test is more suitable than the previously used Cronbach’s alpha test (de Vocht, 2010). The test showed that there was enough internal consistency to merge these variables into one variable for further testing (appendix figure 4.5).

When this variable consisting of two similar variables is tested, a difference between men and women can be seen (figure 5.5). Among the women it appears that the vast majority feels safer during the summer, and that this feeling of safety affects their use of public spaces in a positive way. Women make more use of public spaces during the summer than in the winter, because of an increased feeling of safety during the summer. Summer is often associated with longer availability of daylight and warm, sunny weather. Winter is often seen as cold, dark and not very inviting towards public spaces. Men also feel relatively positive towards the summer and how the summer increases their use of public spaces, but not as much as women do.

After using the Chi-square test the outcomes show that there is a significant difference between men and women and the way safety and use of public space during the summer are perceived, with 95% reliability. The Pearson Chi-square score of 3,948 with a significance level of 0,047 confirms the
difference between the two groups (appendix figure 4.6). In order to determine the strength of the outcome of the Chi-square test, a Cramér’s V test needs to be performed. The Cramér’s V test shows that there is a weak relation between the tested variables (appendix figure 4.6.1). This means that the difference between men and women regarding their safety perception and use of public spaces during the summer is significant, but not very strong. According to the literature from chapter two in this thesis the difference between men and women regarding safety perception had been confirmed, but not in the light of how seasons could potentially influence their behavior. To calculate the direction of how the relation between the variables develops itself is once again not relevant due to the testing of gender. This means that the Kendall’s tau test is irrelevant.

Concluding, the outcomes of these tests mean that the hypothesis “Different seasons have a direct influence on the safety perception for both men and women” can be accepted, with the note that there is a significant difference between men and women. The difference between men and women that has been tested confirms the outcome of the study done by Brands et al. (2015). This study asked respondents (with a similar target group to this study, consisting of young adults) to describe the way they felt about certain areas illustrated with photographs, mostly at night time. There was a difference between men and women and how they perceived their own safety in the different situations; men tended to be more positive and less anxious about the photographs, while women felt that they would be unsafe in the selected pictures because of the possibility to become a victim of crime.

5.5 Heat map results
Two questions of the survey were posed as situational (hypothetical) questions, asking the respondents to mark certain areas within the selected research area that they would rather avoid during a certain time of the day and during a specific season. This information could pinpoint places within the research area that the respondents find uncomfortable to be in. Additionally, the respondents were asked why they felt uncomfortable in the area(s) they selected. As the heat map questions were not obligatory for the respondents to fill in, not every respondent has marked a spot on the map that they feel unsafe in. Due to the literature pointing towards a difference in safety perception between winter and summer time, a difference in response between the two seasons is expected. The amount of people that responded to the winter map was 68, and the amount of people that responded on the summer map was 42. Each respondent had a maximum of three spots they could mark, however not every respondent made use of this maximum.

When comparing the heat maps of the two seasons to each other, it appears that the winter map is more scattered than the summer map. The summer map has a strong concentration in the area near Kulturhuset. Additionally, the area near Kungsträdgården is also selected often in the summer. This means that these two areas in particular, during the summer time, are experienced as unsafe at 20.00 o’clock. The respondents feel that there are more areas within the selected research area that are unsafe than in the summer; this statement does not necessarily mean that the winter season is more unsafe than the summer, as it was determined that hypothesis 4 (‘Different seasons have a direct influence on the safety perception for both men and women’) was rejected. It appears that the area closest to the central station of Stockholm is often perceived as unsafe by respondents in the winter. In the summer some of the areas near central station are still perceived as unsafe at 20.00 o’ clock, but less so than in the winter.
The selected heat maps show only a part of the research area; this is done because other parts in the research area were not selected by many people, thus less interesting when analyzing this spatial data (figure 5.6 & 5.7).

