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DIPLOMA THESIS

ON THE ISSUE OF

Livable dimensions of public spaces:

A psychological analysis of health, well-being and social capital in urban squares

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ABSTRACT

(English)

Public spaces are the heart of a city and can influence city dwellers with health, well-being and social capital. Sustainable design factors, based on human needs, are important for success of urban squares and their perceived urban quality by humans. Therefore, this study investigated the relevance of five livable dimensions of public spaces: comfort, access, function, maintenance and sociability and their effects on people's perceived and evaluated livability. A nonprobability sample of 601 subjects, most of them with German background, participated in a randomized online survey that showed experimentally-manipulated images of three Central European urban squares. Participants rated their subjectively-perceived livability regarding those images in a self-constructed questionnaire, conceptualized as the total of three scales detecting met human needs for health, well-being and social capital. Furthermore, personality traits and socio-demographic information were collected for explorative reasons. The findings revealed that success of public spaces is strongly related to its physical design and the compliance of comfort, access, function and maintenance. Additionally, appearance and interaction with people in city plazas enhanced subjectively-perceived livability. Physical and social environment interacted and mutually influence their effects, too. Regarding the exploration of personal characteristics only age had a significant impact on the research results. Younger people (18 to 29 years old) rated the livability of public spaces significantly higher than older participants (30 to 65 years old). All other controlled factors (gender, relationship status, education level, job and income) did not show any correlations. All results were integrated in the Livability – Public Space - Model (LIV-PS Model) to gain a better understanding of user's environmental needs for a more healthy and pleased urban life.

ABSTRACT

(German)

Öffentliche Räume sind das Herz einer Stadt und versorgen Stadtbewohner und Stadtbewohnerinnen mit Gesundheit, Wohlbefinden sowie sozialen Ressourcen. Nachhaltige Gestaltungsfaktoren, basierend auf menschlichen Bedürfnissen, sind daher von hoher Bedeutung für den Erfolg von städtischen Plätzen und ihrer durch Menschen wahrgenommenen Lebensqualität. Aus diesem Grund untersucht diese Studie die Bedeutsamkeit von fünf lebenswerten Dimensionen öffentlicher Räume: Komfort, Zugang, Funktion, Aufrechterhaltung sowie Geselligkeit und ihren Effekt auf die von Menschen wahrgenommenen und bewerteten Lebenswert (= Livability, Maß der subjektiv-eingeschätztem Umweltqualität). Eine nicht-repräsentative Stichprobe von 601 Probanden, die meisten davon mit deutschen Hintergrund, nahm an einer randomisierten Online-Umfrage teil, die experimentell manipulierte Bilder von drei mitteleuropäischen städtischen Plätzen zeigte. Die Teilnehmenden schätzen ihren subjektiv wahrgenommen Lebenswert bezüglich der Bilder in einem selbstkonstruierten Fragebogen ein. Dieser war als Summe von drei Skalen konstruiert, die Befriedigung von menschlichen Bedürfnisse nach Gesundheit, Wohlbefinden und sozialem Kapital erfassten. Weiterhin wurden Persönlichkeitsmerkmale und soziodemografische Informationen aus explorativen Gründen gesammelt. Die Ergebnisse zeigten, dass Erfolg von öffentlichen Räumen stark mit ihrer physischen Gestaltung sowie der Erfüllung von Komfort, Zugang, Funktion und Aufrechterhaltung verbunden ist. Auch Anwesenheit und Interaktion mit Menschen auf Stadtplätzen verstärkte den subjektiv wahrgenommen Lebenswert. Physische und soziale Umwelt schienen weiterhin miteinander zu interagieren und verstärkten gegenseitig ihre Effekte. Bezüglich der Erkundung von persönlichen Merkmalen hatte nur das Alter der Teilnehmenden einen Einfluss auf die Untersuchungsergebnisse. Jüngere Personen (18- bis 29-Jährige) schätzen den Lebenswert von Plätzen signifikant höher ein, als ältere (30- bis 65-Jährige). Bei den übrigen kontrollierten Faktoren (Geschlecht, Beziehungsstatus, Bildungsgrad, Beruf und Einkommen) zeigten sich keine Zusammenhänge. Alle Ergebnisse wurden in das Livability – Public Space - Model (LIV-PS Model) integriert, um ein besseres Verständnis über umweltbezogene Bedürfnisse von Nutzerinnen und Nutzern zu gewinnen und ein gesünderes und glücklicheres urbanes Leben zu ermöglichen.

This thesis is dedicated:

To Jasmin and Loïc.
The both who gave the expression "livable" a new dimension!

To my parents.
For their love, patience and belief in my decisions.

And to Prof. Peri.
For the help and mentoring of this study.

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CHAPTER 1 – INTRODUCTION

While during the first half of the 20th century most of mankind lived in rural settings, the majority has moved into highly-dense urban areas with the beginning of the 21th century (Schönborn & Schumann, 2013, p. 263). Today, the amount of inhabitants in Germany has increased more than five times during the last 200 years, for example. Thereby, the "rush to the city" is a worldwide phenomenon and the growth rate can mostly be found in urban regions, particularly with enormous dimensions (Gifford, 2007, p. 287). Additionally, with the beginning of post-war era in 1950s a focus of urban developers occurred on modern and functional cities. New neighborhoods were constructed in distance to old town districts with individual and free-standing buildings, so called monocultures with only a single function of living, working or consuming.

> The first time in history of man as settler cities were no longer being built as conglomerations of city space and buildings, but as individual buildings. At the same time car traffic was squeezing the rest of urban life out of space (Gehl, 2010, p. 3).

The modern and functional city overlooked many human needs and was characterized by spatial separation and poor accessibility (Jacobs, 1961). The focus on the economic potential of many recreation and leisure areas led to privatization and commercialization of remained urban squares (Lyold & Auld, 2008).

Today, city dwellers have to fight with an increasing structural and social density (Gehl, 2010, p.4; Schönborn & Schumann, 2013, p.263). The loss of open public spaces, due to traffic, commercialization or functional changes, leads to urban decay and decreases health, well-being and social interaction in the city. Public spaces with limited resources have to perform better in the future, if they still want to meet the needs of health, recreation and integration of the growing population (Gehl, 2010, p.5). Fortunately, a new human-centered urban movement has started and city dwellers become more aware of their "rights to the city" (Lefebrvre, 2009). Therefore, the social design of public spaces, made by architects, urban developers and policy makers (Summer, 1983), becomes more necessary than ever and has to be based on scientific knowledge under the compliance of user's needs, desires and behavior (Jacobs, 1961). For that purpose, this study will integrate postulated livable dimensions of public spaces in a self-developed model and prove the impact of these design features on people's perceived urban quality for creating a better understanding of user's needs and desires in public urban squares. A quantitative experimental design may

help to confirm or disprove found design aspects from previous field studies, to gain a better knowledge about the impact of plaza design on human well-being. We also will look whether personal characteristics like personality traits or socio-demographic variables have an impact on subjectively-perceived livability.

CHAPTER 2 – THEORY AND BACKGROUND

Public space is a frequently-used term in modern urban development and policy. It is utilized to describe special urban places in various contexts and meanings but there are still lacks in definitions. Because of that, we want to explain briefly related terms of public spaces in the beginning to create a fundamental understanding of public space. Furthermore, the literature review will go deeper into the human experience of urban spaces. He will compare various theories and empirical studies to find general design dimensions of public spaces that are associated with social interaction and residential well-being. In the end of this chapter we will analyze different concepts of urban quality to find a fitting approach for this study and will combine all the important information of the chapter in a research model.

2.1 From Space via Interspace to Public Space

Whenever the term *"space"* is used in this study it refers to a combination of physical urban environment with its design features and its socio-cultural and psychological context. Architectural space is constituted by space-building elements. These "objectives are rarely isolated, they are in the company of other volumes or limits. Space is born from the relationship between objects or boundaries and from planes which do not themselves have the character of object, but which define limits" (Von Meiss, 1994, p. 101). If each single object is organized in a group, their object radiance will be superimposed and as a sum they lead to a new recognizable structure, a *space*. According to Aristotles space is a container of things – filled up in the inside and limited externally. But the limits may be more or less explicit, created by walls, a surface or only constitute by a few cues between which the observer establishes a relationship. This perceived *interspace* as free volume limited between two or more objects is characterized by an additional third quality which harmonizes the relation between actors, buildings and free space (Richter & Hahn, 2013, p. 321). Every interspace constitutes its unique radiance or atmosphere. Furthermore, they are bounded settings in which social and cultural relations as well as identity are shaped and developed (Duncan, 2000, p. 582). As soon as these interspaces are run by public authorities and established under public law, an interspace becomes a *public space*. Perla Korosec-Serfaty defines these special urban locations in her work to environmental psychology and urban sociology as the follow:

> Public spaces in the city are collective territories which limits are exactly defined (i.e. by buildings, gardens, streets) and which are well-accessible (i.e. by different streets, alleys, stairs or parks). In this sense they are places, which are closed and open at the same time and invites for a stay as also to traverse. (Korosec-Serfaty, 1990, p. 534)

As an additional social and cultural open location, public spaces are in principle open for all members of a society and are characterized by these various amount of visitors and behaviors (Korosec-Serfaty, Öffentliche Plätze & Freiräume, 1990). They are influenced by their physical design, geographical location in the city and their symbolic function for a political system and society.

A short summary of historical functions of public space shows that these squares were made for various reasons, in example for hygienic and ventilation reasons, for the rhythm of an architectonical pattern, as a memory for historical events, as places for special daily behavior or for the enhancement of community identity (Lavedan, 1960; Mumford, 1963; Gutkind, 1969; Rasmussen, 1974; Norberg-Schulz, 1980; Sitte 1965). But their function also has changed over centuries. In the medieval period, public space was a location for physical proximity of the citizenship where lots of activities happened at the same time and city dwellers could participate in community life. They also had been a work place which saved the survival of community. During the era of renaissance their meaning changed and an aesthetical component was added. The idea was created to use urban squares for pleasant walking, to observe the beauty of a place and for the grand spectacle (Korosec-Serfaty, 1990). Because of its representational character public spaces became more significant for the ruling class which leads to more splendor squares but also to a stricter division among all users from different classes. But they were still central to everyone's lifes. People had little choice but to use public spaces. Urban families depended on walking in them to get around or to buy groceries (Gehl cited by Walljasper, 2005). This division reached its peak during the 19th century where bourgeois tolerance for streets or places decreased and the traditional physical proximity between different social classes, age groups or jobs was neglected. Urban environment was structured and equipped with mostly a single function. Monumental places got in lane with the regular street network and the traditional function was confiscated from them. With the beginning of the 20th century private life overlaid public life and vivid spaces became increasingly unimportant for urban developers (Korosec-Serfaty, 1985). The increasing car traffic, new communication technologies like the internet and the urban planning theory of modernism separated the uses of the city and emphasized

free-standing individual buildings which put definitely an end to vibrant urban spaces (Jacobs, 1961). Fortunately, Jane Jacobs (1961), William H. Whyte (1980, 1988), Jan Gehl (2011) and many other urban developers and researchers have contributed to the studies and collected knowledge to create more livable and human scaled spaces once again.

In consequence of the different historical context of public spaces and their perception by the human eye, Alfred Lang (1987) classified two general types of public spaces: the *ventricle square* and the *focus square*. Both types are in human perception a result of Gestalt psychology in general. This approach tries to find laws to acquire and maintain meaningful perceptions in a chaotic world. The central belief that human mind forms a global whole out of chaotic and diverse stimuli by self-organisation can also be found in perception of public spaces. For example, the figure-ground principle (Rubin, 1915) allows our perception only one interpretation of an ambiguous scenario. People only see the untilled ground or the adjacent properties of a public space like they see in Figure 1 the faces or the vase. Additionally, the law of good gestalt (Wertheimer, 1923) helps to reduce the complex stimulus pattern of the urban scenario. The human mind tries to find the easiest interpretation of the scenario – a whole new, easily-perceived and independent urban square. However, Lang theoretically suggests that a ventricle square arise by "bulging". Related to the law of closure (Wertheimer, 1923), humans tend to ignore the gaps between the adjacent contours and perceive a closed form. There only need to be indicated contours like in Figure 2 to create a new form by visual completion (Kanizsa, 1976; Richter & Hahn, 2013). In reality this means if the contours, the limits and edges of adjacent buildings in a place establish a relation among each other, people will notice an independent new interspace (see Fig. 3). Usually, this kind of interspace is accessible for all members of society and does not belong to a special group in contrast to the private adjacent spaces. Ventricle squares own an open structure for social relationships. They are constituted as a neutral territory, where confrontation and exchange among equal users is possible (Richter & Hahn, 2013). Typical prototypes are medieval market squares or modern urban traffic nodes. As in the sense of democracy a ventricle square promotes freedom and equality for its users and possibilities for political engagement like demonstrations. There is less inner order or control in these interspaces (Richter & Hahn, 2013). Standing patterns of behavior are just slightly defined in this milieu (Barker, 1978).

