

Urban green spaces and mental well-being

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Abstract

Urban green spaces are areas that are either partially or entirely covered by a significant amount of vegetation and provide space for leisure and exercise. This thesis examined the influence of perceived green space characteristics on the frequency of visits to green spaces and their impact on subjective mental well-being. To investigate these relationships this case study focused on students in the neighbourhoods of Binnenstad and Oranjebuurt in the city of Groningen. The main research question guiding the study is: How do perceived characteristics of green spaces influence the frequency of visits to green spaces and affect subjective mental well-being among students in the city of Groningen? This has been explored through a literature review and a survey. The results show that students who perceive higher quantity and quality of green spaces also report higher levels of mental well-being. Moreover, students who visit green spaces more frequently reported higher levels of mental well-being. No relationship was found between perceived green space characteristics and the frequency of green space visits. Policy implications in improving green spaces should be directed to Binnenstad as students residing in this neighbourhood reported higher levels of litter, air and noise pollution on green streets, higher air and noise pollution in parks and overall lower levels of green space, mental well-being and frequency of green space visits than students in Oranjebuurt.

Table of Contents

<i>Abstract</i>	3
1. Background	5
1.1 Societal relevance	5
1.2 Academic relevance	5
1.3 Research Problem	6
1.4 Reading guide	6
2. Theoretical framework	7
2.1 Subjective mental well-being	7
2.2 Urban green spaces	7
2.3 Perceived green space characteristics	8
2.3.1 Quantity	8
2.3.2 Quality	8
2.3.3 Accessibility	9
2.4 Conceptual framework	9
3. Methodology	10
3.1 Case study	10
3.2 Data collection	10
3.2.1 Literature review	10
3.2.2 Survey	10
3.3 Data analysis	11
3.4 Ethical considerations	12
4 Results & Discussion	12
4.1 About the dataset	12
4.2 Perceived green space characteristics	12
4.3 Perceived green space characteristics and subjective well-being	14
4.4 Frequency of visits and subjective well-being	16
5. Conclusion	19
5.1 Recommendations for planning practice	20
5.2 Limitations & Further Research	20
5.2.1 Data collection	20
5.2.2 Data analysis	20
References	21
Appendices	26
Appendix 1: Complete survey	26
Appendix 2: SPSS	32
Appendix 3: SPSS - cross-tabulations	33

1. Background

Green spaces are natural or semi-natural environments that provide several benefits to human physical and mental health (Di Nardo et al., 2010). One of the most significant impacts of green spaces is on human mental well-being considering that stress and mental problems are more prevalent in urban areas (Lederbogen et al., 2011). Several studies have shown that exposure to green spaces can improve mental well-being by providing opportunities for relaxation, recreation, enhanced contact with nature and social interaction (Houlden et al., 2018, Barton, J. and Rogerson, M., 2017, Zhang et al., 2020). Time spent in green spaces is associated with enhanced mood, fewer depressive symptoms, improved mental health and behaviour, and decreased psychological distress (Zhang et al., 2020, Beyer et al., 2014). However, the relationship between green space exposure and mental well-being can vary by demographic and socio-economic factors such as age, gender, household size, education level and occupation (Zhang et al., 2020, Aamodt et al., 2021, Vanaken & Danckaerts, 2018).

1.1 Societal relevance

Studies have shown that promoting the amount, accessibility and quality of green spaces could have a positive impact on the physical and mental well-being of urban residents (Wood et al., 2017, Reyes-Riveros et al., 2021, Jabbar, M. et al., 2021). Increasing neighbourhood access to green space could be a cost-effective strategy for improving the health of city residents and reducing health disparities, as lower socioeconomic status groups often have a more limited ability to travel outside of their neighbourhoods, resulting in a greater reliance on green spaces found in the respective local environments (Beyer et al., 2014). A study by Wood et al. (2017) found that adequate provision of green space within walking distance in a neighbourhood was a significant factor for positive mental health. Students are a vulnerable group to mental health problems due to academic pressure and financial difficulties, loneliness and substance abuse (Auerbach et al., 2018). Moreover, students often live in densely populated areas with limited access to green spaces (Richardson et al., 2013). Therefore it is important to understand how green spaces can support students' mental well-being and what factors may influence this relationship.

1.2 Academic relevance

A systematic review of the association between green space and adolescents' mental well-being found that improving the availability, accessibility and quality of green space is likely to have positive impacts on adolescents' mental well-being (Zhang et al., 2020). It suggests that more evidence is

needed to understand better how different types of green spaces and their specific features affect mental well-being. Moreover, Van Dinter et al. (2022) suggests gaining more data on a case-study basis in the Netherlands for investigating the impact of green space characteristics on mental well-being.

1.3 Research Problem

This paper aims to address the research gap by investigating the relationship between green space and mental well-being among students in two neighbourhoods in the city of Groningen. In order to investigate this relationship the following research question has been composed: How do perceived characteristics of green spaces influence the frequency of visits to green spaces and affect subjective mental well-being among students in the city of Groningen?

The paper also addresses four sub-questions:

- How is mental well-being defined?
- How do the perceived quantity, quality and accessibility influence the frequency of green space visits of students in Groningen?
- How do the perceived quantity, quality, and accessibility of green spaces influence the subjective well-being of students in Groningen?
- How does the frequency of visits influence the subjective well-being of students in Groningen?

1.4 Reading guide

The topic and the research aim are introduced in the first chapter. The relevant theories are explained in the next chapter and the methodology is covered in chapter 3. The survey's findings are presented in chapter 4 and discussed in relation to relevant literature. The conclusion is given in chapter 5 which also discusses the limitations and recommendations for further research. Finally, a list of references and appendices can be found.

2. Theoretical framework

This chapter discusses the concepts that are relevant to this study and presents a conceptual model that shows the relation between the relevant concepts. In addition, the first sub-question is answered.

2.1 Subjective mental well-being

The term subjective mental well-being relates to the emotional, psychological, and social well-being of an individual (Keyes, 2006). It includes the ability to maintain a sense of autonomy, self-acceptance, personal growth, self-esteem and an overall purpose in life. Positive affect, relaxation, functioning interpersonal relationships, life satisfaction, and general happiness are all aspects of subjective mental well-being (Houlden et al., 2018). It is made up of two major components: hedonia and eudaimonia. Hedonia refers to the pleasure and enjoyment that an individual can derive from activities. Eudaimonia on the other hand refers to having a sense of purpose and meaning in life (Keyes, 2006). It can be impacted by several factors including personality, genetics, environment, culture, relationships, and life events (Das, K. V. et al., 2020). The term “mental well-being” is often used interchangeably with “mental health”, however, it is crucial to differentiate between these two terms. While mental health encompasses an individual's overall psychological well-being, including the ability to cope with challenges such as anxiety, stress and depression, mental well-being specifically focuses on the positive aspects of mental health (WHO, 2022). In order to capture respondents' subjective mental well-being the study will utilise the General Health Questionnaire-12 (GHQ-12). The GHQ-12 is a well-established and widely used measure of mental health that evaluates individuals' overall psychological well-being and detects non-psychotic psychiatric problems (Hu et al., 2007). Several studies have adopted this measure when examining the association between green space and mental well-being (Zhang et al., 2020, Gascon et al., 2015).