The heat maps and the corresponding reasons why people chose the areas on the map are not used for in-depth statistical testing. Instead, the reasons that people chose to avoid the areas during the different situations will be looked at and compared. The descriptive statistics show that there is a shift in why people tend to avoid certain areas. The reason why 20.00 o’clock was chosen for both scenarios (winter and summer) is because of the change in daylight between the two seasons. During the winter there is less daylight than in the summer, which resulted in the assumption that there would be differences in the areas people would avoid, and the reasons why they would avoid these areas. During the winter, the respondents have answered that the lack of streetlights and lack of visible security in areas are the main factors in determining their level of safety. However there were a lot of respondents that had a specific reason that was not listed among the multiple choice answers. One of the most given answers was that there were not enough people around that could possibly help in case someone were to be a victim of a crime. This relates to the literature regarding ‘safety by community’, about how keeping an eye on each can decrease crime rates in areas (Schroeder & Anderson, 1984; Mehta, 2014). It appears that among the other answers given for the winter season, the respondents feel uneasy about other people, especially beggars or drunks. This ‘fear of the unknown other’ is a concept discussed earlier in the theoretic chapter as well, which is not necessarily a spatial related factor, but more of a social factor (Maruthaveeran & Konijnendijk van den Bosch, 2014). Comparing the winter descriptive statistics to that of the summer, it appears
that there are some differences; for example lack of streetlights only has 3.8% of the total amount of responses, while lack of visible security in the area has become bigger. This means that the lack of daylight is not a very much of a factor anymore; however the change in season invites more people to make use of public spaces. According to the respondents, this process requires more visible security in order to make them feel safer in public spaces. The answers given by the respondents that they could voice with the ‘other’ option shifted to being scared of becoming a victim of getting harassed by certain groups of people. This is a difference when compared to the winter season: during the winter the respondents feel that there are not enough people around to keep an eye on each other, and during the summer people feel that there are too many people that could potentially form a threat.

Figure 5.8 Summer and winter hypothetical situation: reasons why people avoid certain areas

### Reasons avoiding area during the winter at 20.00 o'clock
- Lack of streetlights: 22.05%
- Lack of visible security in the area: 18.11%
- Too much security in the area: 15.75%
- Narrow streets: 12.60%
- Too many trees or bushes in the area: 8.66%
- Badly maintained area: 2.36%
- Other reason: 20.47%

### Reasons avoiding area during the summer at 20.00 o'clock
- Lack of streetlights: 16.46%
- Lack of visible security in the area: 25.32%
- Too much security in the area: 20.25%
- Narrow streets: 11.39%
- Too many trees or bushes in the area: 3.80%
- Badly maintained area: 1.27%
- Other reason: 21.52%
5.6 Extra testing
This paragraph contains tests and analyses that do not belong to a specific hypothesis but could be of value when concluding the sub-questions and main research question.

5.6.1 Safety perception in different seasons among different residents Stockholm
The variables that are tested here tell if the amount of time lived in or near Stockholm affects an individual’s safety perception. For example if someone would live longer in Stockholm, it is to be expected that this person would be more familiar with the city and thus feel safer in public spaces than someone who has not lived as long in the city.

At the end of the survey respondents were asked to fill in how long they’ve lived in or near Stockholm, which is one of the variables used here. The other variable is a likert-scale question which has been used for some of the previous hypotheses: “I feel safer in public spaces during the summer than during the winter”. For the testing of these variables it must be noted that no difference between men and women has been made. Instead the focus lies upon the possible difference between the amount of time lived in or near Stockholm in relation to seasonal safety perception.

Figure 5.6 The influence of time lived in Stockholm on safety perception during different seasons

The residents living longer in or near Stockholm feel differently towards the two seasons and how this affects their safety perception. The majority of the people living for ten years or longer in Stockholm think that feeling safe does not change whether it is summer or winter. The people living in Stockholm from one to five years have the opposite opinion; summer does affect the safety perception and makes them feel safer. These two variables have been tested using the Independent Samples T-test, which showed that there is a significant difference between the two inhabitant groups with 95% reliability (appendix figure 4.7). When taking the target group for the survey (18 to 30 year olds) into account, the inhabitants that have lived longer than ten years in Stockholm have most likely grown up in the city. The inhabitants that have lived between one to five years in Stockholm have moved relatively recently in their lives, and it could be argued that this has been done for work or study related reasons.

Concluding it could be said that the longer one lives in Stockholm, the more familiar one becomes with the city, which influences the safety perception throughout different seasons in a positive way.
5.6.2 Visiting frequency to the city in relation to avoiding narrow streets when it is dark outside

The data from the survey regarding the frequency with which the respondents visit the city of Stockholm could offer insight into the relation between safety perception and familiarity with the city. Similar to the test with the variable that looked at the amount of time respondents had lived in Stockholm, the variable visiting frequency looks at commuters and inhabitants together. The respondents were asked to answer how frequently they visit the city of Stockholm, in a multiple choice setting. The possible answers consisted of: 1 time per month, 2 times per month, 1-2 times a week, 2-4 times a week, 4-6 times a week, or daily. In order to be able to test this variable a division of the answers was made into ‘infrequent’, ‘regular’ and ‘frequent’ visitors. The people that visit the city 1 or 2 times per month are categorized as infrequent visitors. The people that visited the city 1 to 4 times a week are categorized as regular visitors. The last group, labeled as frequent visitors, consists of the people that visited the city 4-6 times a week to daily.