Fig. 1-2. Optical illusions: *1)* Rubin's vase-face illusion (1915, left) and *2)* Kanzsia's triangle (1976, right)

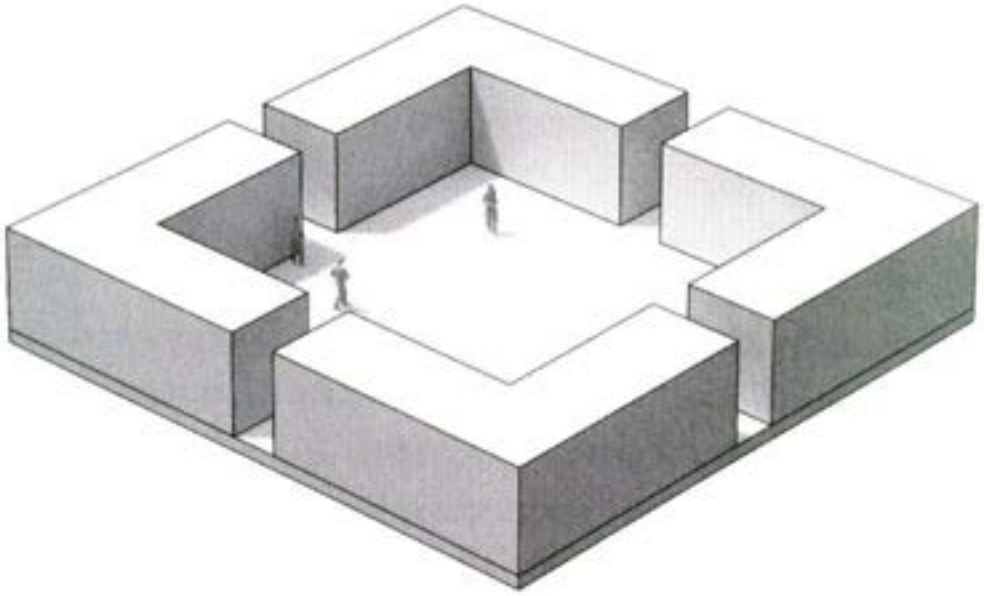

Fig. 3. Ventricle square (scheme) (by Lang, 1987; Figure in Richter & Hahn, 2013, p.324)

Furthermore, the ventricle square offers many various opportunities for interaction among people and the environment.

While the ventricle square is more constituted from outside to the inside, the focus square constitutes itself from its inside. Because of the figure-ground perception as in Rubin's vase (1915) a given stimulus in an interspace has the tendency to radiate its atmosphere to its environment. The white figure superimposes the black ground and people perceive a vase or in sense of public space, around a salient figure a court evolves itself (Richter & Hahn, 2013). If this figure is an optimal observer distance (Maertens, 1884) the law of good gestalt works again and humans will do an easy interpretation that the interspace is part of the figure in its center (see Fig. 4). Even the social structure of focus square is center-orientated. People are unequal in this type of public space and are confronted with a higher secular or sacred instance (Richter & Hahn, 2013).

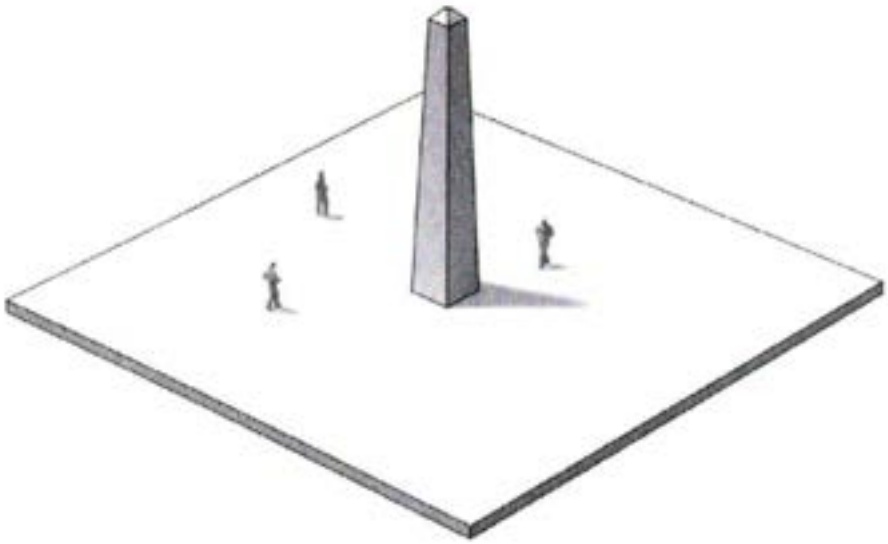

Fig. 4. Focus square (scheme) (by Lang, 1987; Figure in Richter & Hahn, 2013, p.327)

Focus squares are typical environments in monarchies or autocracies (Lang, 1987). They are high controllable and have a strict inner order. Standing patterns of behavior are deliberated and tightly defined in this milieu. Typical prototypes are public spaces close to castles like they were built during the period baroque in France, Italy or Germany. But even former UdSSR or GDR built focus squares in the last century. Representing buildings as churches, court houses or government buildings can also be found on the edge and the center often is characterized by a monument of an emperor or a symbol for the ruling class. Even during the 1930s and 1940s the National Socialists tried redesigning democratic ventricle squares to temporary focus squares by installing flags and symbols of the Third Reich in the center for propaganda and public control. Fortunately, many classic focus squares can be found today in democratic societies and their behavior patterns converged to those of ventricle squares.

Alfred Lang's (1987) categorization of public space is of a theoretical nature and there is no empirical evidence for the existence of these both types. In nature, individuals are also often confronted with mixed types of ventricle and focus squares. However, it was illustrated that perception and behavior are regulated by the design of public spaces and that it has an impact on our daily urban experience. To create a deeper understanding of this interaction we want to introduce into the relationship between environmental conditions, human experience and resulting behavior in the following section.

2.2 The Impact of Public Spaces on Human Experience and Behavior

As mentioned, mankind is strong influenced by its daily urban environment and related stimuli. But this impact happens on various levels of human experience and resulting behavior. Therefore researchers have developed different approaches that describe the impact and relations between environments and processes like perception and evaluation, environmental behavior as well as human experience.

2.2.1 Public Spaces and Environmental Perception

All ways and movements are targeted and people need orientation and awareness to achieve our goals. These spaces of everyday life, where humans work, relax, observe, use things or just move, are called *oriented spaces*. In Kruse's (1974) phenomenological approach the oriented space is limited by a "here" and a "there" (i.e. place, individual or object). "Here" is the center of oriented space and the location of the acting individual. But before people can act in a space they have to perceive and organize it, first. For this reason everyone's oriented space can be divided into the *space of perception* and the *space of action*. The space of perception is formed by individual tactile, auditory, olfactory and visual experience and is generated through colors, forms, textures, movements, height and depth (Kruse, 1974). Also location and spatial proximity of objects or humans changes the way how individuals perceive a situation (Kruse, 1990). For instance, humans will perceive the music from the neighborhood apartment differently (i.e. more annoying) than the same music out of our own kitchen radio. Even the structure of the space-defining elements should be easily readable and ascertainable. In Kevin Lynch's (1960) studies about the image of the city the importance of cognitive organization of environmental structures was showed. He emphasizes simple legibility of space-defining elements to create an easier understanding of the more complex urban pattern. In other words, a public space has to be simply decomposed in its elements by cognition, i.e. seating, trees, shops, bus stop or fountain, but it should also be possible to perceive it as a unique structure, i.e. an urban ventricle square.

But all this setting qualities are not perceived directly. During the process of perception the visitor passes first quality judgements (Campbell, Converse, & Rodgers, 1976) influenced by his/her attention and personal characteristics. Following Brunswik's lens model (1956) the objective quality of a setting is manifested in objective measurable characteristics of a setting, so-called distal cues. In example (see Fig. 5), a public space is equipped with a number of trees and benches, the height of its buildings, an amount of litter or the number of visiting people. The observer's subjective impression of these distal cues

is called proximal cues. The perceived quality of stay will closely approximate to the actual quality of the square, if certain requirements are given for the process of quality judgement: first, the actual quality is truly manifested in the observed distal cues (i.e. the visitor has directed his/her attention on important quality-defining elements). Second, proximal cues are closely related to distal cues (i.e. the number of trees has truly an influence on his/her experienced comfort) and third, the proximal cues are closely related to the observer's judgement about the quality of stay (i.e. a comfortable space is import for one's personal quality of stay) (Gifford, 2007). As a result of this process two people can perceive the quality of the same environment differently and one will visit the square daily while another person avoids it.

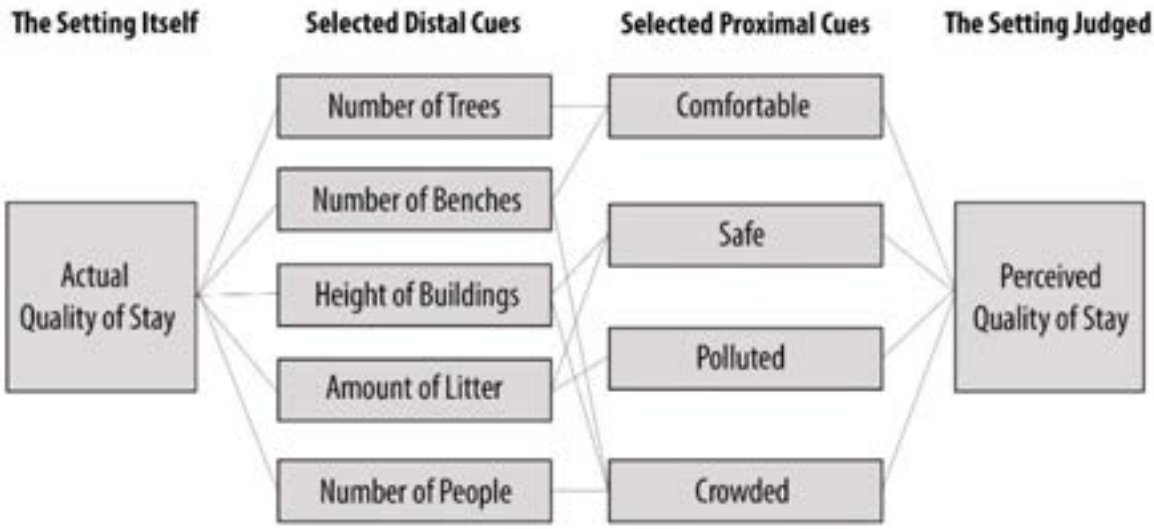

Fig. 5. Brunswik's lens model adapted to environmental perception (Gifford, 2007, p. 30, adjusted)

2.2.2 Public Spaces and Environmental Behavior

More often than just perceiving a square humans tend to interact with their environment. The individual gathers implicit behavior-related information about the function and use of space-defining elements. This direct and immediate conveyed information, so-called *affordance*, is created by the perceived arrangement of surfaces and substances in a setting, called layouts, and afford the opportunity for the individual to perform an action in that space (Gibson, 1979). For example the layout of a wide and stony shop windowsill on ground level will afford an opportunity to sit down like on a chair, even if it was not designed for this purpose. In Kruse's *space of action* (1974) people tend to show various behaviors dependent on elements in their motion range and the time and afford to reach them. But affordances are depending on the anatomical-physiological equipment of a person or a group, too (Schulze, 2013). "For instance a kitchen chair or table with the same

objective features in size suits more or less for adults, children or people with physical disabilities in relation to their body size" (Schulze, 2013, p. 81). But how humans act in a space also depends on the suitability between a standing pattern of behavior and the milieu where it takes place. Roger G. Barker (1978) and his colleagues observed from 1947 to 1972 different environments in small towns in the Midwest of the United States and the behavior of their inhabitants in those places. They recorded their observations of everyday life in the settings, especially of children in schools or playgrounds. During his research Barker recognized that the interindividual differences among people's behavior in the same context is smaller than their intraindividual behavior between various contexts and created the theory of *behavior settings*. In example, the children in school tended to act similarly during the classes or breaks. In class they showed a similar behavior like listening, answering, reading or writing. During the break they all behaved totally different compared with class context (Schulze, 2013). Barker calls these found patterns of behavior in different milieus "programs". Every environmental setting owns its unique programs. "If you enter a classroom, a sporting event, or even a political protest, you are likely to see recurrent activities, regularly carried out by persons holding specific roles" (Gifford, 2007, p. 9). Behavior setting theorists tend to explain person-environment relations primarily in terms of social features of a setting, such as its rules, customs, typical activities and its physical features.

2.2.3 Public Spaces and Human Experience

In contrast to the actively-perceived oriented space, the concept of *tuned space* (Binswanger, 1933) has developed to describe the more passive and emotional impact of an environment. Tuned space is a correlate of a tuned subject who moves in spaces and is influenced by moods, personality or situations (Kruse, 1974, 1990). This emotional impression of an atmosphere can also be found in the proximal cues of Brunswik's lens model. The tuned space is not perceived in single features as forms, colors or size ratios. It is the whole emotional impression of aesthetics and atmosphere in landscapes. The individual is not anymore in the center of space but it is still a moving part of it. The measurement of tuned space in environmental psychology is limited. The emotional evaluation of urban environments is mostly collected with the semantic differential (Osgood, Suci, & Tannenbaum, 1957) to measure synesthetic qualities as emotional-connotative meanings (Kruse, 1990).