2.2 Urban green spaces

Urban green spaces (UGS) can be defined as areas in the urban fabric that are either partially or entirely covered by a significant amount of vegetation including grass, trees, shrubs, flowers and other types of greenery (Atiqul Haq et al., 2021). Green spaces in urban settings contribute to improving urban environments by offering a range of spaces for leisure and exercise (Chen et al., 2021). Furthermore, these spaces play a crucial role in improving ecosystem functions such as the purification of air, reduction of extreme temperatures and the reduction of noise pollution (Atiqul Haq et al., 2021). Within the context of this study, a distinction has been made between two primary types of publicly accessible urban green spaces found in Binnenstad and Oranjebuurt, these are parks and green streets. The terms “urban green spaces” (UGS) and “green spaces” are used interchangeably throughout the study to refer to these distinct types of environments.

2.3 Perceived green space characteristics

2.3.1 Quantity

The term “quantity of green spaces” refers to the extent of greenery available within a specific area (Zhang et al., 2020). The perceived quantity has been shown to be positively associated with increased green space visits and mental well-being (Reid et al., 2021., Zhang et al., 2020). Various studies have employed different approaches to assess the amount of green space. Some studies have measured the amount of green space objectively by the ratio of green space (Houlden et al., 2017, Gupta et al., 2012). Objective green space measures often involve the use of geographic information systems and land cover data such as a normalised vegetation difference index - NDVI and satellite imagery (Shuvo et al., 2020). Others have used perceived quantity to capture the quantity of green space in a subjective manner (Reid et al., 2021, Yessoufou et al., 2020). Both objective and subjective measures have their own advantages and disadvantages. Objective measures are more accurate and reliable as these depict the actual amount of green space in a study area. However, objective measures are often more expensive and time-consuming to collect. Obtaining data through subjective measures, on the other hand, is easier and less time-consuming (Voukelatou et al., 2020). Subjective measures also allow for a deeper understanding of how individuals evaluate the amount of green space in their neighbourhoods. These perceptions can differ based on personal preferences and socio-demographic factors (Zhang et al., 2021, Wright Wendel et al., 2012). Moreover, research has found that subjective measures are stronger predictors of green space visits than objectively measured quantity (Bloemsma et al., 2018, Flowers et al., 2016). The present study will adopt the practice of utilising perceived quantity as it is less time-consuming and the focus of the study is on investigating perceived characteristics of green spaces.

2.3.2 Quality

Green space quality is a common way to assess an individual's subjective experience of green spaces (Zhang et al., 2020). Perceived green space quality has been shown to be a significant predictor of mental well-being, higher green space quality is associated with increased mental well-being (Fongar et al., 2019, Zhang et al., 2020). Moreover, it has been shown that perceived quality is a significant predictor of the frequency of green space visits (Flowers et al., 2016, Zhang et al., 2020). The quality of green spaces has been used as a measure in several studies investigating the impact of green space characteristics on mental well-being (Reid et al., 2021., Akpınar, A., 2016). When investigating a respondent's perception of a specific green space, various questions can be asked to assess its quality, depending on the study's nature. The quality of green spaces such as the presence of amenities and the level of maintenance have been identified as significant factors influencing the frequency of visits to green spaces (Žlender & Thompson, 2017). A study by Reid et al. (2021) included questions

regarding the presence of litter and the overall appearance and found that higher perceived green space quality is associated with increased mental well-being. Moreover, studies such as Rey Gozalo et al. (2019) have demonstrated that factors such as the absence of noise pollution and air quality can impact individuals' enjoyment of green areas.

2.3.3 Accessibility

Accessibility of green spaces refers to the relative ability of an individual to have contact with a green space (Poortinga et al., 2021). In addition to physical health benefits, increased accessibility to green spaces has been associated with several mental health benefits, including reduced stress and depression (Slater et al., 2020, Zhang et al., 2020, Houlden et al., 2017). Increased time spent in green spaces has been shown to be associated with increased mental well-being (van den Berg et al., 2016, Laforteza et al., 2009, Callaghan et al., 2021). Research by Žlender & Thompson (2017) has identified perceived travel distance as a significant factor influencing the frequency of visits to green spaces with individuals being six times more likely to visit green spaces located within a 10-minute walking distance from individuals homes. Moreover, residents living in neighbourhoods with a greater abundance of green spaces tend to report higher frequencies of green space visits and less mental distress compared to those residents living in areas with fewer amounts of green space (Neuvonen et al., 2007). Socio-demographic factors have also been shown to have an impact on green space exposure (Zhang et al., 2020, Aamodt et al., 2021, Vanaken & Danckaerts, 2018).

2.4 Conceptual framework

The conceptual framework illustrates how the used concepts relate to one another. It is expected that the perceived quantity, quality and accessibility of green spaces will show a relationship between the frequency of visits to green spaces and subjective mental well-being. Additionally, it is expected that the frequency of visits to green spaces will show a relationship with subjective mental well-being and that sociodemographic characteristics will impact perceived green space characteristics.