When comparing the visitor groups in relation to how they feel about avoiding narrow streets or small spaces when it is dark outside shows a significant difference between the groups (figure 5.7). The Chi-square test shows, with a Pearson Chi-square value of 12,486 and a significance level of 0,002, that there is a significant difference between the amount of visits and the way narrow streets and small spaces are perceived when it is dark outside (appendix figure 4.8). The Cramér’s V test shows that there is a relatively strong relation between the two variables; however this does not say anything about the direction of this relation. The Kendall’s tau-c test shows that the relation between the two variables develops in the following way: the more a person visits the city, the less impact small or narrow streets have on the safety perception of the individual when it is dark outside (appendix figure 4.8.1).

Figure 5.7 The frequency of visits by respondents in relation to the answer given to the statement ‘I would avoid narrow streets when it’s dark outside’
6. Conclusion

Feeling safe in public spaces is a relatively well known subject among urban researchers. It is a subject that often has its focus on the entire population. From these existing studies, there appears to be a big difference between young and older people regarding safety perception. Younger people tend to feel safer than older people, and men tend to feel safer than women. By gathering empirical data regarding the safety perception of younger people, this thesis tried to get a better understanding of this group of relatively young people and how they perceive their own safety. Using a survey that was spread both online and in the field itself, respondents were able to voice their opinion on hypothetical situations and factors that they believe are vital for their safety. By selecting a research area in the city centre of Stockholm, location specific questions could be asked to the respondents, which in its turn could help pinpoint areas that need extra attention in improving the feeling of safety. The data gathered was transformed into a statistical database in order to test variables that could point towards answers regarding young adults and the way they perceive their own safety. The statistical tests would determine if the hypotheses that were developed in the methodology chapter, based on the literature, were to be accepted or rejected. These hypotheses, in their turn, would help answer the sub-questions, which were made in order to be able to answer the main research question of this study: “In what ways does safety perception affect the use of public spaces by young adults?”

The first sub-question is “in what ways does safety perception differ between men and women?”, which can be answered by looking at the outcomes of several of the hypotheses. After testing it appears that there is no significant difference between men and women in relation to feeling unsafe outside. Even though women tend to feel a little more unsafe then men, after testing it became clear that this difference was not significant and thus cannot be accepted. However, when the behavior of the two groups was tested, a significant difference was found. Using several statements regarding behavior that the respondents could voice their opinion on, a distinction between people that felt safe and people that did not feel safe was made. Statements such as “for my own safety I would rather walk through Stockholm with a friend/colleague than alone” and “I tend to avoid small/narrow streets when it is dark outside” were mostly agreed upon by women, while men tended to either disagree or feel neutral about these statements. Regarding the behavior of men and women there was a significant difference, which means that men and women see situations differently in regards to how it can affect their own safety. This significant difference could explain why the first hypothesis was not accepted; if men and women have their own concept of ‘feeling unsafe’, then a general statement is perhaps too vague in order to determine a difference between men and women. According to the outcome of the behavior test, women tend to deal with situations differently than men, perhaps avoiding certain possible situations or areas. This process of avoiding possible situations and areas that could compromise the safety could help women into feeling safe in the areas they do know. When looking at factors that could influence the safety of an individual, based on the literature of this study, there appears to be no difference between men and women. The respondents could value several factors that could affect their safety by ranking them from most important to least important. Most men and women felt that ‘too much green in the area’ was the most important factor that affects their safety perception. Areas that are difficult to get an overview of, was the second most picked factor for women. This means that if an area consists of small streets or a lot of green, this affects the ability for people to determine whether or not an area is safe or if an area is unsafe. Another difference between the two groups is that men tend to not avoid public spaces when it is dark outside, as opposed to women. After testing it appeared that there is a significant difference between men and women in relation to darkness and the use of public space. This darkness is something that affects a city like Stockholm more in some seasons than in others.
This difference in daylight between the winter and the summer season was looked at within the survey as well. The tests showed that men and women make more use of public spaces during the summer. However when looking at the combined statement: ‘do you feel safer during the summer in public spaces, and does this influence your use of public spaces?’, a significant difference was determined between men and women. Women agreed significantly more with this statement than men, meaning that the summer does not affect men’s safety and use of public spaces as much as it affects women’s perception.