The physical, social and symbolic features of public spaces can provide humans with coping strategies and can re-establish some balance between environmental demands and personal resources or in a bad design they might operate as an environmental stressor and straining human adaptive capacities (Berto, 2014). Theoretical perspectives of urban impact already explain the relation between well-designed environments and beneficial effects on health or well-being (Wirth 1938; Fisher, 1984; Milgram, 1970; Lefcourt, 1976; 1978; Barker, 1978). The s*tress model of urban impact* of Pacione (2003) describes the influence of objective design features, affected by individual and social conditions, on our subjective perception and the resulting evaluation of the living environment (see Fig. 6). If the perception of the environment is made inside optimal range of stimulation, it will be experienced as beneficial. If it is evaluated outside of this optimal range, the individual will feel stressed and will try to adapt or habituate to his/her surroundings. If the physical environment supports the coping behavior, people will automatically perceive their environment more positive and the evaluation moves into the optimal range of stimulation. If the coping behavior fails, negative consequences for health and well-being will rise cumulatively and create a more pessimistic view on the local environment of the individual.

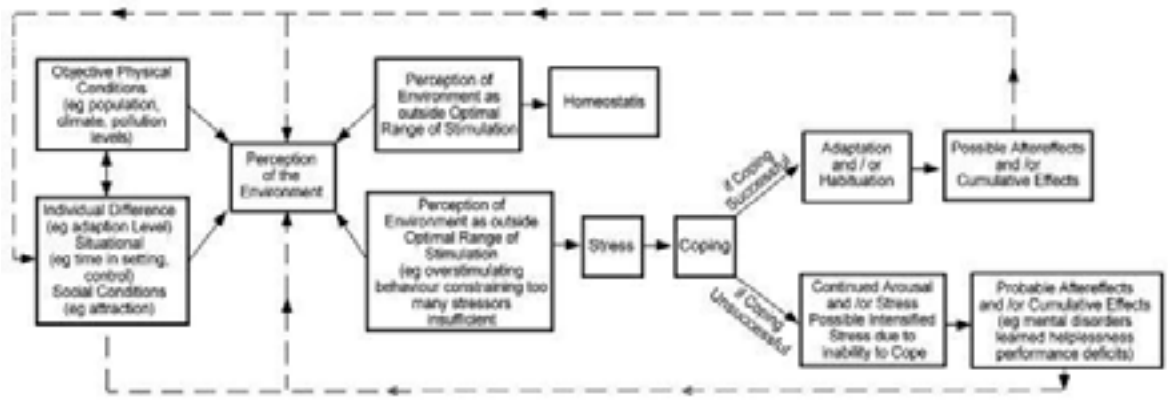

Fig. 6. A stress model of urban impact (Pacione, 2003)

With the idea of urban squares as "places for needs, demands and desires" (Jacobs, 1961, pp.71) public space became concern of psychology, medicine, public and geographic health research and a growing literature on the potential benefits of public spaces to physical, mental and emotional well-being has employed the concept of *therapeutic landscape* (Cattel, Dines, Gesler, & Curtis, 2008).

Originally used for natural environments, "the therapeutic landscape framework recognizes places, settings, situations, locales, and milieu as encompassing physical/built, symbolic and social environments that work to achieve an enduring reputation for achieving

physical, mental and spiritual healing" (Gesler, 1993, pp. 171). Their visit is associated with increasing well-being and health behavior as also a reduction in mental and physical illness (Gesler, 1993; 1996; Williams, 1999). Geographers, sociologists and psychologists have long argued that place is relevant for health variation because it constitutes and contains social relation and physical resources (Cummins, Curtis, Diez-Roux, & Macintyre, 2007). In combination with characteristics of individuals, the environmental context has significant impact to health and well-being variation. But unfortunately most research in this area has focused on a single spatial scale, generally that of local areas or "neighborhoods" (Cummins et al., 2007).

This has been an important first step in the examination of the association between health and place. William Rohe (1985) suggests that physical stressors as high density, through streets, poor unkeep of public places, a lack of community meeting places and high-rise residents promote mental health problems. Living in a poor-quality neighborhood also increases perceived danger (Austin, Furr, & Spine, 2002), enhances the risk for mental health problems (Downey & Van Willigen, 2005) and in combination with low income, residents tend to develop a depression more likely (Cutrona, Walace, & Wesner, 2006). Even physical health seems to be affected by public space design. In a large study in Atlanta (US) with over 10.000 residents objective neighborhood features were correlated with measures of obesity and transportation practice. Low-walkability areas, less walking and more driving were significant related to obesity (Frank, Andresen, & Schmid, 2004). Furthermore urban environments also have an impact on the behavior of residents. City dwellers mistrust others more than suburb residents do but this effect also seems moderated by the poorer income (Ross, Mirowsky, & Pribesh, 2002). Even a higher amount of children's behavior problems is associated with poor-quality neighborhoods and the effect still occurs after the effects of poverty and other factors has taken into account (Gifford & Lacombe, 2006).

However, urban spaces have can provide restorative effects on human stress experience and mood (Korpela & Hartig, 1996). A higher amount of green spaces in cities is associated with more positive coping behavior and reduced aggressions (Kuo & Sullivan, 2001). People who visited bustling places, streets and farmer's markets in South London described these public spaces as more pleasant, enhancing and comfortable (Cattel, Dines, Gesler, & Curtis, 2008). Also one's expectancy of having a happy life is predicted by differences in the urban environment (Veenhoven, 1996). The interaction with others supports coping behavior of city dwellers and has a positive effect on stress reduction (Bell, Fisher, & Loomis, 1976). Another factor is the amount of green space in public spaces that

has a significant impact on children play quantity (Skjaeveland & Garling, 1997). Also elderly like to hang out, walk and watch others in public. But the use of public space for them often is limited and makes them spatially disadvantaged (Smith, 1991). Families who had recently moved in Toronto showed that their satisfaction with urban quality was strongly influenced by the availability of public transportation, facilities, appearance of the neighborhood and distance to green spaces (Michelson, 1977).

In sum, there is a lot of theoretical and empirical evidence that the design of urban neighborhoods and especially public spaces has strong impact on city dweller's health, well-being and behavior. For this reason many researchers and practisers engage themselves to create an essential design framework for cities. Beside the general design these experts have also to consider the behavior, wishes and needs of the usual city dweller in their work (Summer, 1983). Unfortunately the focus between planners and daily users on urban environment differs more than thought. While the usual citizen pays attention to the use and sociability of an urban setting (*le perçu*), the expert often perceives the city more in form of development plans and from an artistic-aesthetical perspective (*le conçu*) (Lefebvre, 1991a). Because of this it is important to examine the connection between environmental factors and design solutions in public spaces and their effect on a healthy and happy urban life.

2.3 How to Design Public Space?

During the last five decades lots of theories and qualitative evidence how to develop livable public spaces occurred in the field of urban research. Pioneer Jane Jacobs (1961) was the first who questioned modern planning strategies of New York City in her book *The Death and Life of Great American Cities:*

> She pointed out the dramatic increase in car traffic and problem of planning theories of modernism and emphasizes free-standing individual buildings that separates the uses of the city into functional areas and would put an end to urban space and city life and result in lifeless cities devoid of people. (Gehl, 2010, p. 3)

Jacobs was also the first who described qualities of living in and for enjoying lively cities from her perspective as a resident of the small, mixed and vital community in Greenwich Village in New York.

What she called qualities of living and other researchers named human dimensions, livability dimensions or spatial characteristics (Carr, Francis, Rivlin, & Stone, 1992; Gehl,

2010, 2011; Leby & Hashim, 2010; Zakariya, Harun, & Mansor, 2014), shall be titled as *livable dimensions* in this research. Livable dimensions are behavioral and psychological aspects of design factors which contribute to the satisfaction of environment-related needs and wishes. Furthermore, they are highly associated with health, well-being, social interaction and general quality of life. Due to an amount of approaches, theories and research perspectives in this field, a number of livable dimensions of public spaces were developed under certain names in the past.

2.3.1 Empirical Approaches and Theories about Livable Dimensions

While Jacobs illustrates the situation of modern cities in an anthropologic-philosophic manner, sociologist William H. Whyte (1980, 1988) studied empirically the design effectiveness and use of public plazas, playgrounds and parks in Manhattan for the first time. He and his team of young research assistants examined public spaces over a multiyear period and developed innovative methods of observing and mapping physical activity, including the use of time lapse photography, film, unobtrusive observation, behavior mapping, questionnaires, personal interviews and pedestrian path analysis. As a result of Whyte's Street Life Project many postulated hypothesis of the team were either validated or refuted. First of all, the most popular plazas tend to have considerably more sitting space than the less well-used ones (Whyte, 1980). It doesn't matter if seating options are comfortable benches or concrete ledges or stairs. Whyte concludes: "People tend to sit most where there are places to sit" (1988, p.110). The seating with most success was physically comfortable (backrests, well-contoured chairs) and additionally socially comfortable, what means choice. Sitting up in front, in back, to the side, in the sun or shade in groups or alone, seating choice should be built into the basic design for Whyte. Because of this, Whyte's Street Life Project promotes the movability of chairs, too. They are a declaration of autonomy and rather satisfying. Another indicator for a successful public space was the availability of natural elements like grass, trees and water in form of fountains or water plays. Grass offers comfortable seating and a psychological benefit as well (Whyte, 1988). Trees are also strongly related to sitting space and provide people with a satisfying enclosure. They feel cuddled and protected. Furthermore trees and water fountains help to cool down public spaces. People tend to get in contact with these objects and interact with them, i.e. touching or playing with the water. The relaxing sound of the fountains also decreases the noise of traffic and creates combined with the other elements a comfortable atmosphere. A head quarter with responsibility for a space that takes care also supports its

success and makes it more comfortable. A third detected factor with significant impact on city dwellers' behavior was the relationship to the street. For a space to function truly well it must be central to the visitors it serves to, or in visual accessibility. Whyte and his team found most vital space of all on streets corners. They had direct connection to pedestrian paths and the absence of walls and fences around a square promoted easy physical and visual access to its visitors. The important point for a successful place is the transition between plaza and street.

A different approach was developed by Carr, Francis, Rivlin, & Stone (1992) in their book *Human Dimensions of Public Spaces*. They outlined essential human qualities of public spaces that distuingish the places that support and stimulate the needs and activities of users. For this reason they analysed various field studies using qualitative methods and filtered three functions of public spaces: *needs, rights* and *meanings*. Most people go to public space because of a specific reason – to satisfy their needs for comfort, relaxation, active and passive engagement and also discovery (Carr et al., 1992, p. 87). While comfort is primarly achieved by designing plazas which invites to linger, sit, eat, drink and converse (Hajmirsadeghi, Shamsuddin, & Foroughi, 2014) relaxation is promoted by natural environments in form of trees, grass, water, flowers or walking path. Concerning passive engagement we concluded that the opportunity to observe the setting or other humans in their activities has a recreational effect on the observer, too. Public spaces also promote active engagement for citizens to interact with their environment and others in form of jogging, sports, play, gathering or social interaction. Making new experiences and discovering certain scenarios, objects or people is the fifth reason for people's presence in public spaces and represents the desire for stimulation (Lynch, 1960) and the delight individuals all have in new, pleasurable experiences (Carr et al., 1992, p.134).

If a place really works also depends on the rights to use a public space and the control people get in the setting. The ability to enter spaces is basic for their use. Physical, visual and symbolic access and freedom of use for all users without any discrimination guarantee an amount of different people and activities in space as well as the success of places. Visitors should get the possibility to claim the space temporary for some time and to change the setting to reach their goals and earn some resources out of public space. Furthermore, people have a need for linking themselves with special groups, neighbors or society and get attached by their living environment. Connecting a public space to one's own life, to a group, the society and with other environments is an important step to gather health and well-being in the city (Carr et al., 1992, p. 187).

The *What Makes a Great Place?* - approach by Project for Public Spaces (PPS, 2005), an US-American planning, design and education organization dedicated to helping people create and sustain public spaces that build stronger communities, specifies the success of public places by four key attributes as it is illustrated in Figure 7. High c*omfort & image* offers the visitor an attractive, green and safe space with choice of seating opportunities. The place is clean and pedestrians get the possibility to walk across the space. Also the connection to an aesthetic surrounding rises the comfort of the square. With high *access & linkage* a place is easily physical reachable for city dwellers and people can cross. It is connected to the street level and its surroundings. People can go to and through the space. We can find mode splits, what means that cars, bicycles and pedestrian can use the space in the same way with the same rights how it is practiced in shared spaces. A linked public space offers opportunities for public transport like bus, tram or underground and has also a high parking turnover. As a next key factor for success Project for Public Spaces describes u*ses & activities* as the basic building blocks of a place (2005). People need a reason to come to a square and to return. This reason is given with all possibilities of person–environment interaction like shops and stores, but also playgrounds, markets, sport devices or events. Multiple use and activities throughout the day help to enhance the quality.