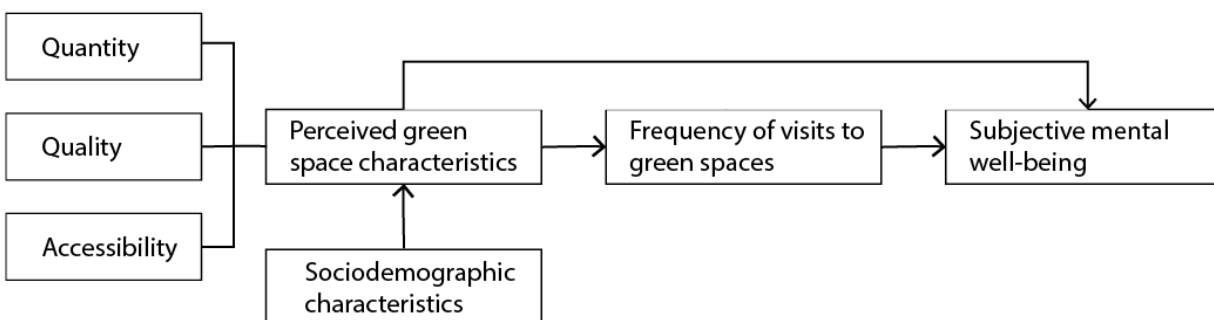


Figure 1: Conceptual framework

3. Methodology

This research is a two-case study in the neighbourhoods of Binnenstad and Oranjebuurt in the city of Groningen. This research uses a mixed methods approach to answer the aforementioned research questions. A qualitative literature review was conducted to describe the different measures of capturing perceived green space characteristics and subjective mental well-being while the other data collection method is a survey. The neighbourhoods of Binnenstad and Oranjebuurt in the city of Groningen have been chosen for the present study. By exploring on a two-case study basis how the quantity, quality, and accessibility of green spaces influence the frequency of visits and subjective well-being amongst two neighbourhoods in Groningen, the impact of perceived green space characteristics on the use of green spaces and mental well-being can be analysed.

3.1 Case study

Two adjacent neighbourhoods were chosen for the two-case study which are located in the central part of the city of Groningen - Binnenstad and Oranjebuurt. Binnenstad is a neighbourhood making up the city centre of Groningen. In this neighbourhood, the presented urban green spaces in the form of green streets and parks can be found. The neighbourhood of Oranjebuurt is a neighbourhood located next to one of the main city parks - Noorderplantsoen (CBS, 2022). Oranjebuurt also contains green space in the form of green streets and parks.

3.2 Data collection

3.2.1 Literature review

A literature review was conducted in order to answer the first sub-question (see chapter 2). In search of relevant academic literature, the following databases were used: Scopus, SmartCat and Google Scholar. Different keywords were used to find applicable literature: green spaces, mental health, and mental well-being.

3.2.2 Survey

To address the second, third and fourth research questions empirical research was conducted through a survey. The target population consisted of students residing in the neighbourhoods of Binnenstad and Oranjebuurt. In order to generalise findings to students residing in the two neighbourhoods the survey is quantitative in nature. The survey was designed to capture respondents' socio-demographic characteristics, perceived green space characteristics, frequency of green space visits and subjective mental well-being. The first questions about socio-demographics included variables such as age, gender, employment situation, living condition and the composition of their household. Afterwards,

respondents were asked to evaluate green spaces in their neighbourhoods which included questions about the amount, quality and accessibility of green spaces. Responses were measured using a 5-point Likert scale ranging from “*strongly disagree*” to “*strongly agree*”. Respondents were also asked to indicate their frequency of visits to green spaces using a 7-point Likert scale ranging from “*not at all*” to “*every day*”. The duration of the visits was measured on a 6-point Likert scale ranging from “*1-10 minutes*” to “*more than one hour*”. To capture subjective mental well-being the GHQ-12 was adopted which aims to capture psychological distress. It consists of 6 positively and 6 negatively worded questions. These are measured using a 4-point Likert scale ranging from “*not at all*” to “*much more than usual*”.

Survey participants were recruited through a combination of snowball sampling, convenience and random sampling techniques. Participants were recruited through social networks employing a convenience and snowball sampling method. This approach is particularly useful when the target population is located in a specific neighbourhood or community. To make the sample more diverse flyers were distributed in the two neighbourhoods employing random sampling. This approach allows for a more diverse sample. A complete overview of the survey can be found in appendix 1.

3.3 Data analysis

In order to answer the second sub-question the questions regarding perceived green space characteristics measured on a 5-point Likert scale are used. These responses were treated as ordinal data as the values have a clear rank order and do not have an equal distribution between them. In addition, the frequency of visits is also treated as an ordinal variable. In order to predict the behaviour of an ordinal dependent variable, ordinal regression as a statistical analysis method is adopted. By using ordinal regression it can be determined how the quantity, quality and accessibility of green spaces influence the frequency of visits to these spaces whilst controlling for the neighbourhood variable.

To answer the third sub-question the questions regarding perceived green space characteristics measured on a 5-point Likert scale and subjective mental well-being measured on a 4-point Likert scale are used. To predict the behaviour of an ordinal dependent variable (subjective mental well-being) ordinal regression as a statistical analysis method is adopted.

To answer the fourth sub-question the questions regarding the frequency of visits are used and measured on a 5-point Likert scale in addition to questions regarding subjective mental well-being measured on a 4-point Likert scale. To predict the behaviour of an ordinal dependent variable ordinal regression as a statistical analysis method is adopted.

3.4 Ethical considerations

In order to avoid potential harm or deception survey participants were first informed about the aim of the study prior to filling out the survey. The participants were informed that the survey is anonymous and that all recorded responses would only be used for the purpose of the study. Both the survey and the flyer had the author's contact information in case of any questions regarding the survey or the study.

4 Results & Discussion

This chapter shows the results of the survey and answers the second, third and fourth sub-question. After the discussion of the results, the present findings are discussed with relevant academic literature.

4.1 About the dataset

A total of 71 responses were recorded in Qualtrics out of which 7 were not filled out completely and thus removed from the dataset. This leaves the survey with 64 valid cases out of which 33 were respondents residing in Binnenstad and 31 were residing in Oranjebuurt.

4.2 Perceived green space characteristics

This section will give an answer to the second sub-question: *“How do the perceived quantity, quality and accessibility influence the frequency of green space visits of students in Groningen?”*

The relevant variables of interest were first put into cross tables to see the potential relationship between perceived green space characteristics and the frequency of green space visits. One of the tables was chosen to show the relationship between one of the green space characteristics and the frequency of visits (A full list of cross-tabulations can be found in appendix 3). Table 1 shows the relationship between Q7 (There is a lot of green space in the form of parks) and Q21 (How often do you visit a park?). The figure reveals that most respondents who strongly agree with the statement of Q7 visit a park 2-3 times a week (13 respondents). However, most respondents that indicated disagree only visit a park once a week (12 respondents). Moreover, 7 of the respondents strongly disagree with visiting a park once a week and 6 respondents indicated that they visit a park only 1-2 times a month showing a potential relationship between perceived quantity and frequency of visits to green spaces.