The second sub-question is “which factors seem to be the most important with reference to safety perception in general (by both men and women)?”. As had been determined in the previous sub-question, different seasons have an effect on the safety perception of women. Too much green in areas can compromise the ability for people to estimate if an area is safe or unsafe, and thus are these areas often experienced as unsafe. In the previous tests men and women were taken as two separate groups, however extra tests were made in order to test different groups of people. Within the survey people were asked to fill in how long they’ve been living in or near Stockholm. This variable was tested with feeling safe in different seasons. Residents that had lived in or near Stockholm for longer than ten years appeared to feel no different towards the winter season than the summer season. The residents that had lived in Stockholm between one to five years felt significantly safer in the summer season than in the winter season. This indicates that familiarity with the area has a positive influence on the safety perception of Stockholm residents, eliminating the preference for a certain season regarding their own safety. Within the survey respondents were also asked how often they visit the city. This variable was tested with the statement “I would avoid narrow streets when it is dark outside”, in order to see if there was a difference between the frequency of visits to the city and feeling unsafe in particular areas of the city. After testing it appeared that the frequent visitors had a significantly different opinion than the infrequent and regular visitors. Frequent visitors felt that there was no need to avoid narrow streets when it is dark outside, unlike the infrequent and regular visitors. After testing these two variables on how they develop, it appears that the more often an individual visits the city the less impact small areas have when it is dark outside.

The third and last sub-question is “how can public spaces be improved in order to grow a positive sense of safety among the visitors?”. The results from the heat maps gathered with the survey it appears that among the respondents the area near Kulturhuset is often associated with a lack of visible security in the area and a badly maintained area. According to the respondents this is also the area they would rather avoid during the winter season when it is dark. However, some other areas were marked by the respondents as well as unsafe, mostly having to do with the lack of other people around and the lack of streetlights which compromises the visibility of an area. Small street areas in or near Gamla Stan, the small peninsula Skeppsholmen and some parts of Djurgården are examples of this. When comparing the winter to the summer map, the areas that were often marked during the winter were less visible on the summer map. This meant that there was a change in areas the respondents would avoid. The area near Kulturhuset and the central station contained less scattered marked areas in the summer map as places the respondents would avoid than on the winter map. Additionally, respondents were able to write down their own specific answer if their answer was different than the multiple choice options given to them. A substantial amount of respondents felt that they would avoid areas (both during the summer and winter) because of drunks and beggars, which had an impact on their safety. This relates back to the literature regarding ‘fear of the unknown other’.
To answer the main research question “In what ways does safety perception affect the use of public spaces by young adults?”, one must look at the outcome of the different sub-questions. Men and women experience safety as different processes in general, not just when looking at the entire population, but also when looking at young adults. Men tend to feel more indifferent towards certain situations than women. This does not necessarily mean that men are safer than women, according to the statistical research discussed in the theoretic chapter; men are more often victims of crime than women. However the differences in potential crimes also affect women, as women are more often subject to sexually related crimes than men, which has an impact on their safety perception. In general young adults make more use of public space during the summer and tend to avoid areas that contain too much green and are difficult to get an overview of. Additionally, for young adults living in Stockholm for ten years or longer the seasons have less of an impact than for young adults living in Stockholm for a shorter period of time. Darkness and seasons are two factors that have an influence on the safety of certain groups within the young adults. Women tend to feel safer during the summer, which affects their use of public spaces in a positive way. Infrequent and regular visitors to the city of Stockholm are more intimidated by darkness than frequent visitors. Some areas within the selected research area are more popular during the summer than during the winter, which is affected by the amount of people in a certain area and the amount of daylight available. Regarding safety perception the young adults group is not a homogeneous group. Men and women behave differently regarding their safety perception; women feel safer with the presence of a friend or colleague when walking around Stockholm, while the presence of a friend or colleague does not affect the safety perception for men. Young adults that have lived for a longer time in Stockholm are not affected much by the different seasons, while young adults that have not lived as long in Stockholm still prefer summertime over wintertime regarding their own safety.

The research question asked which factors affect the safety perception by young adults in general. The results from this study show that within the group of young adults there are many different groups that can be distinguished that each have their own opinion on safety perception that differs significantly from other groups. The most obvious sub-group is perhaps men and women, but other sub-groups such as visitors to the city, inhabitants of the city and Swedes and migrants (born outside of Sweden) perceive their safety in significantly different ways. From existing literature the main conclusion is that young adults feel significantly safer in public spaces than older people. This study has confirmed that within the group of young adults, there is not homogeneity regarding safety in public spaces, and instead spatial and social variables affect the sub-groups within the young adult population of Stockholm in different ways.
7. Discussion

This chapter will reflect back upon the processes that came along with creating this thesis. First, the methods used will be discussed, subsequently the use of the conceptual model will be discussed and lastly the results from this study will be put in a broader perspective using the literature from the theoretic chapter.