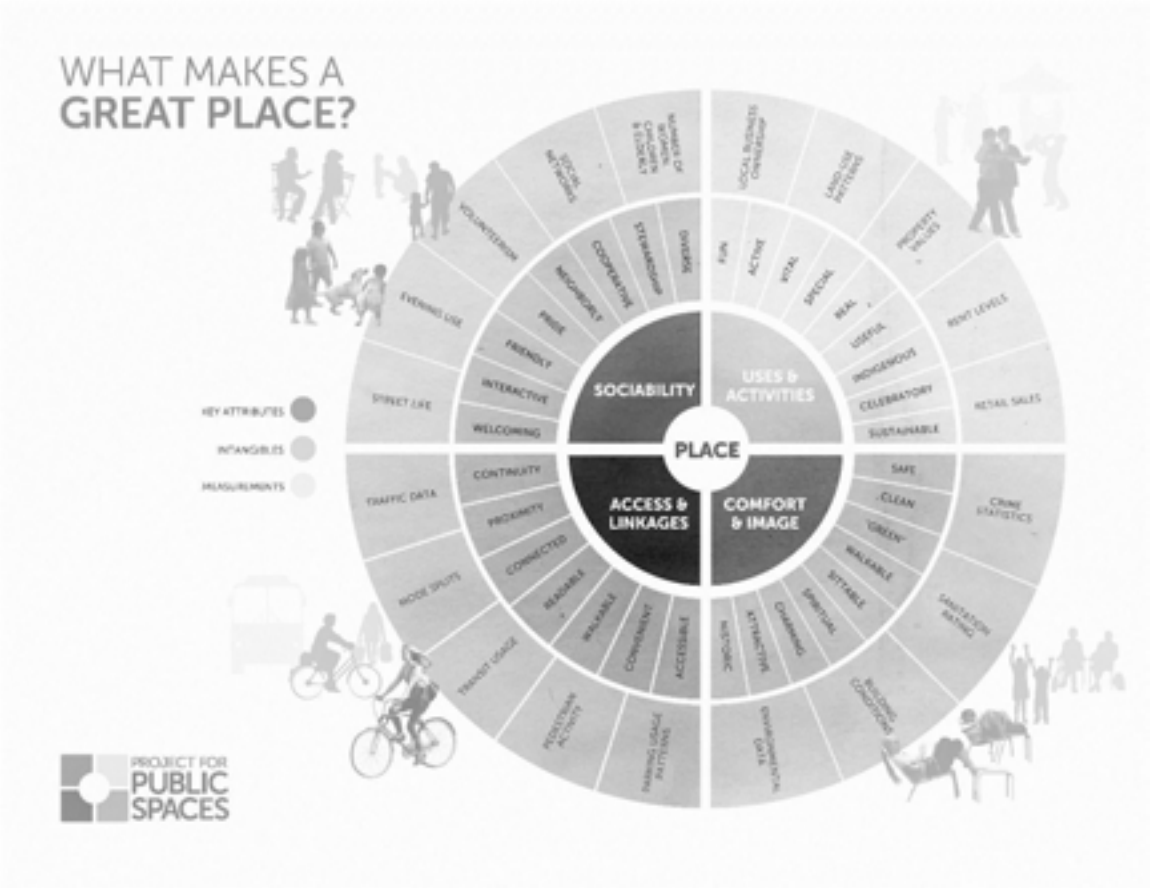

Fig. 7. Place Diagram – What Makes a Great Place? (Project for Public Spaces, 2005)

Finally the *sociability* is an important determinant of a livable urban environment:

> When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place that fosters these types of social activities. (Project for Public Spaces, 2005, www.pps.org/reference/grplacefeat/)

A sociable public space affects evening use and street life. People can come together to meet, volunteer and cooperate. Furthermore, diversity and sense of community are related qualities of sociability in urban space.

However, we want to underline these three theories with some evidence of actual field research on livable dimensions of public spaces. Zakariya, Harun & Mansor (2014) studied the City Square of Melbourne, Australia before and after its redesign caused by a lack of success of its first design scheme. They compared both designs and analysed with behavior mapping and spatial analysis the mistakes of the old square and after its redevelopment. In general, City Square is well-linked to public transport and central street network. Also important representative buildings as the city's theatre, cathedral and town hall are located on the edge of the place. The first design provided an amount of various functions like video screen, restaurants, arcade shops, cafés and art in form of a graffiti wall and a sculpture. The fragmentation of the place into different sections and levels and the bad visibility produced by a sculpture that did not allow to see the place from the streets were the real problems of the old design. People did not become attracted to enter the space and furthermore their desires were not met. Old City Square was uncomfortable with less green space and the bluestone surface enhanced the glare and heat in summer. The space was not flexible in use and because of a sunken fountain with a water wall shops were hardly-accessible. As a result less sociability was created and people did not get attracted by public space. After its redesign the space was designed more open and less fragmented in levels. The new design offers visibility from the streets because of the removing of the giant sculpture. The stoned surface and sunken fountain were removed and replaced with a sandy open space with benches, trees for people to sit. Grass allows people to sit and offers them flexibility in choice and different activities. By this new flexibility the place is used now for different events and festivals. Also the behavior of people changed dramatically and the sociability of Melbourne's City Square rose so that it is now an important meeting point in the city. Zakariya et al. (2014) concludes that a permeable, visible and linked public square

creates access. They proofed that various activities, comfortable green space, shelter by trees and flexible use create strong connections with its people physically, socially and environmentally.

Cattel, Dines, Gesler, & Curtis (2008) also examined a neighborhood in South London and the behavior and well-being in its public spaces with observation and narrative interviews. They figured out that people firstly need to feel comfortable and safe in space. Interestingly, litter and noise assumed less relevance in the description of use and enjoyment of public spaces. Secondly, the area needs to be perceived as a pleasant place and has to engage in activities deemed siginificant to well-being. Thirdly, places where used to interact with other people, to create and care their social networks but also to escape from the bustle of the city, to reflect, to relax and feel free of surveilliance. As a last intersting aspect, the interviewed persons had connected memories with the studied places and were attatched by them. They reported that the places became a part of them.

We can find cultural difference among the importance for serveral livable dimensions in the literature too, especially between western and eastern societies. A field study of Nasution & Zahrah (2014) in Medan, Indonesia did not find accessibility as an important factor (Project for Public Spaces, 2000; Gehl, 2002), instead they revealed it as the most insignificant feature. Maybe Medan's inhabitants are used to move long distances to reach public spaces. However, beside the low significance of accessibility, Nasution & Zahrah (2014) still detected the same significant livable dimensions like activity & facility, management as well as natural environment and additionally the researchers found that the intensity of activities' (i.e. duration, frequency and variation) had a significant impact on people's perception of a high-qualitative space. While people in western societies are concerned about to high control and security in public and safety more results of the presence of other people, Leby & Hashim (2010) found that the perceived safety of a Malaysian neighborhood had the most significant influence on its quality. Additionally, the appearance and maintenance of its physical attributes and the availability of facilities and activities also were strong demands of the inhabitants. Interestingly, the importance of social attributes as relationships, sociability and sense of community was less import for living quality than in studies of Whyte (1980) and Project for Public Spaces (2005).

2.3.2 The Five Livable Dimensions of Public Spaces

There are many approaches and theories in the consisting literature but until today a general overview was missing. Therefore, most important studies were summarized after an extensive literature research and categorized them inductively concerning the content into five livable dimensions: (I) comfort, (II) access, (III) function, (IV) maintenance and (V) sociability. This categorization with its attributes and empirical evidence is illustrated in Table 1. The first dimension of *comfort* describes opportunities for stay, relaxation, recreation and enjoyment provided by seats or benches but also natural elements as trees, grass, flowers as well as fountains or water plays. To protect visitors from bad weather conditions like rain, wind or heavy sun glare, a shelter should be part of a public square, too. The second dimension of *access* describes the physical and visual access to a place. Plazas with barriers, fences, walls and gates hinder city dwellers to overview and to enter a place from a distance. To increase the success of a public space it should be designed barrier-free and visible. Pedestrians as well as cyclers, car users and public transport users have to get to and through an urban square with the same rights (PPS, 2005). While the factors comfort and access create a passive requirement, the third dimension of *function* summarizes all kinds of activities that a public space can offer to its visitors. City dwellers need a reason to visit an area i.e. sport spaces, shops, cafés, festivals, play grounds, temporary and permanent art like sculptures or graffiti. The square should also be multifunctional and allow a wide variation of uses. Furthermore a place needs to be maintained. The dimension of *maintenance* means security and care of the environment. A clean and safe public space with good lightning in the night, absence of crime and vandalism creates stress reduction and well-being but visitors still need to feel free from surveillance and heavy control (Dupuis & Thorns, 1998) by video cameras and authorities.

These four livable dimensions of comfort, access, function and maintenance represent fundamental design factors of the physical environment that is influenced by urban developers and designers, architects and landscape architects. It is the first step for a higher urban quality in public spaces. If a square satisfies the needs of inhabitants, more people will come and stay there. Thus, *sociability* is the result of a well- designed plaza and a particular case of the five livable dimensions. It is the attraction of individuals and groups towards a public space and enables them to follow social and leisure activities (Zakariya et al., 2014). Furthermore, sociability increases and enhances the perceived quality of a space. But social and physical environment are not independent from each other.

Table 1.

Categorization of five relevant livable dimensions for public spaces.

Livable Dimensions	Attributes	Evidence
Comfort	Seating Green spaces Water elements Shelter	Carr et al. (1992); Cattell et al. (2008); Nasution & Zahrah (2014); PPS (2005); Whyte (1980); Zakariya et al. (2014);
Access	Physical access Visibility Linkage to public transport, cycling paths and parking	Carr et al. (1992); Cattell et al. (2008); PPS (2005); Whyte (1980); Zakariya et al. (2014);
Function	Activity areas Multiple offers Facilities Food and stores	Carr et al. (1992); Cattell et al. (2008); Leby & Hashim (2010); Nasution & Zahrah (2014); PPS (2005); Whyte (1980); Zakariya et al. (2014);
Maintenance	Lightning Cleanliness and care Rules Security	Leby & Hashim (2010); PPS (2005); Whyte (1980);
Sociability	Presence of people Social interaction Diversity Participation	Carr et al. (1992); Cattell et al. (2008); Leby & Hashim (2010); Nasution & Zahrah (2014); PPS (2005); Whyte (1980); Zakariya et al. (2014);

Every environment is the result of constantly interaction with another (Yen & Syme, 1999). William H. Whyte describes this relationship as the follow: “Let us turn to the factors that make such places. The most basic one is so obvious it is often overlooked: people. […] what attracts people most, it would appear, is other people.“ (1980, p.19). Best-used plazas are sociable places, with a higher proportion of couples, more groups and more interaction.

There is also a higher amount more sophisticated user groups like women and elderly who tend to be more critical in choosing a fitting plaza (Whyte, 1988).

In example, Hajmirsadeghi, Shamsuddin & Foroughi (2014) proved the relationship between behavioral and psychological aspects, social activity and perception of environment attraction in a correlational structure model. Behavioral and psychological aspects described met human needs that are promoted by the physical environment. The physical design expressed in these behavioral and psychological aspects only had a small direct effect on the perception of a square's environmental attraction but correlated high with its social activity. This in turn had a high correlation with the perceived environment attraction. The impact of the sociability was higher than the impact of physical environment in that study. We guess an interaction or mediation in this case.

We have seen that a public space equipped with the five livable dimensions, called comfort, access, function, maintenance and sociability, promotes high urban quality and the success of public life. What success does mean and how a conception of urban quality looks like, is focused in the following section.

2.4 Towards a Conception of Urban Quality

The concept of urban quality and related terms as quality of life, environmental quality and livability have formed an increasing central issue in urban development, policy making and research programs for the last decades (van Kamp, Leidelmijer, Marsman, & de Hollander, 2003). Due to their origins in various research and policy approaches the existing terms are often used as synonyms. They interrelate with human well-being and try to examine the value of living environments, as a whole or as part of a broader concept. However, there is a broad variety of definitions for each of the terms and every so often are contrasted (van Kamp, Leidelmijer, Marsman, & de Hollander, 2003). Until now, no generally accepted conceptual framework of the relation between urban living quality and human well-being does exist (Leidelmijer, van Kamp, & Marsman, 2002). Van Kamp et al. (2003) describe urban [environmental] quality as a multi-dimensional container concept with different theories which relate to different aspects of environmental quality. On the other hand Architect Witold Rybczynski claims that it is not possible to define the concept:

> It's like describing an onion. It appears simple on the outside, but it's deceptive, for it has many layers. If it is cut apart there are just onion-skins left and the original form has disappeared. If each layer is described separately, we lose sight of the

> whole. The layers are transparent so that when we look at the whole onion, we see not just the surface but also something interior (Rybczynski, 1986, p. 230).

Based on a literature study of van Kamp et al. (2003), we want to specify the common features and differences among these various concepts in the following section and create a conceptual framework for this study.