There is a lot of green space in the form of parks * How often do you visit a park? Crosstabulation

Count

		How often do you visit a park?						Total
		Rarely	Once a month	1-2 times a month	Once a week	2-3 times a week	Every day	
There is a lot of green space in the form of parks	Strongly disagree	0	1	6	7	0	0	14
	Disagree	1	2	1	12	1	0	17
	Neither agree nor disagree	0	0	0	1	0	0	1
	Agree	0	0	2	2	5	1	10
	Strongly agree	0	0	1	4	13	4	22
Total		1	3	10	26	19	5	64

Table 1: Relationship between perceived quantity of parks and frequency of visit

To gain a single variable that represents a combination of information from multiple variables a composite score was calculated for the questions that fall under the categories of quantity, quality, accessibility and the frequency of green space visits (see appendix 1). Equal weights were assigned to each of the variables. To examine the potential relationship between the variables ordinal regression is used to indicate whether there is a relationship between the ordinal dependent variable (frequency of green space visits) and the ordinal independent variables (quantity, quality and accessibility). **The null hypothesis** for this test is as follows: There is no relationship between perceived quantity, quality and accessibility of green spaces and the frequency of green space visits in the neighbourhoods of Binnenstad and Oranjebuurt.

Location	Quantity	.221	.433	.260	1	.610	-.628	1.071
	Quality	.596	.501	1.412	1	.235	-.387	1.579
	Accessibility	.623	.475	1.718	1	.190	-.309	1.555
	[Q3=1]	-1.082	.977	1.226	1	.268	-2.996	.833
	[Q3=2]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 2: Ordinal regression outcomes for frequency of green space visits

The Cox and Snell R-Square value of 0.386 indicates that approximately 39% of the variation in the dependent variable is accounted for by the independent variables in the regression model. Table 2 shows the results of the ordinal regression. It can be seen that neither of the independent variables is significant. Quantity ($p=0.610 > p=0.05$), quality ($p=0.235 > p=0.05$) and accessibility ($p=0.190 > p=0.05$). Moreover, there is not a significant difference between the two neighbourhoods (Q3=1=Binnenstad; Q3=2=Oranjebuurt). Therefore it is assumed that **the null hypothesis cannot be rejected** and that there is no relationship between perceived quantity, quality and accessibility of green spaces and the frequency of green space visits in the neighbourhoods of Oranjebuurt and Binnenstad.

These results are not in line with relevant academic literature establishing a significant relationship between green space characteristics and frequency of visits (Žlender & Thompson, 2017., Reid et al., 2021., Zhang et al., 2020, Flowers et al., 2016). The present findings that accepted the null hypothesis of no relationship between perceived quantity, quality and accessibility of green spaces and the frequency of green space visits in the neighbourhoods of Oranjebuurt and Binnenstad may be explained by the relatively small sample size. Responses for each of the Likert scale values are below 30 making it harder to establish a significant relationship. Moreover, personal preferences when it comes to green space visits might play a larger role than perceived characteristics.

4.3 Perceived green space characteristics and subjective well-being

This section aims to answer the third sub-question: *“How do the perceived quantity, quality, and accessibility of green spaces influence the subjective well-being of students in Groningen?”*

One table was chosen (table 3) to investigate the relationship between Q3 and Q8, the neighbourhood of origin and the perceived quantity of parks. It can be seen that the majority of respondents in Binnenstad strongly disagree that there are a lot of parks indicating a difference in the perceived quantity between the two neighbourhoods, a full list of cross-tabulations can be found in appendix 3. The majority of Binnenstad residents reported higher levels of litter, air and noise pollution on green streets, and higher air and noise pollution in parks. However, residents of Binnenstad reported lower levels of litter in parks than in Oranjebuurt.

In which neighborhood do you live? * There is a lot of green space in the form of parks
Crosstabulation

Count

		There is a lot of green space in the form of parks					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	14	16	1	1	1	33
	Oranjebuurt	0	1	0	9	21	31
Total		14	17	1	10	22	64

Table 3: The relationship between the neighbourhood of origin and the perceived quantity of parks

The Mann-Whitney U test was used (appendix 2) to see if there are differences between the two independent groups when the dependent variable is ordinal and not normally distributed (appendix 2). The test was significant meaning that we can assume there is a difference in subjective mental well-being between the two neighbourhoods with Oranjebuurt having a higher mean rank indicating higher overall well-being.

The composite scores for perceived green space characteristics and mental well-being were used to answer the sub-question. When calculating the composite score for mental well-being the negatively worded questions were recoded so that a higher score for well-being would indicate higher mental

well-being. The **null hypothesis** for the ordinal regression test is as follows: There is no relationship between perceived quantity, quality and accessibility of green spaces and subjective mental well-being in the neighbourhoods of Binnenstad and Oranjebuurt. Table 4 shows the results of the ordinal regression. The Cox and Snell R-Square value of 0.668 indicates that approximately 68% of the variation in the dependent variable is accounted for by the independent variables in the regression model. The variable quantity has a significant p-value ($p=0.015<0.05$) meaning that **we can reject the null hypothesis** and assume that there is a relationship between the perceived quantity of green spaces and subjective mental well-being. One unit increase in green space quantity is associated with a 1.109 increase in the log odds of increased subjective mental well-being. The variable quality also has a significant value ($p=0.006<0.05$) meaning that a one-unit increase in green space quality is associated with a 1.419 increase in the log odds of increased subjective mental well-being. Accessibility, however, was not significant ($p=0.115>0.05$) meaning that we can assume that there is no relationship between perceived accessibility and subjective mental well-being. Moreover, the factor variable (neighbourhood) was not significant meaning that there is no evidence to suggest that the impact of perceived quantity, quality and accessibility on subjective well-being differs significantly for individuals residing in Binnenstad and Oranjebuurt.

Location	Quantity	1.109	.454	5.975	1	.015	.220	1.999
	Quality	1.419	.518	7.516	1	.006	.404	2.433
	Accessibility	.771	.489	2.482	1	.115	-.188	1.730
	[Q3=1]	-.267	.974	.075	1	.784	-2.176	1.642
	[Q3=2]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 4: Ordinal regression outcome for perceived green space characteristics and subjective mental well-being

Another ordinal regression was conducted this time (Cox and Snell R square= 0.684) accounting for sociodemographic variables: Q2 (What is your gender?), Q4 (What is your current employment situation?), Q5 (What is your current living condition?), Q6 (What is the composition of your household?). Q1 (What is your age) was not included as all respondents N=64 were in the age group 18-24. None of the variables were significant meaning that there is no evidence to suggest that these variables have a direct impact on the subjective mental well-being in the context of the two neighbourhoods (appendix 2).

Based on the results it can be assumed that the perceived quantity and quality of green spaces in the neighbourhoods of Binnenstad and Oranjebuurt have a positive significant relationship with subjective mental well-being. This is partly in line with findings in the literature that state that improved quantity, quality and accessibility of green spaces are associated with increased mental well-being (Reid et al.,

2021., Zhang et al., 2020, Fongar et al., 2019), however, this is not true for accessibility as it has a non-significant value (0.115).