To be able to make generalizing statements about populations, quantitative studies are necessary. The main goal of this study was to be able to see how the young adult population sees their own safety perception in public spaces, and if there are any differences within this population. The chosen method of conducting surveys offered a systematic way to gain information about a relatively large portion of the target population, by spreading the survey online and by in-field surveying. This method of surveying was accompanied by statistical analysis of the gathered data, which in its turn enabled statistical testing and being able to make generalizing statements. Even though this method offered a good way to gain insight in the target population, quantitative methods also have their downside. Qualitative methods have their focus on a smaller scale such as neighborhoods or individuals, which often offer more detailed insight into the chosen populations. In the case of this study, focus groups could have offered insight into specific neighborhoods in the research area, offering the participants a platform where safety perception could be discussed. If this study were to be continued or conducted in a different city, a mix of quantitative and qualitative methods would be preferred, due to the valuable insights of both methods.

When using statistical analyses, a common method is to create hypotheses that are derived from existing literature. These hypotheses are assumptions from the researcher (based on existing literature and/or assumptions) which suggest certain relations between variables in a study. For this study, hypotheses regarding gender and safety perception were developed in order to answer the sub-questions. Additional testing between other variables was done in order to gain more information about young adults as a group, instead of only looking at the differences between men and women. The survey consisted of several likert-scale questions (questions with statements where the respondents can agree or disagree with), which were very valuable when making statistical tests in order to accept or reject the majority of the hypotheses. If this same study were to be done again, the survey could be adjusted slightly in a way that it would contain more likert-scale questions, as the outcomes from these questions offer a direct insight into the opinion of respondents on hypothetical situations. When conducting a survey, the option for open answer style questions must be added, however the downside of open answer questions in a quantitative survey is that these answers cannot be statistically tested. The survey that was used for this research was often well received by the respondents; there were only a few people that commented that it was too long for them to finish the survey.

The survey questions and the hypotheses were based upon existing literature. The existing literature pointed towards vital relations between several factors that had an impact on safety perception. These variables and relations were visualized into a conceptual model (figure 7.1). The main goal of this study was to look further into the relations between the variables discussed in the theoretic framework chapter and the conceptual model (for example how men and women (gender) would relate to different seasons, or the green infrastructure in Stockholm regarding their safety perception). The conceptual model helped with keeping an oversight on which factors and variables were of importance and which tests needed to be done in order to get a complete insight into the young adult population regarding the topic of safety perception in public spaces. As stated earlier, the variables that could possibly affect the safety perception of people were derived from existing literature. However, if interviews or focus groups were held prior to the creation of the survey,
perhaps factors that would come up during these interviews or focus group meetings could have been added to the list in the conceptual model.

Figure 7.1 Conceptual model derived from existing literature made by the author (2015)

The statistical testing showed that within the group of young adults many sub-groups could be distinguished, for example: men and women, visitors to the city, inhabitants of the city and Swedes and migrants. The statistical outcomes showed that there are not several set factors that have the same influence on all of the sub-groups. For example, a significant difference between men and women could not be seen when testing ‘gender’ with the variable ‘avoiding narrow streets when it is dark outside’. However, when this same variable was tested with the sub-group ‘visitors’ (infrequent-, regular- and frequent visitors) a significant difference within this group could be seen. These outcomes show that safety perception is a complicated topic of which the spatial and social factors have different effects on different groups of people. When relating the results back to the literature in the theoretic framework chapter, it appears that only few studies actually looked at the behavioral differences between men and women. Shenassa et al. (2006) asked respondents if they would feel safe to walk around their neighborhood when it is dark outside, which is a hypothetical behavioral question. The behavior of the respondents to the survey in this study was also tested, and similar results were found, compared to the study of Shenassa et al. (2006). Men and women behave differently when being in public spaces, and feel differently about their own safety. This does not just confirm the study done by Shenassa et al., but also the other literature which does not necessarily test on behavior differences between men and women. This similar behavior among the entire population, and not just among young adults, shows that behavioral patterns are not limited or changed depending on age. Within the literature, little was discussed regarding safety perception in relation to different seasons. This is why the outcomes of studies that looked at the influence of daylight on safety perception were used in order to determine if seasons could have the same
influence within this study. The respondents to this study showed that there are different social and spatial reasons for the summer and winter to avoid certain public spaces. Women tend to feel significantly safer during the summer which influences the use of public spaces in a positive way, while seasons appear to have less of an influence on the safety perception by men. Additionally, the summer and winter seasons affect inhabitants of the city in different ways as well. People that have lived for a shorter time in the city feel less safe during the winter than in the summer. The inhabitants that have lived for a longer period of time in Stockholm are less bothered by the different seasons regarding their safety perception. This relation between darkness and the amount of time lived in the city could make the conclusion that the more familiar an individual gets with an area (or a city in this case), the more positive one’s safety perception becomes. The measurement of familiarity of a city linked to safety perception is relatively hard to find among the existing literature, however, according to the outcomes of this study it could be argued that this relation of variables could be taken into account when conducting similar studies.