2.4.1 Quality of Life (QoL)

At first, we will start with the surface of Rybczynski's concept onion, the external layer, and define quality of life (QoL) as the broadest ranging concept of all (WHO (World Health Organization), 1997). OECD (1973) postulated that economic growth cannot be an aim in itself but it serves the achievement of better life circumstances. As a consequence the interest and research on quality of life as an indicator grew. In general, it is impossible to develop one fitting definition caused by the context-dependency and dynamic of the concept and its dependency on research method and discipline. Therefore, the concept of quality of life is characterized in three general aspects: First, it is multi-dimensional and depends on different domains. Secondly, it is a mixture of objective standards and subjective evaluation of individuals. Thirdly, socio-political, traditional values as freedom, security, equity, participation and sustainability are included in the concept (Glatzer, 1990). For Dutch National Institute of Public Health and Environment (RIVM) quality of life represents the factual material and immaterial equipment of life and its perception characterised by health, living environment, legal and equity, work and family (RIVM, 2000). Definitions also focus on individuals' perception of their position in life in the context of culture and value systems he/she lives and in relation to their goals, expectations, standards and concerns (World Health Organization [WHO], 1997). The measurement of quality of life depends on the selected domains which are often affected by the discipline perspective from which the subject is approached (van Kamp, Leidelmijer, Marsman, & de Hollander, 2003). In a geographical conception QoL depends on six domains (health, physical environment, natural resources, goods and services, community development, personal development and security*)* that precisely describe different aspect of the person-environment relationship (Mitchell, 2001). For every domain various subdomains are postulated which shall facilitate the measurement of QoL. All domains and their subdomains are visualized in Figure 8.

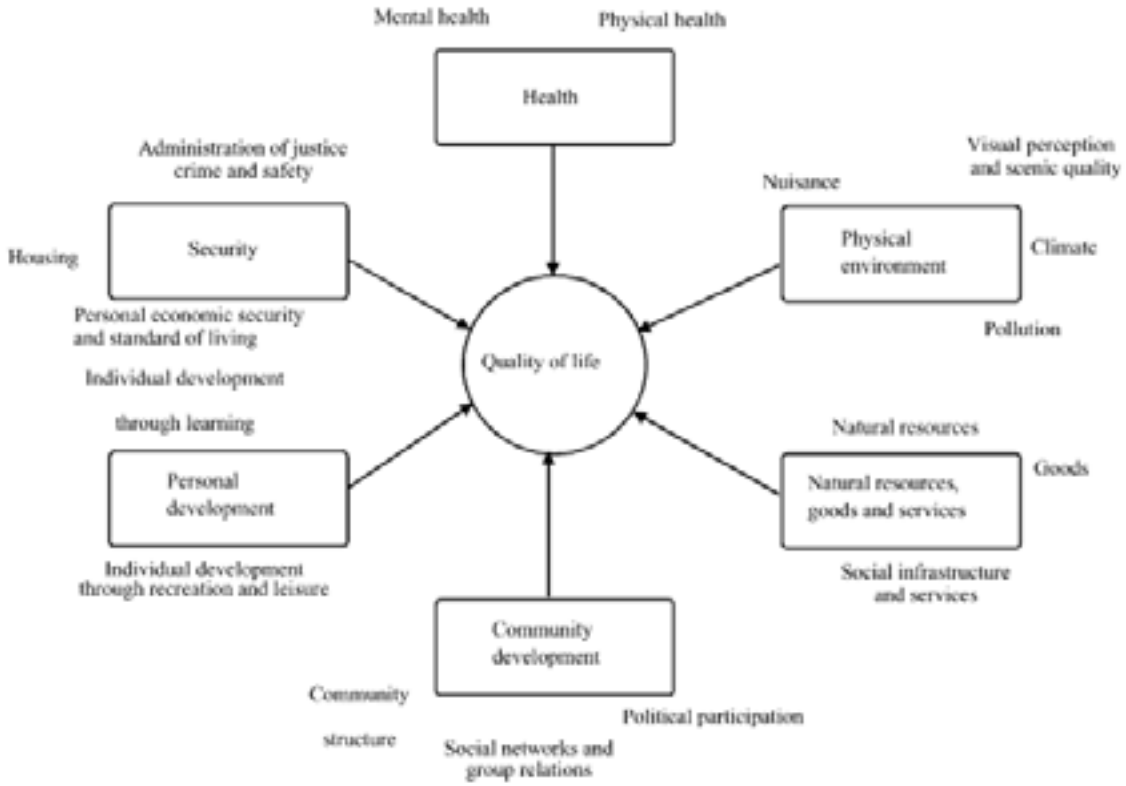

Fig. 8: Quality-of-life components (Mitchell, 2001)

To connect the various domains and concepts with each other, the Dutch National Institute for Public Health and the Environment (RIVM, 2000) created a different approach on the measurement and development of the good life (see Fig. 9). Quality of life is affected by two domains: local environment and health. In consensus with the general literature, objective as well as subjective indicators are used in this concept to measure the person-environment relationship (Cummins, 2000). In this approach a person's health is operationalized by his/her objectively measurable health status but also by the subjectively perceived health. On the other side, the domain of local environment can be recorded by the sum of subjectively perceived livability and objective measurements of the conditions of the living environment, for example air and water pollution, housing quality, natural resources, provided goods and services or security (Pacione, 2003; Mitchell, 2001). These both domains in turn are affected individually by the physical environment like housing or spatial characteristics as also by the social environment like lifestyle, personal characteristics or social quality. Additionally, there is the need to record socio-demographics as legal and social security, social relations, employment, income, activities or consumption to create a complete measurement of QoL.

Finally, based on the concept of the Dutch National Institute for Public Health and Environment (RIVM, 2000), we want to define *quality of life* as the combination of objectively-measurable material and immaterial life domains (i.e. health, social relations and work, legal and equity, personality or physical environment) and their subjectively-made perception affected by satisfaction, needs and wishes.

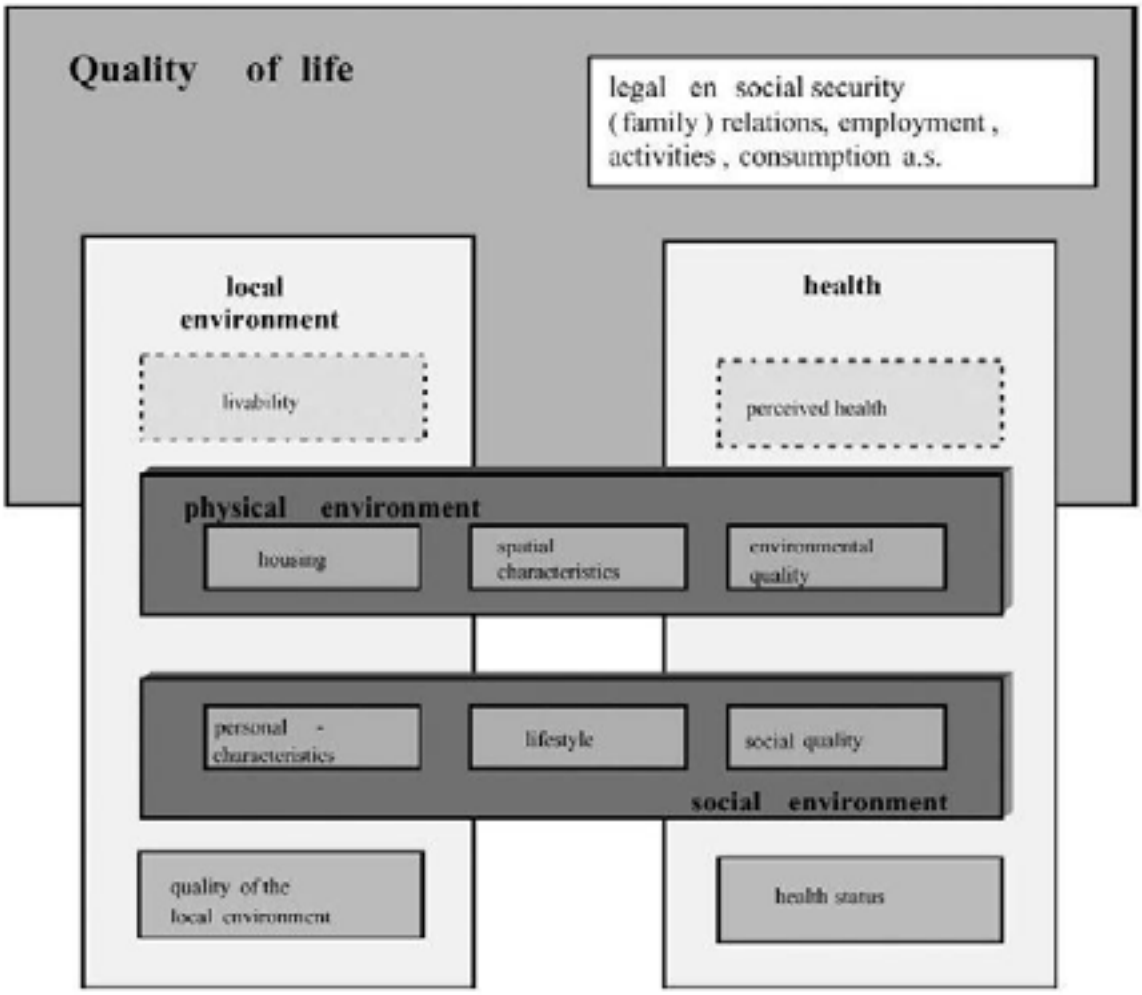

Fig. 9. Scheme of the basic elements of quality of life, health and local environment (RIVM, 2000)

2.4.2 Environmental Quality (EQ)

We see that quality of life is a broad concept and determined by different components. The environmental component of that concept is called environmental quality (EQ). A high quality conveys a sense of well-being and satisfaction to its population through physical, social or symbolic characteristics (Lansing & Marans, 1969). For the Organization for Economic Co-Operation and Development "Environmental quality is a state of environmental conditions in environmental media, expressed in terms of indicators or indices related to environmental quality standards" (OECD, 2001). This standards are

externally measurable factors like climate, nature or housing indicators but also social indicators like employment, skills, age or ethnicity (Pacione, 2003). The Dutch Council for Environment and the Council of Urban Planning added a more subjective perspective in their definition:

> *Environmental quality* is the resultant of the quality of its composing parts in a given region like nature, public space, infrastructure, built environment, physical environment amenities or natural resources, each with their own characteristics [but environmental quality] is more than the sum of its parts, it is the perception of a given region as a whole location. (Raad voor het milieubeheer & Raad voor de Ruimtelijke Ordening, 1996).

At this point we have to focus the weakness of this concept. Environmental quality is an indicator-related, objectively-measurable concept but it's also affected by various perceptions, values and attitudes among individuals or groups (Porteous, 1971). Because of that, the objective perspective has been paralleled by the development of approaches using subjective social indicators (Pacione, 2003). One subjective environmental quality approach focused on the concept of livability.

2.4.3 Livability

Livability is the degree to which the provisions and requirements of a specific environment fit with the human needs and capacities (Veenhoven, 1996). The construct 'livability" is less objective compared to the concept of environmental quality (Pacione, 2003) Its meaning depends on place, time and purpose of the assessment. Livability is the perception and evaluation of a daily living environment by its inhabitants (RIVM, 2003). A livable environment meets human requirements for social amenity, health and well-being (Newman, 1999). Need satisfaction is an integrational part of this concept and spaces that satisfy needs for health, well-being and social capital are perceived as livable. Therefore we want to review these domains in more detail.

A lot of health definitions resulted from pathogenic approach in the past and asserted it only as the absence of illness. But modern research figured out that health is more than this. The first positive definition in a broader sense was made by World Health Organization:

> The Constitution of WHO states that good *health* is a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Health is a resource for everyday life, not the object of living, and is a positive concept emphasizing social and personal resources as well as physical capabilities. (WHO, 1948)

One's health status can be explained on an illness-wellness-continuum that localizes the current state of human beings in a dimension between the pols of total presence ("health ease") and absence ("dis-ease") of health, well-being and satisfaction (Antonovsky, 1979). Positive mental health on this continuum, a state of physical, mental and social wellness (WHO, 1948), is called *well-being*. "In this state every individual can rely his/her potential, can cope with normal stress issues in life, can work productively and fruitfully, and is able to make a contribution to her or his community" (WHO, 1948, p.100). Environmental psychologists define well-being as a healthy balance between met and unmet requirements, including social, emotional and self-actualizing needs (Pickering, 2001). Well-being is the concept of the experienced happiness, explained through the social environment of a person (Keyes, 2002). Past researchers measured well-being mostly by the four indicators: pleasant affect, unpleasant affect, life satisfaction as also domain satisfaction and combined subjective satisfaction with emotions (Diener, Suh, Lucas, & Smith, 1999).

Livability locates individual experience within social contexts and is concerned especially with human interaction. Linked to that fact, public spaces can provide access to social networks, develop human relationships and induce integration. Especially for low income households, studies proved that contact to friends and people is important for one's mental health status (Stafford, De Silva, Stansfeld, & Marmot, 2008). Researchers stresses the significance of the community with its social networks, too. (Cattel, Dines, Gesler, & Curtis, 2008). The resource produced by social networks, trust, co-operation and perception of safety is called *social capital* (Jacobs, 1961; Putnam, 1995). "More extensive social ties are associated with benefits in terms of health, well-being and quality of life through providing support, conferring esteem, a sense of belonging and identity, or facilitating social interaction" (Blaxter, 1990; Brown & Harris, 1978; Wellman & Wortely, 1990, cited by Catell, Dines, Gesler & Curtis, 2008). As a result high livable urban squares have to be desinged in a way that enhances a community with social capital. Social ties are always connected with settings of everyday life (Featherstone, 1991) and there is significant

evidence that social interaction is more traceable in settings like markets, urban squares or locations with seating possibilities (Cattell & Herring, 2002).