4.4 Frequency of visits and subjective well-being

This section will give an answer to the fourth sub-question: *“How does the frequency of visits influence the subjective well-being of students in Groningen?”*

Examining one of the GHQ-12 questions table 5 shows the relationships between Q21 (How often do you visit a park) and Q29 (Have you recently felt that difficulties were piling up so that you could not overcome them?) indicating a potential relationship between the frequency of visits and subjective well-being. A full list of cross-tabulations can be found in appendix 3. The majority of respondents who indicated *“not at all”* visit a park 2-3 times a week (11 respondents). 3 respondents indicated that they visit a park every day, two respondents visit a park once a week and two respondents visit a park 1-2 times a month. Moreover, the majority of respondents (7 respondents) who visit a park 1-2 times a month indicated *“much more than usual”*.

**Have you recently felt that difficulties were piling up so that you could not overcome them? * How often do you visit a park?
Crosstabulation**

Count

		How often do you visit a park?						Total
		Rarely	Once a month	1-2 times a month	Once a week	2-3 times a week	Every day	
Have you recently felt that difficulties were piling up so that you could not overcome them?	Not at all	0	0	2	2	11	3	18
	No more than usual	0	0	0	5	7	2	14
	Rather more than usual	0	1	1	10	1	0	13
	Much more than usual	1	2	7	9	0	0	19
Total		1	3	10	26	19	5	64

Table 5: Relationship between reported difficulties and frequency of visits to parks

When investigating the frequency of green space visits among respondents of the neighbourhoods of Binnenstad Oranjebuurt table 6 suggests that there may be differences in the frequency of green space visits between the two neighbourhoods. Investigating table 6 which shows the relationship between Q3 (In which neighbourhood do you live) and Q20 (How often do you visit green streets) 8 respondents from Oranjebuurt reported visiting green streets every day whereas there were only 3 respondents from Binnenstad who reported daily visit to green streets. 19 respondents from Oranjebuurt reported visiting green streets 2-3 times a week while there were 10 respondents from Binnenstad reporting the same frequency of visits.

In which neighborhood do you live? * How often do you visit green streets? Crosstabulation

Count

		How often do you visit green streets?					Total
		Rarely	1-2 times a month	Once a week	2-3 times a week	Every day	
In which neighborhood do you live?	Binnenstad	1	4	15	10	3	33
	Oranjebuurt	0	0	4	19	8	31
Total		1	4	19	29	11	64

Table 6: Relationship between the neighbourhood of origin and frequency of visit to green streets

Looking at Table 7 which shows the relationship between Q3 (In which neighbourhood do you live) and Q21 (How often do you visit a park), the majority of respondents from Binnenstad visit a park once a week (20 respondents) whereas the majority of respondents from Oranjebuurt (18 respondents) visit a park 2-3 times a week. Not a single respondent from Binnenstad reported visiting a park every day whereas 5 respondents from Oranjebuurt reported a daily visit to a park. Furthermore, there were no respondents reporting visiting a park rarely or once a month in Oranjebuurt whereas 1 respondent from Binnenstad reported visiting a park rarely and 3 reported a visit once a month. This suggests that there may be differences in the frequency of green space visits between the two neighbourhoods.

In which neighborhood do you live? * How often do you visit a park? Crosstabulation

Count

		How often do you visit a park?					Total	
		Rarely	Once a month	1-2 times a month	Once a week	2-3 times a week		Every day
In which neighborhood do you live?	Binnenstad	1	3	8	20	1	0	33
	Oranjebuurt	0	0	2	6	18	5	31
Total		1	3	10	26	19	5	64

Table 7: Relationship between neighbourhood of origin and frequency of visit to parks

In order to establish whether the frequency of visits has a significant relationship with subjective mental well-being ordinal regression was conducted. The **null hypothesis** for this test is as follows: there is no significant relationship between the frequency of visits to green spaces and subjective well-being in the neighbourhoods of Binnenstad and Oranjebuurt. The results of the ordinal regression (table 8) suggest that the frequency of green space visits is a significant predictor of subjective well-being in the neighbourhoods of Binnenstad and Oranjebuurt. The Cox and Snell R-Square value of 0.645 indicates that approximately 65% of the variation in the dependent variable is accounted for

by the independent variable in the regression model. The variable frequency has a significant p-value ($p=0.000002<0.05$) meaning that **we can reject the null hypothesis** and assume, that there is a significant relationship between the frequency of visits to green spaces and subjective mental well-being in the neighbourhoods of Binnenstad and Oranjebuurt.

Location	Frequency	2.191	.464	22.289	1	.000	1.281	3.100
	[Q3=1]	-2.577	.638	16.314	1	.000	-3.828	-1.327
	[Q3=2]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 8: Ordinal regression outcome for frequency of green space visits and subjective mental well-being

One unit increase in the frequency of green space visits is associated with a 2.191 increase in the log odds of increased subjective mental well-being. This suggests that individuals who visit green spaces more often are more likely to report higher levels of subjective mental well-being. Moreover, the neighbourhood variable is significant with an estimated value of -2.577 meaning that individuals living in Binnenstad report lower overall levels of subjective mental well-being than individuals living in Oranjebuurt (Q3=1=Binnenstad, Q3=2=Oranjebuurt).

To investigate the differences in the frequency of green space visits between Binnenstad and Oranjebuurt a separate ordinal regression model was used employing the frequency of green space visits as the dependent variable. Socio-demographics were included to account for their potential influence on the frequency of green space visits between the two neighbourhoods (Appendix 2). The neighbourhood variable (Q3=1=Binnenstad) had a significant value and the estimated value was -2.571 suggesting that individuals living in Binnenstad report a lower frequency of green space visits compared to individuals living in Oranjebuurt. None of the sociodemographic variables had a significant value meaning that there is no evidence to suggest that these variables have a direct impact on the frequency of green space visits in the context of the two neighbourhoods.

Based on the results it can be assumed that the frequency of green space visits in the neighbourhoods of Binnenstad and Oranjebuurt have a positive significant relationship with subjective mental well-being. This is in line with other literature stating that increased time spent in green spaces is associated with increased mental well-being (van den Berg et al., 2016, Laforzezza et al., 2009, Callaghan, A. et al., 2021). Moreover, it was found that individuals living in Binnenstad are associated with a lower frequency of green space visits than individuals living in Oranjebuurt whilst controlling for sociodemographic variables none of which showed a significant impact. This is not in line with other literature indicating that green space exposure is influenced by sociodemographic factors (Zhang et al., 2020, Aamodt et al., 2021, Vanaken & Danckaerts, 2018). The findings suggest a potential association between the lower frequency of visits and lower subjective mental well-being among

Binnenstad residents, however, other factors might influence the overall lower levels of subjective mental well-being. Drawing from the conclusions of chapters 4.2 4.3 and 4.4 a reworked version of the conceptual framework is presented.