The outcomes of this study show that safety perceptions in public spaces differ among the subgroups within the young adult target group. The lack of streetlights in certain areas of Stockholm city during the winter, and the crowdedness and lack of visible security during the summer play significant roles for young adults regarding their safety perception and avoidance of certain public spaces. If this study were to be continued and taken into a broader perspective, a comparison could be made between young adults and the rest of the population, to test the results from existing literature regarding the safety perception of young and older people. Additionally, the same study could be done in other cities (within Sweden or Scandinavia) in order to determine if young adults feel the same way as they do in Stockholm, or if there are differences regarding safety perception among different young adult populations.
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Appendix

8.1 Research area
8.2 Survey

Dear participant,

Purpose: Survey regarding safety perception in Stockholm city.

My name is Walt Machielse and I am a Master’s student at Stockholm University. Currently I am in the last phase of my Master’s program Human Geography, which needs to be concluded with a thesis. This survey serves as a tool to gather empirical results regarding the topic of my thesis: safety perception of young adults in public spaces in the city of Stockholm.

By filling in this survey, you will support me in this research, and contribute to finalizing my Master’s thesis.

Filling in this survey will take about 10 minutes. The answers given by you in this survey are treated with strict confidentiality, only used anonymously and only for the purpose of this research. If you have any further questions or remarks please feel free to contact me via email:

wama3059@students.su.se

Thank you very much in advance for your cooperation,

Yours sincerely,
Walt Machielse
General sense of safety - Part 1/3

This first part of the survey covers the general questions regarding safety in public spaces. Please fill in the answers that apply to your personal situation.

Q1. Do you ever feel unsafe when walking alone outside?
   ○ Yes
   ○ No

Q2. Do you ever visit Stockholm city?
   ○ Yes
   ○ No (go to question 6)

Q3. How often do you visit Stockholm city?
   ○ 1 time per Month
   ○ 2 times per Month
   ○ 1-2 times a Week
   ○ 2-4 times a Week
   ○ 4-6 times a Week
   ○ Daily

Q4. Which factors do you think contribute the most to feeling unsafe in general?
Please drag the factors below in the order of most importance (1 being the most important and 7 being the least important).

   Lack of streetlights
   Too much green in the area (trees, bushes)
   Areas which are difficult to get an overview of, crowdedness of the environment
   The presence of youths/groups bothering people passing by
   The presence of beggars
   Water present in the area (a harbor or area bordering a waterfront)
The time of day (daytime versus nighttime)
Q5. Why do you never visit Stockholm city?

- I have no business being there
- The city is too crowded for me, I rather avoid it
- I feel the city is too unsafe for me
- Other reason: 

Q6. On which scale do you agree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Totally Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Totally Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most public areas in Stockholm are unsafe</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>For my own safety, I would rather walk through Stockholm with a friend/colleague than alone</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I tend to avoid small/narrow streets when it's dark outside</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel safer in public spaces during the summer than during the winter</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I tend to avoid public spaces when it's dark outside</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Q7. On which scale do you agree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Totally disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Totally agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the winter it's not the darkness that makes me feel unsafe, it's the weather.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The different seasons throughout the year do not have any effect on my safety perception in public spaces.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I tend to make more use of public spaces during the summer than during the winter</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Feeling unsafe in the city centre of Stockholm - Part 2/3

Part two of this survey will contain questions about places you feel uneasy or unsafe in. The results from these questions will help to show if there is a spatial pattern among the respondents of this survey regarding unsafe areas.

Q8. Within the selected city centre of Stockholm below, which area would you rather avoid during the winter?

Please mark your chosen area as red (not green or unmarked). Click twice to mark an area as red.
Q9. Why would you rather avoid the above selected area?


Q10.
Situation: 20.00 o'clock, during the winter
Which area(s) would you avoid? (Mark a maximum of 3 spots on the map below)
Note: if you wouldn't avoid any of the areas below, you do not have to answer this question
Q11. Why do you feel unsafe in the location(s) marked above?

Fill in a maximum of 3 factors.