With the concept of livability, we have reached an interesting layer of Rybczynski's urban quality onion and found a fitting psychological approach for this study. However, in the last section of this chapter we want to shortly summarize the important points and illustrate their relationships in a research model.

2.5 The LIV-PS-Model as a Research Framework

For a better understanding of the complex relationship between livable dimensions of public space, perceived livability and personal characteristics, the *Livability – Public Space – Model* (LIV-PS-Model) was developed as a study framework. The model helped as a theoretical guideline for the generation and verification of hypothesises as well as for the development of instruments for the measurement. Figure 10 contains an illustration of this framework.

The existing interaction between the dimensions of physical environment (comfort, access, function and maintenance) and social environment (sociability) has an impact on the individual perceived and evaluated satisfaction of human environmental needs. This satisfaction caused through a high manifestation in livable dimensions is named livability (Newman, 1999) and will show very high scores, if human needs for health, well-being and social capital are promoted by public space design. Additionally, it is assumed in this model that individual's evaluation of livability is affected by personal characteristics (Eddy & Sinnett, 1973; Altman, 1975; Driver & Knopf, 1977; Whyte, 1980; PPS, 2005; Cutrona, Walace, & Wesner, 2006; Gifford, 2007; Nasution & Zahrah, 2014). We distinguish between socio-demographic or outer characteristics like gender, age, income, culture and relationship status as well as inner characteristics like actual stress experience and personality traits following the Five-Factor-Model of Costa & McCrae (1992) like neuroticism, extraversion, agreeableness, consciousness and openness for experience.

As research questions this study will prove the relationships of the LIV-PS-model and whether the presence or absence of the five livable dimensions of public space affect the perceived and evaluated livability. The single impact of comfort, access, function, maintenance and sociability on the perceived livability will be observed. Also the interaction between physical and social environment may be examined. Additionally, we want to explore the impact of inner and outer characteristics on subject's perception and evaluation about the livability.

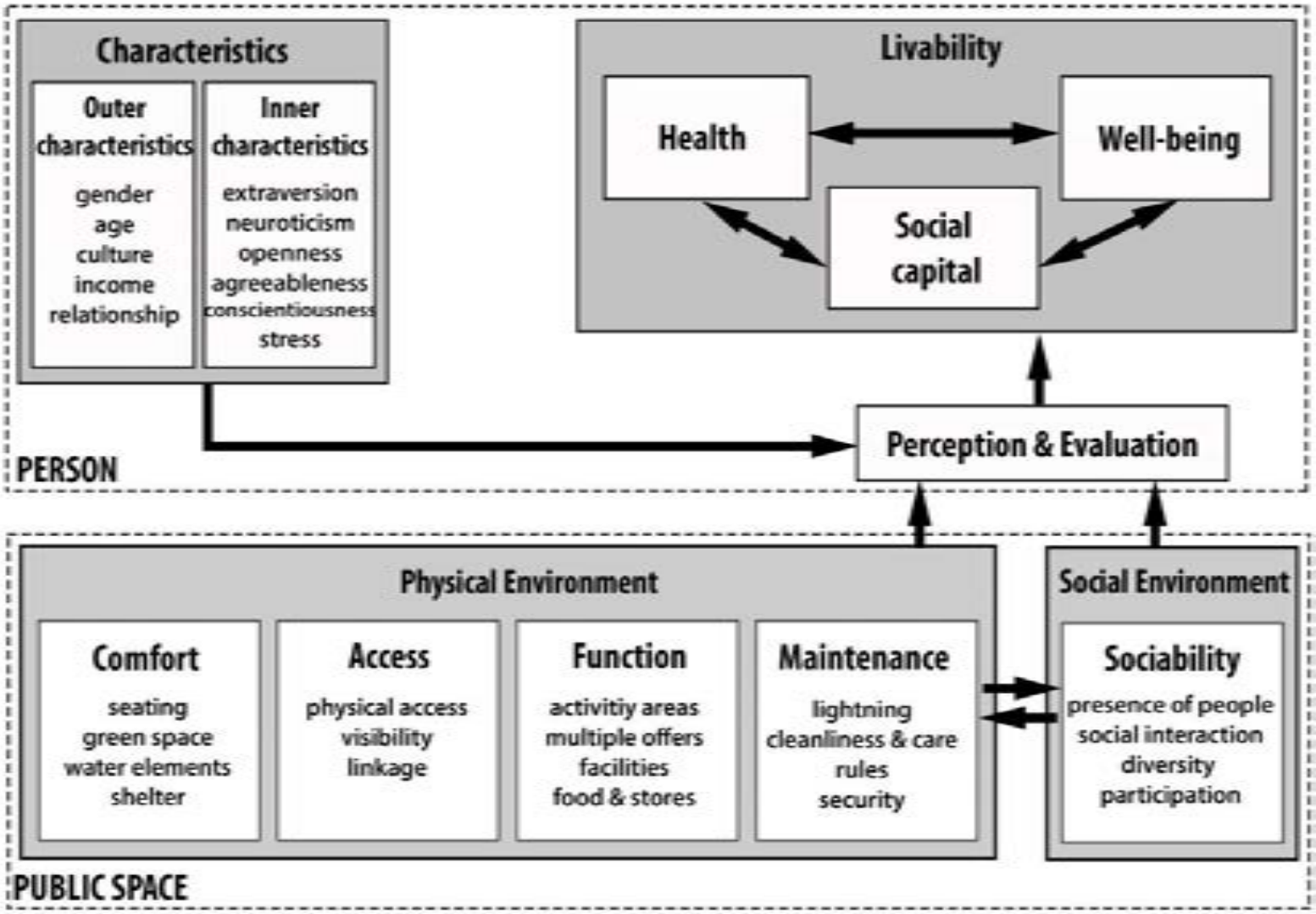

Fig. 10. The postulated LIV-PS Model

CHAPTER 3 – HYPOTHESES & ASSUMPTIONS

3.1 Hypotheses Regarding the Effect of the Physical Environment

Whyte (1980) was the first who empirically-studied the impact of physical urban design on the stay and behavior in public spaces. He detected that public plazas with a comfortable design including seating, shelter, grass and trees were visited by more people than plazas without these features. Also a good physical and visible access without barriers of the streets was important for the success, measured by the frequency and interaction of visiting people, of New York's public squares. A field observation of Zakariya et al. (2014) in Melbourne's City Square found similar results and noticed the importance of overviewing the square from a distance. Besides these both factors other researchers (PPS, 2005; Nasution & Zahrah (2014)) observed in field studies the human need for passive and active engagement (Carr et al., 1992) in public places. They figured out that people need a reason to go somewhere and that they will stay longer and will walk more often to a public square that offers activities or functions like playgrounds, sport areas, art, food stores, cafés or shops. Furthermore, people in an examination of Malaysia's communities reported a high need for security and maintenance of public spaces (Leby & Hashim, 2010). Also Whyte (1980) and Project for Public Spaces (2005) stressed out the relation between cleanliness and maintenance of a public place and its perceived high livablity (Newman, 1999). It seems that the presence of these four physical livable dimensions and the consideration of their design attributes (see Tab. 1) lead to a higher perceived livability of public spaces.

For that reason it may be assumed:

Research Hypothesis 1: People tend to perceive a higher livability in public spaces that comply with physical livable dimensions (comfort, access, function & maintenance), compared to people in public spaces that do not comply with physical livable dimensions.

Operationalized Research Hypothesis 1: If the participants view images of Central European ventricle squares, that display beneficial attributes of the physical livable dimensions (comfort, access, function & maintenance), they will rate a higher subjectively-perceived livability on average, compared to participants who view the same images displaying harmful attributes of physical livable dimensions.

Sub-Hypothesis 1.1: People tend to perceive a higher livability in public spaces that comply with comfort, compared to people in public spaces that do not comply with comfort.

Operationalized Sub-Hypothesis 1.1: If the participants view images of Central European ventricle squares that display beneficial attributes of comfort like benches, trees, fountains and shelter, they will rate a higher subjectively-perceived livability on average, compared to participants who view the same images displaying harmful attributes of comfort like concrete ground or unconvienient stone blocks.

Sub-Hypothesis 1.2: People tend to perceive a higher livability in public spaces that comply with access, compared to people in public spaces that do not comply with access.

Operationalized Sub-Hypothesis 1.2: If the participantsview images of Central European ventricle squares that display beneficial attributes of access like missing fences and gates, existing street crossings, narrow roads and linkage to public transport, they will rate a higher subjectively-perceived livability on average, compared to participants who view the same images displaying harmful attributes of access like fences and gates, broad roads, missing street crossings and missing linkage to public transport.

Sub-Hypothesis 1.3: People tend to perceive a higher livability in public spaces that comply with function, compared to people in public spaces that do not comply with function.

Operationalized Sub-Hypothesis 1.3: If the participants view images of Central European ventricle squares that display beneficial attributes of function like a playground, a market, a sport field and chess field as well as shops and sculptures, they will rate a higher subjectively-perceived livability on average, compared to participants who view the same images displaying harmful attributes of function like empty spaces without any offers of activities.

Sub-Hypothesis 1.4: People tend to perceive a higher livability in public spaces that comply with maintanance, compare to people in public spaces that do not comply with maintenance.

Operationalized Sub-Hypothesis 1.4: If the participants view images of Central European ventricle squares that display beneficial attributes of maintenance like proper lanterns, trash cans, indicating labels as well as police offices and cars, they will rate a higher subjectively-perceived livability on average, compared to participants who view the same images displaying harmful attributes of maintenance like loose garbage, graffiti, bad lightning and potholes.

3.2 Hypothesis Regarding the Effect of the Social Environment

Public spaces are made for social exchange. People are attracted by more people (Whyte, 1980) and the connection to individuals, groups or society provided by public space is associated with higher well-being (Cattell et al., 2008). Socially-designed plazas have a higher amount of gathering groups, couples and interaction as well as women and elderly (Whyte, 1988). Project for Public Spaces (2000, 2005) measured in various researches that the interaction with other people in public spaces created a stronger reported sense of community and place attachment. They are also an important resource for creating and maintain social networks (Cattell et al., 2008). Even the satisfaction of social needs and human interaction was higher correlated with the attraction of public space compared to the satisfaction of needs provided by its physical design (Hajmirsadeghi, Shamsuddin, & Foroughi, 2014). Interestingly, the social environment of a neighborhood was less important for inhabitants in a Malaysian sample than the physical livable dimensions (Leby & Hashim, 2010). Because this study will deal with a Central European sample, we want to concentrate more on the evidence of Whyte (1980, 1988), Project for Public Spaces (2000, 2005) and Cattell et al. (2008).

For that reason it may be assumed:

Research Hypothesis 2: People tend to perceive a higher livability in sociable public spaces, compared to people in non-sociable public spaces.

Operationalized Hypothesis 2: If the participants view images of Central European ventricle squares that display humans, they will rate a higher subjectively-perceived

livability on average, compare to participants who view the same images without displaying humans.

3.3 Hypothesis Regarding the Interaction of Physical and Social Environment

The social and physical environment of public spaces are dependent and have a continuously impact on each other (Yen & Syme, 1999). Hajmirsadeghi, Shamsuddin, & Foroughi (2014) examined the correlation between environmental attraction and human need satisfaction provided by physical design dimensions and social activity. They found that the correlation of social activity and atrraction is higher than the correlation with the need satisfaction of physical design features as comfort, safety, discovery and joy. But there is also evidence that a beneficial physical design of public spaces is the requirement for high sociablity (Zakariya et al, 2014).

With regard to our study these evidences imply that people tend to perceive the highest livability in sociable public spaces that comply with physical livable dimensions, compared to all other conditions. Furthermore people tend to perceive a higher livability in sociable public spaces that do not comply with physical livable dimensions, compared to people in non-sociable public spaces that comply with physical livable dimensions. Additionally, people tend to perceive the lowest livability in non-sociable public spaces that do not comply with physical livable dimensions, compared to all other conditions.

For that reason it may be assumed:

Research Hypothesis 3: An ordinal interaction occurs between physical and social environment with the result, that the difference of perceived livability is bigger between the presence and absence of physical livable dimensions in the condition of sociable public spaces than in the condition of non-sociable public spaces.

Operationalized Hypothesis 3: The difference in average rating of subjectively-perceived livability on images of Central European ventricle squares containing humans is bigger between images that display beneficial attributes of physical livable dimensions and images that display harmful attributes of physical livable dimensions, compared to the same images not containing humans.