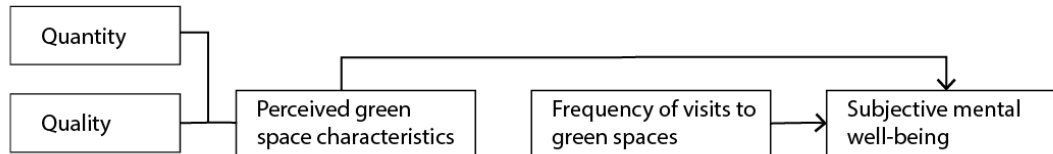


Figure 2: A reworked conceptual framework

5. Conclusion

This study aimed to identify how perceived characteristics of green spaces influence the frequency of visits to green spaces and affect subjective mental well-being among students in the neighbourhoods of Binnenstad and Oranjebuurt in the city of Groningen.

To answer the first part of the main research question *“How do perceived characteristics of green spaces influence the frequency of visits to green spaces among students in the neighbourhoods of Binnenstad and Oranjebuurt?”* respondents evaluated green spaces in their neighbourhoods and indicated their frequency and duration of visits to green spaces. Results showed that there is no significant relationship between the perceived quantity, quality and accessibility of green spaces and the frequency of visits to green spaces among students in the neighbourhoods of Oranjebuurt and Binnenstad. This suggests that personal preferences might play a larger role than perceived characteristics when it comes to the frequency of visits to green spaces.

To answer the second part of the research question *“How do perceived characteristics of green spaces influence subjective well-being among students in the neighbourhoods of Binnenstad and Oranjebuurt?”* respondents evaluated green spaces in their neighbourhoods and their mental well-being. The majority of respondents in Binnenstad reported higher levels of litter, air and noise pollution on green streets, higher air and noise pollution in parks and lower levels of green space. It was found that the perceived quantity and quality of green spaces had a significant relationship with subjective mental-well being among students in both neighbourhoods. Students who perceive higher quantity and quality of green spaces report higher subjective mental well-being. However, there was no evidence to suggest that the influence of quantity and quality of green spaces on subjective well-being differs significantly for individuals residing in Binnenstad and Oranjebuurt. Moreover, it was found that there is a significant relationship between the frequency of visits to green spaces and subjective mental well-being among students in both neighbourhoods. Students who visit green spaces more frequently reported higher levels of subjective mental well-being. Students living in

Binnenstad reported lower levels of subjective mental well-being and a lower frequency of visits than residents in Oranjebuurt. These findings suggest a potential association between the lower frequency of visits and lower subjective mental well-being among Binnenstad residents.

5.1 Recommendations for planning practice

Efforts should be made to promote the provision, quality and use of urban green spaces among residents considering the observed relationship with increased subjective mental well-being. Particular attention should be directed towards the neighbourhood of Binnenstad as students reported higher levels of litter, air and noise pollution on green streets and higher air and noise pollution in parks than students in Oranjebuurt. Moreover, future policies should be aimed at improving the quantity of green space in Binnenstad as students reported fewer amounts of green space both in the form of parks and green streets than students in Oranjebuurt.

5.2 Limitations & Further Research

5.2.1 Data collection

To gather participants who are students living in the neighbourhoods of Binnenstad and Oranjebuurt social networks and social media were used to spread the survey. In addition, flyers were handed out on the street in both of the neighbourhoods. The sample could be more representative if flyers were distributed throughout several locations around the city and not only in the neighbourhoods of Binnenstad and Oranjebuurt. In total 71 responses were recorded in Qualtrics out of which 7 were not filled out completely and thus removed from the dataset resulting in 64 valid cases. The reduced sample size may affect the reliability of the results obtained from ordinal regression analysis. Future studies investigating ordinal dependent variables should aim to increase the sample size for achieving more accurate findings.

5.2.2 Data analysis

The data analysis process relied on self-reported measures which are subject to response biases and potential inaccuracies. While the study provides valuable insights into the relationships observed there may be other factors that were not accounted for such as socio-economic status or individual preferences that might affect the relationship between perceived green space characteristics, frequency of visits to green spaces and subjective mental well-being. Future research should consider incorporating these factors to provide a more comprehensive understanding of the relationships at play. Additionally, employing longitudinal designs can help to establish causal relationships and determine the underlying mechanisms driving these relationships.

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Appendices

Appendix 1: Complete survey

1.1 Sampling procedure

In addition to spreading the survey through social networks participants were recruited by approaching students on the street and asking them to help with filling the questionnaire.

Date	Time	Flyers handed	Location
20/04/20 23	13:00-14:00	25	Kerklaan 75, 9717HB
20/04/20 23	15:00-16:00	30	Akerkhof 2, 9711JB
23/04/20 23	13:00-14:00	24	Akerkhof 2, 9711JB
23/04/20 23	16:00-17:00	19	Kerklaan 75, 9717HB

Table a: Overview of sampling on the street



Link: https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_9YqneWkMeHCHQ5o



*All responses will be kept confidential and will only be used for the purposes of this study.

Figure a: Survey flyer

1.2 Complete survey

Q#	Question	Measurement level	Answer options	Question aim
Socio-demographic characteristics				
Q1	What is your age?	Ordinal	18-24 25-44	Enables the opportunity to separate between different age groups in data analysis
Q2	What is your gender?	Nominal	Female Male Other	Enables the opportunity to separate between different genders in data analysis
Q3	In which of the two districts do you live?		Binnenstad Oranjestad	Enables comparing the two neighbourhoods
Q4	What is your current employment situation?		No job Part-time Other	Enables understanding of the respondent's amount of available time
Q5	What is your current living condition?		Owner Renter	Provides general information about the sample
Q6	What is the composition of your household?		Single Single parent Couple without children Couple with children Other	Provides general information about the sample
Self-reported measures of green space characteristics				
Q7	There is a lot of green space in the form of parks in my	Ordinal	(1) Strongly disagree; (2) Disagree; (3)	Provides information regarding

	neighbourhood		Neither agree nor disagree; (4) Agree; (5) Strongly agree	the amount of green space		
Q8	There are a lot of trees on streets in my neighbourhood					
Q9	There is a lot of on-street greenery (flower beds & pots) in my neighbourhood					
Q10	Green streets are easily accessible on foot from home				Provides information regarding access to green space	
Q11	Parks are easily accessible on foot from home					
Q12	Green streets are easily accessible by bike from home					
Q13	Parks are easily accessible by bike from home					
Q14	There is no litter in parks					Provides information regarding the quality of green space
Q15	There is no litter on green streets					
Q16	There is no air pollution in parks					
Q17	There is no air pollution on green streets					
Q18	There is no noise pollution in parks					
Q19	There is no noise pollution on green streets					
Q20	How often do you visit green streets?	Ordinal			Rarely, not at all, once a month, 1-2	Provides information