☐ Lack of streetlights

☐ Lack of visible security (for example, policemen patrolling the area and/or security cameras placed in the area)

Too much security visible (for example, too many policemen patrolling the area) and/or too many security...
Q12.

Situation: 20.00 o'clock, during the summer

Which area(s) would you avoid? (Mark a maximum of 3 spots on the map below)

Note: if you wouldn't avoid any of the areas below, you do not have to answer this question
Q13. Why do you feel unsafe in the location(s) marked above?
Fill in a maximum of 3 factors.

☐ Lack of streetlights
☐ Lack of visible security (for example policemen patrolling the area or security camera’s placed in the area) Too
☐ much security visible (for example too many policemen patrolling the area(s) and/or too many security camera’s present

**Personal characteristics - Part 3/3**
This last part of the survey covers questions about personal characteristics. This information will be processed anonymously and will only be used in and for this Master’s thesis. Please answer the questions that apply to your situation.

Q14. What is your gender?
☐ Male
☐ Female

Q15. In what year were you born?

☐

Q16. What is your current employment status?
☐ Full time job
☐ Part time job
☐ Volunteer
☐ work
☐ Out of work and looking for work
☐ Out of work but currently not looking for work
☐ Student
☐ Unable to work (due to illness)
Q17. What is the highest degree or level of school you have completed? If you are currently enrolled, mark the previous grade or highest degree obtained.

- Grundskola
- Gymnasieskola
- Bachelor's degree
- Master's degree
- Doctorate

Q18. Were you born in Sweden?

- Yes (proceed to question 20)
- No

Q19. What country were you born in?

- Finland
- Bosnia and Herzegovina
- Serbia Somalia
- Iran Turkey
- England
- United States
- Other: [ ]

Q20. For how long have you lived in/near Stockholm?

- Less than a year
- Between 1-5 years
- Between 5-10 years
- Longer than 10 years
Q21. What does your household look like?

There are ...... person(s) younger than 18 living in this household

There are ...... person(s) between the age of 18 and 65 living in this household

There are ...... person(s) over the age of 65 living in this household

Q22. What is the net income of the household per month?
With this question the net income of you and your partner is asked. An exception is made for students; students are allowed to fill in their own net income.

☐ Less than 15,000 kr
☐ 15,000 kr - 25,000 kr
☐ 25,000 kr - 35,000 kr
☐ 35,000 kr - 45,000 kr
☐ 45,000 kr or more
☐ I'd rather not say

Q23. After filling in this survey, are there any final remarks regarding the topic you would like to make? (optional)

If you'd like to receive the final version of the thesis (PDF file), please fill in your email address:
### 8.3 Representativeness tests (chapter 4)

**Figure 3.1** Chi-square test for testing the representativeness of the variable gender in relation to the target population.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>What is your gender?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>274$^a$</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.601</td>
</tr>
</tbody>
</table>

*a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 51.3.*

**Figure 3.2** Chi-square test for testing the representativeness of the variable age in relation to the target population.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Age into classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>1,891$^a$</td>
</tr>
<tr>
<td>df</td>
<td>2</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.388</td>
</tr>
</tbody>
</table>

*a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 19.9.*

**Figure 3.3** Chi-square test for testing the representativeness of the variable ethnicity in relation to the target population.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Were you born in Sweden?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>3,489$^a$</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.062</td>
</tr>
</tbody>
</table>
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.1.

**Figure 3.3** The variable age divided into classes with the expected age after using the Chi-square Goodness-of-fit test and the target population statistics.

<table>
<thead>
<tr>
<th>Age into classes</th>
<th>Observed N</th>
<th>Expected N</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-21 years</td>
<td>18</td>
<td>19.9</td>
<td>-1.9</td>
</tr>
<tr>
<td>22-26 years</td>
<td>46</td>
<td>39.3</td>
<td>6.7</td>
</tr>
<tr>
<td>27-30 years</td>
<td>37</td>
<td>41.9</td>
<td>-4.9</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.4** The variable ethnicity with the expected percentage after using the Chi-square Goodness-of-fit test and the target population statistics.