3.4 Explorative Hypotheses Regarding the Impact of Outer Characteristics

Some evidence exists that the evaluation of environments is influenced by socio-demographic factors like gender, age, cultural background, financial income and relationship status. In example, women evaluate and perceive public spaces more critically than men do (Whyte, 1980; PPS, 2005). Also children, teenagers as well as elderly people are more dependent of public resources and more critical in the perception of urban quality (Whyte, 1980; PPS, 2005; Nasution & Zahrah, 2014). Furthermore it seems that the financial income takes a crucial role on perceived livability, too. People of low-income households who live in a badly-designed neighborhood develop more likely depressions (Cutrona, Walace, & Wesner, 2006) and rated their neighborhood more prestigious than outsiders did (Cunningham, 1984). Because people with low income cannot afford commercial meeting and activity spaces as cafés, malls or movie theatres, they are more dependent on free resources like they are provided by urban squares. Even the relationship status and cultural background could have an impact on perceived livability.

For that reason it may be assumed:

Research Hypothesis 4.1: Women will differ in their perceived livability of public spaces, compared to men.

Operational Hypothesis 4.1: If the female participants view images of Central European ventricle squares, they will differ significantly in ther ratings of subjectively-perceived livability on average, compared to male participants who view the same images.

Research Hypothesis 4.2: Younger individuals will differ in their perceived livability of public spaces, compare to older individuals.

Operational Hypothesis 4.2: If the participants in an age under 30 years view images of Central European ventricle squares, they will differ significantly in their rating of subjectively-perceived livability on average, compared to participants in an age over 30 years, who view the same images.

Research Hypothesis 4.3: People with low income will differ in their perceived livability of public spaces, compared to people with high income.

Operational Hypothesis 4.3: If the participants with a net income under 1.000 Euro per month view images of Central European ventricle squares, they will differ significantly in their subjectively-perceived livability on average, compared to participants with a net income over 1.000 Euro per month, who view the same images.

Research Hypothesis 4.4: People with German background will differ in their perceived livability of public spaces, compared to people with Austrian background.

Operationalized Hypothesis 4.4: If the participants who grew up in Germany view images of Central European ventricle squares, they will differ significantly in their subjectively-perceived livability on average, compared to participants who grew up in Austria and view the same images.

Research Hypothesis 4.5: People in a romantic relationship will differ in their perceived livability of public spaces, compared to people who are not in a romantic relationship.

Research Hypothesis 4.5: If the participants who are part of a couple, a marriage or an alternative partnership view images of Central European ventricle squares, they will differ significantly in their subjectively-perceived livability on average, compared to participants who are single, divorced or widowed and view the same images.

3.5 Explorative Hypotheses Regarding the Impact of Inner Characteristics

An individual's inner psychological structures might additionally influence its perception and evaluation of an urban setting (Gifford, 2007). Our judgements of urban squares are influenced by our emotions or temperament, as Binswanger (1933) described in his aproach of tuned space. Pacione's stress model of urban impact (2003) also factors in individual differences as a predictor for environmental perception. It focuses on situational stress experience but also on personality traits. In example, the frequency of engaging in six outdoor recreation activities was correlated with scores on a general personality test (Driver & Knopf, 1977). Studies show that outgoing individuals prefer to be physical closer to others than do reserved individuals (Altman, 1975, p. 73). Additionally extraverted people spend more time in social places compared to their counterparts (Eddy & Sinnett, 1973). People who score low on emotional stability in standardized personality questionnaires report a

higher environmental sensibility and stress experience (Borkenau & Ostendorf, 1993). Beside these two personality traits we assume that openness for experience, agreeableness and consciousness (Costa & McCrae, 1992) as well as an individual's actual stress experience could have an impact on the perception and evaluation of public spaces, because these traits have a crucial influence on individuals' attitudes and preferences.

For that reason it may be assumed:

Research Hypothesis 5.1: Besides the presence or absence of livable dimensions of public spaces an individual's extraversion has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.1: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's extraversion score in NEO-FFI-30 does a significant difference compare to the impact of the same images without the inclusion of NEO-FFI-30's extraversion score.

Research Hypothesis 5.2: Besides the presence or absence of livable dimensions of public spaces an individual's neuroticism has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.2: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's neuroticism score in NEO-FFI-30 does a significant difference compare to the impact of the same images without the inclusion of NEO-FFI-30's neuroticism score.

Research Hypothesis 5.3: Besides the presence or absence of livable dimensions of public spaces an individual's openness for experience has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.3: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's openness score in

NEO-FFI-30 does a significant difference compare to the impact of the same images without the inclusion of NEO-FFI-30's openness score.

Research Hypothesis 5.4: Besides the presence or absence of livable dimensions of public spaces an individual's agreeableness has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.4: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's agreeableness score in NEO-FFI-30 does a significant difference compare to the impact of the same images without the inclusion of NEO-FFI-30's agreeableness score.

Research Hypothesis 5.5: Besides the presence or absence of livable dimensions of public spaces an individual's conscientiousness has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.5: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's conscientiousness score in NEO-FFI-30 does a significant difference compare to the impact of the same images without the inclusion of NEO-FFI-30's conscientiousness score.

Research Hypothesis 5.6: Besides the presence or absence of livable dimensions of public spaces an individual's actual stress experience has an additional moderating impact on his/her perceived livability in public spaces.

Operationalized Hypothesis 5.6: Besides the impact of displayed images of Central European ventricle squares, that display (beneficial or harmful) physical and (beneficial or harmful) social livable dimensions, the additional impact of participant's actual stress experience score does a significant difference compare to the impact of the same images without the inclusion of actual stress experience score.

CHAPTER 4 – METHODOLOGY

4.1 Participants

In this study we have examined a nonprobability sample including N = 601 participants ranging in age between 18 and 65 years (n = 503 between 18 to 29 years; n = 98 between 30 to 65 years) who voluntarily participated in this experiment. The sample includes n = 379 females and n = 216 males as well as n = 6 people who chose another gender. Most participants were students (n = 487 students; n = 104 employed; n = 10 unemployed) with a German cultural background (n = 552 Germany; n = 34 Austria; n = 15 other European countries). Furthermore all participants were highly-educated. While n = 377 subjects were partnered, n = 223 subjects were not (n = 1 missing answer). Over two-third of the sample had a monthly net income under 1.000 Euro while one-third earned more than 1.000 Euro in a month (n = 428 low income; n = 124 high income; n = 49 missing answers). Most subjects spoke German as mother tongue (n= 583) and n = 18 subjects spoke German as second language with a very good comprehension. The frequencies of this used sample are illustrated in Appendix D, Table D.1.19 – D.1.27.

The study took time from May 4, 2015 to June 8, 2015 for a period of five weeks. The study drop-out was up to 56.08%, caused by the chosen method of anonymous online survey and the duration of 15 minutes.

4.2 Research Design and Operationalization

We used a two-factorial, univariate randomization design for this study. As first independent (iV1) variable, we manipulated the appearance of the physical environment, including the livable dimensions of comfort, access, function and maintenance. In beneficial condition the four physical livable dimensions were implemented in a positive way, i.e. benches, seating, grass, trees, water elements and shelter served as beneficial attributes for comfort. In harmful condition the four physical livable dimension were implemented in a negative way, i.e. concrete ground and non-appropriate seating possibilities served as harmful attributes for comfort. As a second independent variable (iV2) the appearance of the social environment, including the livable dimension of sociability, was manipulated. For that reason our subjects viewed images of urban squares with or without humans. The operationalization of all square attributes for each dimension can be viewed in Table 2.

All voluntarily–participating subjects were randomly assigned to one of the four conditions: A1B1) beneficial physical environment & beneficial social environment, A1B2)

beneficial physical environment & harmful social environment, A2B1) harmful physical environment & beneficial social environment or A2B2) harmful physical environment & harmful social environment. As dependent variable (dV) we measured subjectively perceived livability of showed urban squares by participant's rating in self-constructed LIV-PS questionnaire.

Table 2.

Operationalization of all independent variables.

Livable dimensions		Beneficial attributes	Harmful attributes
Physical environment (iV1)	Comfort	Benches	Non-appropriate seating
		Trees	No trees
		Fountains	No fountains
		Grass	Concrete ground
		Shelter	No shelter
	Access	Crosswalk or traffic light	No crosswalk or traffic light
		Two-lane road with one car	Three-lane road with more than one car
		No barriers	Fence and gate
		Bus, tram or metro stop	No stop for public transport
	Function	Playground, chess field, basketball field, halfpipe or farmer's market	No activity spaces/ empty space
		Stores on ground level	No stores on ground level
		Public toilet	No public toilet
		Sculptures	No sculptures
	Maintenance	Many proper street lights	One or two poor street lights
		Garbage cans	Garbage on ground
		Police department or car	Vandalism and graffiti
		Signs for rules	No signs
		Groomed ground	Potholes on ground
Social environment (iV2)	Sociability	Individuals and groups of different gender and age	No humans

4.3 Procedure and Materials

The experiment was realized with the open source survey application LimeSurvey v2.05 (LimeSurvey, 2014). Invitations for the study were contributed online via social media, email lists of organizations dealing with architecture, urban planning and citizen participation as well as the student email lists of University of Technology in Dresden, Germany (Technische Universität Dresden) and University of Vienna, Austria (Universität Wien). After reading a short instruction about the purpose and procedure of the study the subjects were assigned via randomization to one of four conditions. The first part contained twelve images of three Central European ventricle squares per assigned condition which the subjects rated regarding perceived livability on a self-constructed Questionnaire for Capturing Livability in Public Spaces (LIV-PS).

To find suitable public spaces we searched online images of urban squares in different large cities with more than 200000 habitants in France, Germany and Austria. Fitting ventricle squares (n=14) with similar image composition were chosen and rated on a 6-point semantic differential (Osgood, Suci, & Tannenbaum, 1957) concerning the presence of the five livable dimensions by eleven experts of architecture, urban research and planning. Our selection range for well-fitting images was the rated presence on average plus a standard deviation of 0.5 for all fourteen images. The results and used images of this analysis are illustrated in Appendix A. Four images fulfilled this criteria. We decided to choose randomly three out of these four because of economic decisions. We controlled the influence of weather, colors and further environmental variables by removing sky, trees, humans, signs and more with the graphic software Adobe Photoshop CC (Adobe Systems Inc., 2015). After that step we added beneficial and harmful attributes of each physical livable dimension (see Table 2) and combined them with beneficial attributes of sociability. In sum we gained 48 black-and-white images for the presentation that can be viewed in Appendix B.1 – B.3. Afterwards, the three images of Central European public spaces, displaying Place Kléber (Strasbourg, France), Roßmarkt (Frankfurt am Main, Germany) and Altmarkt (Dresden, Germany) were presented in a size of 700x467px. Subjects viewed each plaza four times, always with a differently illustrated physical livable dimension. The output of those images was measured with a self-constructed questionnaire. The LIV-PS is an instrument that detects the manifestation of subjectively-perceived livability on three scales regarding met human needs of *health, well-being* and *social capital* (Newman, 1999) and is illustrated in Appendix C.1.

Before its implementation, LIV-PS was tested on n = 16 subjects who viewed four images containing all livable physical dimension (comfort, access, function and maintenance) regarding to one of the four conditions. In sum, 64 filled questionnaires were included into item analysis after Moosbrugger & Kelava (2012). Out of 29 original items we only included such with moderate item difficulty ($45<P_i<55$), high item variance ($Var_{(xi)}>1.176$) and high item selectivity ($r_{it}>0.768$). Furthermore a factor analysis with oblique rotation revealed three factors for LIV-PS. While most items of health and well-being scale loaded on the first factor and most items of social capital on the second, the analysis detected that three items of well-being scale loaded on a third factor that described attraction and arousal. Because this factor is not included in Newman's livability definition (1999) those items were eliminated. Also items that loaded moderately on more than one factor were excluded ($r > 0.3$). Additionally, we decided to eliminate a former livability scale containing four items because of theoretical reasons. Out of 29 original items in the pilot version, we took 13 items into account for LIV-PS. By analysing the reliability of all scales again we detected that a 12-item-version with high intern consistency (Cronbach's $\alpha = 0.936$) would be more efficient and economic. Appendix C.2 contains all results of item analysis.

During the second part of the experiment the participants filled a 30-item-short-version of NEO-Five-Factor-Inventory by Costa & McCrae (NEO-FFI-30; (Körner, et al., 2007). NEO-FFI is a multifactorial personality inventory, which portrays the manifestation of the dimensions neuroticism, extraversion, openness for experience, agreeableness and conscientiousness (Borkenau & Ostendorf, 1993). Originally, NEO-FFI collects data with 60 items but Körner et al. (2007) found in a representative German sample that a 30-item-short-version is more efficient. It increases the constructional validity, the independence of trait factors and reliability while using only the six most selective items of each dimension. Additionally, two items were added with a six-point Likert Scale to this section asking for one's actual daily stress experience and perceived quality of life.

The third part contained a self-constructed Questionnaire for Capturing Outer Characteristics (CHA-PS-ex) including socio-demographic data regarding gender, age, job, income, education level and cultural background. NEO-FFI-30 and CHA-PS-ex are illustrated in Appendix C.3 & C.4.