Q21	How often do you visit a park?		times a month, once a week, 2-3 a week, every day	regarding frequency of visits
Q22	How long is your visit usually at a park?		1-10 20-30 30-40 40 to one hour, more than an hour	
Q23	How long is your visit usually on green streets?			
Subjective Mental well-being				
Q24	Have you recently been able to concentrate on whatever you're doing?	Ordinal	Not at all, No more than usual, Rather more than usual, Much more than usual	The 12-item General Health Questionnaire has been adopted to capture the mental well-being of students (Nguyen et al., 2021)
Q25	Have you recently lost much sleep over worry?			
Q26	Have you recently felt that you're playing a useful part in things?			
Q27	Have you recently felt capable of making decisions?			
Q28	Have you recently felt constantly under strain?			
Q29	Have you recently felt that difficulties were piling up so that you could not overcome them?			
Q30	Have you recently been able to enjoy			

	your normal day-to-day activities?			
Q31	Have you recently been able to face up to your problems?			
Q32	Have you recently been feeling unhappy and depressed?			
Q33	Have you recently been losing confidence in yourself?			
Q34	Have you recently been thinking of yourself as a worthless person?			
Q35	Have you recently been feeling reasonably happy, all things considered?			

Table b: Complete survey

Appendix 2: SPSS

Location	Quantity	1.241	.495	6.276	1	.012	.270	2.212
	Quality	1.494	.530	7.935	1	.005	.455	2.534
	Accessibility	.766	.511	2.246	1	.134	-.236	1.768
	[Q2=1]	-.742	.454	2.675	1	.102	-1.631	.147
	[Q2=2]	0 ^a	.	.	0	.	.	.
	[Q3=1]	-.119	1.009	.014	1	.906	-2.097	1.859
	[Q3=2]	0 ^a	.	.	0	.	.	.
	[Q5=2]	0 ^a	.	.	0	.	.	.
	[Q4=1]	-.133	.540	.061	1	.805	-1.192	.925
	[Q4=2]	0 ^a	.	.	0	.	.	.
	[Q6=1]	.390	.760	.263	1	.608	-1.100	1.880
	[Q6=3]	.129	.971	.018	1	.895	-1.774	2.032
	[Q6=5]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table c: Ordinal regression third sub-question

Location	Q2	.279	.446	.391	1	.532	-.595	1.153
	Q4	.032	.489	.004	1	.948	-.926	.990
	Q5	0 ^a	.	.	0	.	.	.
	Q6	-.122	.174	.488	1	.485	-.464	.220
	[Q3=1]	-2.571	.542	22.462	1	.000	-3.634	-1.508
	[Q3=2]	0 ^a	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table d: Ordinal regression fourth sub-question

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Quantity	.199	64	.000	.857	64	.000
Quality	.128	64	.011	.965	64	.067
Accessibility	.162	64	.000	.894	64	.000
Frequency	.116	64	.033	.972	64	.159
WellBeing	.169	64	.000	.909	64	.000

a. Lilliefors Significance Correction

Table e: Tests of normality

Mann-Whitney Test

		Ranks		
In which neighborhood do you live?		N	Mean Rank	Sum of Ranks
WellBeing	Binnenstad	33	19.92	657.50
	Oranjebuurt	31	45.89	1422.50
	Total	64		

Test Statistics^a

	WellBeing
Mann-Whitney U	96.500
Wilcoxon W	657.500
Z	-5.586
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: In which neighborhood do you live?

Table f: Mann-Whitney U test

Appendix 3: SPSS - cross-tabulations

**In which neighborhood do you live? * There is a lot of green space in the form of parks
Crosstabulation**

Count

		There is a lot of green space in the form of parks					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	14	16	1	1	1	33
	Oranjebuurt	0	1	0	9	21	31
Total		14	17	1	10	22	64

In which neighborhood do you live? * There are a lot of trees on streets Crosstabulation

Count

		There are a lot of trees on streets				Total
		Strongly disagree	Disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	13	19	1	0	33
	Oranjebuurt	1	1	12	17	31
Total		14	20	13	17	64

**In which neighborhood do you live? * There is a lot of on-street greenery (flower beds & pots)
Crosstabulation**

Count

		There is a lot of on-street greenery (flower beds & pots)					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	7	15	9	2	0	33
	Oranjebuurt	0	2	0	12	17	31
Total		7	17	9	14	17	64

In which neighborhood do you live? * There is no litter in parks Crosstabulation

Count

		There is no litter in parks				Total
		Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	2	5	25	1	33
	Oranjebuurt	4	5	22	0	31
Total		6	10	47	1	64

**In which neighborhood do you live? * There is no litter on green streets
Crosstabulation**

Count

		There is no litter on green streets			Total
		Disagree	Neither agree nor disagree	Agree	
In which neighborhood do you live?	Binnenstad	7	6	20	33
	Oranjebuurt	1	7	23	31
Total		8	13	43	64

In which neighborhood do you live? * There is no air pollution in parks Crosstabulation

Count

		There is no air pollution in parks			Total	
		Disagree	Neither agree nor disagree	Agree		Strongly agree
In which neighborhood do you live?	Binnenstad	1	4	28	0	33
	Oranjebuurt	2	1	21	7	31
Total		3	5	49	7	64

**In which neighborhood do you live? * There is no air pollution on green streets
Crosstabulation**

Count

		There is no air pollution on green streets			Total	
		Disagree	Neither agree nor disagree	Agree		Strongly agree
In which neighborhood do you live?	Binnenstad	4	11	18	0	33
	Oranjebuurt	1	4	20	6	31
Total		5	15	38	6	64

**In which neighborhood do you live? * There is no noise pollution in parks
Crosstabulation**

Count

		There is no noise pollution in parks			Total	
		Strongly disagree	Disagree	Neither agree nor disagree		Agree
In which neighborhood do you live?	Binnenstad	1	16	8	8	33
	Oranjebuurt	2	11	9	9	31
Total		3	27	17	17	64