<table>
<thead>
<tr>
<th>Were you born in Sweden?</th>
<th>Observed N</th>
<th>Expected N</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>75</td>
<td>65.9</td>
<td>9.1</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>37.1</td>
<td>-9.1</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.4 In-depth tests (chapter 5)

Figure 4.1 Chi-square test in order to determine if there is a significant difference between men and women in relation to feeling safe

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.833*</td>
<td>1</td>
<td>.361</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>.512</td>
<td></td>
<td>.474</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio Fisher's Exact Test Linear-by-Linear Association</td>
<td>.835</td>
<td></td>
<td>.361</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 23.31.
b. Computed only for a 2x2 table

Figure 4.2 Independent Samples Test in order to determine if there is a significant difference between men and women in relation to safety behavior

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your gender? Male Safety in relation to behavior</td>
<td>54</td>
<td>.2917</td>
<td>.47147</td>
<td>.06416</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>.1173</td>
<td>.33697</td>
<td>.04814</td>
</tr>
</tbody>
</table>
Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Safety in relation to behavior</td>
<td>4,854</td>
<td>,030</td>
<td>2,139</td>
</tr>
<tr>
<td></td>
<td>2,173</td>
<td>95,908</td>
<td>032</td>
</tr>
</tbody>
</table>

**Figure 4.2.1** Reliability analysis to test the internal consistence of the different statements used to test against gender

**Reliability Statistics**

<table>
<thead>
<tr>
<th>Cronbach’s Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>,793</td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 4.3** Chi-square test in order to determine if there is a significant difference between men and women in relation to the reasons that contribute to feeling unsafe

**Chi-Square Tests**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>10,779</td>
<td>5</td>
<td>,056</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>12,527</td>
<td>5</td>
<td>,028</td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>4,150</td>
<td>1</td>
<td>,042</td>
</tr>
<tr>
<td>Association</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>102</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Figure 4.4** Chi-square test in order to determine if there is a significant difference between men and women in relation to avoiding narrow/small public spaces when it is dark outside

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>4,928$^a$</td>
<td>1</td>
<td>0,026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction$^b$</td>
<td>4,057</td>
<td>1</td>
<td>0,044</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>4,961</td>
<td>1</td>
<td>0,026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td>4,880</td>
<td>1</td>
<td>0,027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 17,60.

b. Computed only for a 2x2 table

**Figure 4.4.1** Cramér’s V test to test the strength of the relation determined with the chi-square test (figure 4.4)

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal Cramér’s V</td>
<td>0,219</td>
<td>0,026</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>103</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.5 Spearman-Brown reliability test in order to determine if the two selected statements can be used together

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s Alpha</td>
<td>Part 1</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td>N of Items</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>Part 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>N of Items</td>
<td>1</td>
</tr>
<tr>
<td>Correlation Between Forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spearman-Brown Coefficient</td>
<td>Equal Length</td>
<td>.496</td>
</tr>
<tr>
<td></td>
<td>Unequal Length</td>
<td>.496</td>
</tr>
<tr>
<td>Guttman Split-Half Coefficient</td>
<td></td>
<td>.474</td>
</tr>
</tbody>
</table>

Figure 4.6 Chi-square test in order to determine if there is a significant difference between men and women in relation to use of public space & feeling safer during the summer than the winter

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th></th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>3,948</td>
<td>1</td>
<td>.047</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>3,152</td>
<td>1</td>
<td>.076</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>4,010</td>
<td>1</td>
<td>.045</td>
<td>.058</td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td>3,909</td>
<td>1</td>
<td>.048</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.70.
b. Computed only for a 2x2 table

Figure 4.6.1 Cramér’s V test to test the strength of the relation determined with the chi-square test (figure 4.6)

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
<th></th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td>Phi</td>
<td>-.196</td>
</tr>
<tr>
<td></td>
<td>Cramer’s V</td>
<td>.196</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>103</td>
</tr>
</tbody>
</table>

72
**Figure 4.7** Independent Samples test in order to determine if there is a difference between the amount of time lived in Stockholm and feeling safe in different seasons

<table>
<thead>
<tr>
<th>Group Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For how long have you lived in/near Stockholm?</strong></td>
</tr>
<tr>
<td>I feel safer in public spaces during the summer than during the winter</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Independent Samples Test**

<table>
<thead>
<tr>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong></td>
<td><strong>Sig.</strong></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>244</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>3,146</td>
</tr>
</tbody>
</table>

**Figure 4.8** Chi-square test in order to determine if there is a difference between the visiting frequency of the city in relation to avoiding public spaces when it is dark outside

**Chi-Square Tests**

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>12,486</td>
<td>2</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>12,725</td>
<td>2</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>6,145</td>
<td>1</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.89.
**Figure 4.8.1** Cramér’s V test to test the strength of the relation determined with the chi-square test (figure 4.8) & Kendall’s tau-c test in order to determine the development of the variables

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
<th></th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td>Phi Cramer's V</td>
<td>0.350</td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Kendall's tau-c</td>
<td>0.282</td>
<td>0.096</td>
<td>2.921</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>102</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.