In which neighborhood do you live? * There is no noise pollution on green streets Crosstabulation

Count

		There is no noise pollution on green streets					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	2	14	7	10	0	33
	Oranjebuurt	0	2	10	14	5	31
Total		2	16	17	24	5	64

In which neighborhood do you live? * How often do you visit green streets? Crosstabulation

Count

		How often do you visit green streets?					Total
		Rarely	1-2 times a month	Once a week	2-3 times a week	Every day	
In which neighborhood do you live?	Binnenstad	1	4	15	10	3	33
	Oranjebuurt	0	0	4	19	8	31
Total		1	4	19	29	11	64

In which neighborhood do you live? * How often do you visit a park? Crosstabulation

Count

		How often do you visit a park?						Total
		Rarely	Once a month	1-2 times a month	Once a week	2-3 times a week	Every day	
In which neighborhood do you live?	Binnenstad	1	3	8	20	1	0	33
	Oranjebuurt	0	0	2	6	18	5	31
Total		1	3	10	26	19	5	64

In which neighborhood do you live? * How long is your visit usually at a park? Crosstabulation

Count

		How long is your visit usually at a park?						Total
		1-10 minutes	20-30 minutes	30-40 minutes	40-60 minutes	One hour	More than one hour	
In which neighborhood do you live?	Binnenstad	6	17	2	5	1	2	33
	Oranjebuurt	4	11	2	7	4	3	31
Total		10	28	4	12	5	5	64

In which neighborhood do you live? * How long is your visit usually on green streets? Crosstabulation

Count

		How long is your visit usually on green streets?		
		1-10 minutes	20-30 minutes	Total
In which neighborhood do you live?	Binnenstad	25	8	33
	Oranjebuurt	14	17	31
Total		39	25	64

**In which neighborhood do you live? * Green streets are easily accessible on foot from home
Crosstabulation**

Count

		Green streets are easily accessible on foot from home					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	1	9	11	11	1	33
	Oranjebuurt	0	1	0	10	20	31
Total		1	10	11	21	21	64

**In which neighborhood do you live? * Parks are easily accessible on foot from home
Crosstabulation**

Count

		Parks are easily accessible on foot from home					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	1	9	15	7	1	33
	Oranjebuurt	0	1	0	9	21	31
Total		1	10	15	16	22	64

**In which neighborhood do you live? * Green streets are easily accessible by bicycle from home
Crosstabulation**

Count

		Green streets are easily accessible by bicycle from home					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	1	1	9	19	3	33
	Oranjebuurt	0	0	1	5	25	31
Total		1	1	10	24	28	64

**In which neighborhood do you live? * Parks are easily accessible by bicycle from home
Crosstabulation**

Count

		Parks are easily accessible by bicycle from home				Total
		Strongly disagree	Neither agree nor disagree	Agree	Strongly agree	
In which neighborhood do you live?	Binnenstad	1	7	23	2	33
	Oranjebuurt	0	1	4	26	31
Total		1	8	27	28	64

In which neighborhood do you live? * Have you recently been able to concentrate on whatever you're doing? Crosstabulation

Count

		Have you recently been able to concentrate on whatever you're doing?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	1	30	0	2	33
	Oranjebuurt	1	14	6	10	31
Total		2	44	6	12	64

In which neighborhood do you live? * Have you recently lost much sleep over worry? Crosstabulation

Count

		Have you recently lost much sleep over worry?			Total
		Not at all	No more than usual	Rather more than usual	
In which neighborhood do you live?	Binnenstad	16	12	5	33
	Oranjebuurt	24	6	1	31
Total		40	18	6	64

In which neighborhood do you live? * Have you recently felt that you're playing a useful part in things? Crosstabulation

Count

		Have you recently felt that you're playing a useful part in things?			Total
		No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	30	2	1	33
	Oranjebuurt	12	9	10	31
Total		42	11	11	64

In which neighborhood do you live? * Have you recently felt capable of making decisions? Crosstabulation

Count

		Have you recently felt capable of making decisions?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	1	31	1	0	33
	Oranjebuurt	2	7	10	12	31
Total		3	38	11	12	64

**In which neighborhood do you live? * Have you recently felt constantly under strain?
Crosstabulation**

Count

		Have you recently felt constantly under strain?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	1	2	21	9	33
	Oranjebuurt	14	14	2	1	31
Total		15	16	23	10	64

In which neighborhood do you live? * Have you recently felt that difficulties were piling up so that you could not overcome them? Crosstabulation

Count

		Have you recently felt that difficulties were piling up so that you could not overcome them?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	0	5	10	18	33
	Oranjebuurt	18	9	3	1	31
Total		18	14	13	19	64

In which neighborhood do you live? * Have you recently been able to enjoy your normal day-to-day activities? Crosstabulation

Count

		Have you recently been able to enjoy your normal day-to-day activities?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	2	29	0	2	33
	Oranjebuurt	0	10	13	8	31
Total		2	39	13	10	64

In which neighborhood do you live? * Have you recently been able to face up to your problems? Crosstabulation

Count

		Have you recently been able to face up to your problems?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	4	25	1	3	33
	Oranjebuurt	1	10	9	11	31
Total		5	35	10	14	64

In which neighborhood do you live? * Have you recently been feeling unhappy and depressed? Crosstabulation

Count

		Have you recently been feeling unhappy and depressed?			Total
		Not at all	No more than usual	Rather more than usual	
In which neighborhood do you live?	Binnenstad	13	12	8	33
	Oranjebuurt	28	1	2	31
Total		41	13	10	64

In which neighborhood do you live? * Have you recently been losing confidence in yourself? Crosstabulation

Count

		Have you recently been losing confidence in yourself?			Total
		Not at all	No more than usual	Rather more than usual	
In which neighborhood do you live?	Binnenstad	8	15	10	33
	Oranjebuurt	25	4	2	31
Total		33	19	12	64

In which neighborhood do you live? * Have you recently been thinking of yourself as a worthless person? Crosstabulation

Count

		Have you recently been thinking of yourself as a worthless person?			Total
		Not at all	No more than usual	Rather more than usual	
In which neighborhood do you live?	Binnenstad	23	9	1	33
	Oranjebuurt	29	2	0	31
Total		52	11	1	64

In which neighborhood do you live? * Have you recently been feeling reasonably happy, all things considered? Crosstabulation

Count

		Have you recently been feeling reasonably happy, all things considered?				Total
		Not at all	No more than usual	Rather more than usual	Much more than usual	
In which neighborhood do you live?	Binnenstad	4	26	1	2	33
	Oranjebuurt	0	6	10	15	31
Total		4	32	11	17	64