4.4 Data Analysis

IBM SPSS Statistics 21.0 (SPSS Inc., 2012) was used for data analysis in this study. As a first step we viewed socio-demographic frequencies of the sample (Appendix D, Table D.1.1 - D.1.9). Because we were confronted with a nonprobability sample and the disadvantages of high self-selection in online surveys, we had to clean up our data from bias firstly. For this reason, we decided to exclude 15 from originally 650 participants to create a more meaningful and homogeneous target population. Those excluded participants were characterized by strong underrepresentation of belonging age group (older than 65 years), education level (without a degree; compulsory basic secondary schooling/"Hauptschule"; certificate of secondary education/"Real- und Mittelschule") or job group (pupil; internship; retired). The frequencies after exclusion are illustrated in Appendix D, Table D.1.10 – D.1.18.

In the next step we ran an explorative data analysis for n = 635 participants to discover assumptions of normality and homogeneity of error variance. The subjectively-perceived livability scores in Kolmogorov-Smirnov test, $D_{dV}(635) = 0.070$, $p < .001$, deviate significantly from normal (Appendix D, Table D.2.2). To reduce this bias we followed instructions of Field (2013) and trimmed the data by using a standard deviation based rule. We calculated the trimmed mean and standard deviation of our livability scores, $M_{trim(5\%)} = 2.294$, SD = 0.639, and removed 34 values that were two times of standard deviation greater than the trimmed mean. Finally we did a second explorative data analysis with n = 601 subjects. The livability score, $D_{dV}(601) = 0.037$, $p = .045$, slightly deviated from normal (Appendix D, Table D.2.4), but the normality in the beneficial group, $D_{iV1(beneficial)}(356) = 0.035$, $p = .200$, and in the harmful group in the condition of physical environment, $D_{iV1(harmful)}(245) = 0.045$, $p = .200$, as well as the sociable group of social environment, $D_{iV2(sociable)}(312) = 0.036$, $p = .200$ was significantly given. Only the non-sociable group, $D_{iV2(non\text{-}sociable)}(289) = 0.060$, $p = .013$ lacked significantly in normality. By viewing histograms and Q-Q plots of all groups, we still detected a normal distribution in all conditions. Besides, Kolmogorov-Smirnov test can be significant in large samples, even when the scores are only slightly different from a normal distribution (Field, 2013). Therefore we interpreted the test results in conjunction with histograms, Q-Q plots as well as values of skew and kurtosis, and found normality in all conditions for livability scores (Appendix D, Table D.2.5 – 2.8, Figure D.2.7 - D.2.14). Levene's test was run to identify the homogeneity of error variance between experimental groups (Appendix D, Table D.2.9). For the livability scores the variance was equal between all experimental groups, $F(3,597) =$

1.405, p = .240. Because none of these data violated the assumptions, it was possible to run a robust, independent two-way ANOVA, including bootstrapping, for the hypotheses regarding the impact of physical and social environment as well as their interaction.

For the sub-hypotheses regarding the influence of each single physical livable dimensions we ran the same explorative data analysis (Appendix D, Table D.4.1 – D.4.6). Livability scores for comfort, $D_{COM(harmful)}(245) = 0.040$, p = .200, $D_{COM(beneficial)}(356) = 0.038$, p = .200, and function, $D_{FUN(harmful)}(245) = 0.046$, p = .200, $D_{FUN(beneficial)}(356) = 0.044$, p = .091, followed normal distribution in all conditions while scores for access, $D_{ACC(harmful)}(245) = 0.044$, p = .200, $D_{ACC(beneficial)}(356) = 0.052$, p = .020, and maintenance, $D_{MAI(harmful)}(245) = 0.034$, p = .200, $D_{MAI(beneficial)}(356) = 0.059$, p = .005, were significant in Kolmogorov-Smirnov test in the beneficial condition. K-S test only was significant in conditions with a higher amount of participants again, and claimed slight differences from normal as significant (Field, 2013). However, a view on Q-Q plots, histograms, skew and kurtosis also revealed in both conditions normality for all livable dimensions (Appendix D, Figure D.4.1 – D.4.16). Regarding the assumption of homogeneity of error variance, Levene's test did not find significant differences between experimental groups, $F_{COM}(1,599) = 1.587$, p = .208, $F_{ACC}(1,599) = 0.015$, p = .902, $F_{FUN}(1,599) = 0.363$, p = .547, $F_{MAI}(1,599) = 0.556$, p = .456. As a result of explorative data analysis it was possible to run independent one-way ANOVA with robust bootstrapping for the sub-hypotheses, too. For the effect sizes of the impact of environments on perception we used η^2 as well as the comparable and more accurate effect size r that was calculated with the help of Field (2013, p.472).

For the hypotheses regarding the impact of inner characteristics we added trait scores on average of NEO-FFI and actual stress experience as covariates to the model and tested if assumptions are not violated for conducting an independent two-way ANCOVA (Appendix D, Table D.8.1 – D.8.6). The independence of physical environment and covariates was given for neuroticism, $F_{iV1*neuro}(1,596) = 2.814$, p = .095, extraversion, $F_{iV1*extra}(1, 596) = 0.362$, p = .548, openness for experience, $F_{iV1*open}(1,596) = 2.767$, p = .097, agreeableness, $F_{iV1*agree}(1,596) = 0.045$, p = .833, conscientiousness, $F_{iV1*consci}(1,596) = 0.001$, p =.980 and actual stress experience, $F_{iV1*stress}(1,595) = 0.001$, p = .978. The independence of social environment as a treatment variable and covariate was given for neuroticism, $F_{iV2*neuro}(1,596) = 0.168$, p = .682, extraversion, $F_{iV2*extra}(1, 596) = 1.262$, p = .262, openness for experience, $F_{iV2*open}(1,596) = 0.367$, p = .545, conscientiousness, $F_{iV2*consci}(1,596) = 0.291$, p =.590 and actual stress experience, $F_{iV2*stress}(1,595) = 0.648$, p = .421. Unfortunately, the assumption was violated for social environment and agreeableness,

$F_{iV2*agree}(1,596) = 4.220$, p = .040, as a covariate. Furthermore, assumptions of homogeneity of regression slopes were tested (Appendix D, Table D.8.7 - D.12). While this assumption was not violated for scores of neuroticism, $F_{iV1}(1,594) = 0.042$, $p = .882$, $F_{iV2}(1,594) = 0.009$, $p = .837$, extraversion, $F_{iV1}(1,594) = 2.870$, $p = .091$, $F_{iV2}(1,594) = 0.216$, $p = .642$, openness for experience, $F_{iV1}(1,594) = 1.276$, $p = .259$, $F_{iV2}(1,594) = 1.597$, $p = .207$, agreeableness, $F_{iV1}(1,594) = 0.486$, $p = .486$, $F_{iV2}(1,594) = 0.434$, $p = .510$ and actual stress experience, $F_{iV1}(1,593) = 0.561$, $p = .454$, $F_{iV2}(1,593) = 1.726$, $p = .189$. Heterogeneity of regression slopes occurred for scores of conscientiousness, $F_{iV1}(1,594) = 1.177$, $p = .278$, $F_{iV2}(1,594) = 5.559$, $p = .019$, which means that the relationship between outcome and covariate is not the same across all experimental groups. Because the assumptions for an independent two-way ANCOVA were violated for the covariates agreeableness and conscientiousness, we decided to run bootstrapping as a robust method, additionally. Despite this robust method, the results for these two covariates should be interpreted carefully.

As a last step we checked socio-demographic data for assumptions (Appendix D, Table D.6.1 - D.6.15, Figure D.6.1 – D.6.10). The categories of gender, $D_{female}(379) = 0.046$, $p = .053$, $D_{male}(216) = 0.038$, $p = .200$, as well as age, $D_{18\text{-}29years}(503) = 0.040$, $p = .052$, $D_{30\text{-}65years}(98) = 0.053$, $p = .200$, and income, $D_{<1,000€}(428) = 0.043$, $p = .059$, $D_{>1,000€}(124) = 0.047$, $p = .200$, did followed normal distribution and were also homogenous in error variance between groups, $F_{gender}(1,594) = 0.649$, $p = .421$, $F_{age}(1,599) = 0.066$, $p = .798$, $F_{income}(1,550) = 0.069$, $p = .793$. Because assumptions were not violated in these three cases, it was possible to run an independent one-way ANOVA for the hypotheses regarding the impact of gender, age and income on subjectively-perceived livability. Unfortunately, data of cultural background, $D_{Germany}(552) = 0.040$, $p = .037$, $D_{Austria}(34) = 0.087$, $p = .200$, and relationship status $D_{non\text{-}partnered}(223) = 0.048$, $p = .200$, $D_{partnered}(377) = 0.052$, $p = .016$, had a lack in normality in Kolmogorov-Smirnov test for people with a German background and who were partnered, even if their error variance was homogenous between all categories, $F_{culture}(1,585) = 2.001$, $p = .158$, $F_{relationship}(1,598) = 1.425$, $p = .233$. For these reasons, subjectively-perceived livability scores were ranked and Mann-Whitney U-test had been used as a non-parametric method for these two hypotheses regarding the impact of outer characteristics. The effect size *r* for non-parametrical tests was calculated with help of Field (2013, p.227).

CHAPTER 5 – RESULTS

5.1 Results Regarding the Effect of the Physical Environment

The results regarding the influence of the physical environment on subjectively-perceived livability are illustrated in Appendix D (Table D.3.1 – D.3.6). There was a significant main effect of showed public spaces with harmful or beneficial physical attributes on subjectively-perceived livability scores, $F(1,597) = 165.381$, $p < .001$, $\eta^2 = .217$. Thereby, subjects perceived and evaluated a significantly higher livability in the condition of *beneficial physical environment* (M = 2.522, SD = 0.473), compared to the condition of a *harmful physical environment* (M = 2.054, SD = 0.488). Our participants rated public spaces with beneficial physical attributes more livable than urban squares with harmful physical attributes (see Figure 11). Also the effect size ($r = .46$) revealed that physical design of public spaces highly correlates with people's perceived and evaluated livability of urban environments.

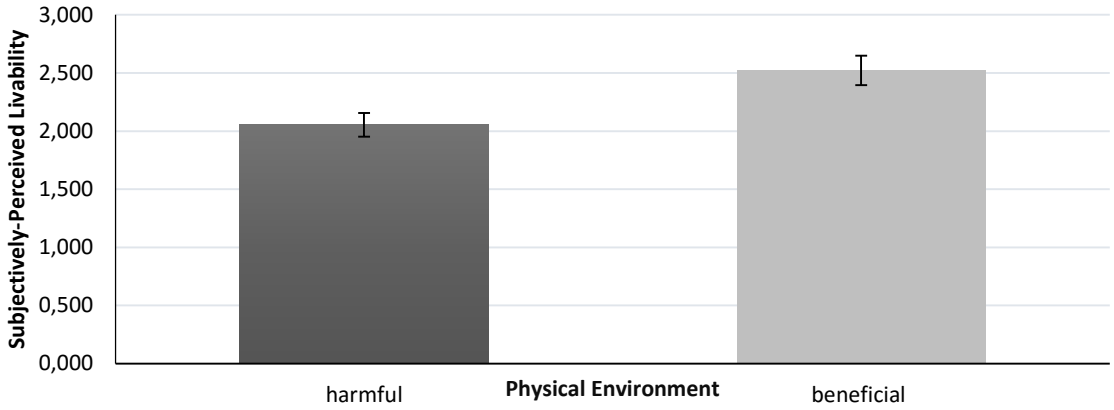

Fig. 11. Main effect of physical environment on subjectively-perceived livability in urban squares.

The results regarding the influence of each physical livable dimension on subjectively-perceived livability are illustrated in Appendix D (Table D.5.1 – D.5.17). There was also a significant main effect for each of the four physical livable dimensions. The images that displayed harmful and beneficial aspects of comfort differed significantly in their subjectively-perceived livability, $F(1,599) = 178.760$, $p < .001$, $\eta^2 = .230$. Subjects perceived and evaluated public spaces with *harmful aspects of comfort* (M = 2.654, SD = 0.686) significantly lower than those with *beneficial aspects of comfort* (M = 3.383, SD = 0.636). The participants rated highly-comfortable urban squares more livable than lowly-comfortable urban squares (see Figure 12). The livable dimension of comfort also seems to

correlate positively (r = .48) with people's perceived and evaluated livability of urban squares.

Similar results were found for the livable dimension of access. Experimental groups of access differed significantly in their subjectively-perceived livability, F(1,599) = 7.742, p = .006, η^2 = .013, too. Subjects perceived and evaluated urban squares with *harmful aspects of access* (M = 1.686, SD = 0.949) significantly lower in livability than those who perceived and evaluated urban squares with *beneficial aspects of access* (M = 1.835, SD = 0.648). In other words, well-accessible public spaces led to a higher perceived livability compared to urban squares with low access (see Figure 12). We also recognized a slight, positive correlation of space accessibility with person's perceived livability in urban squares (r = .11).

Furthermore significant evidence for the livable dimension of function was found. Subjectively-perceived livability ratings differed significantly between both subject groups, F(1,599) = 51.429, p < .001, η^2 = .079. *Harmful aspects of function* (M = 2.554, SD = 0.659) produced a significant lower livability by participants compared to *beneficial aspects of function* (M = 2.959, SD = 0.696). Urban squares which offered functions reached a higher subjectively-perceived livability than empty urban square without any functions (see Figure 12). There was also a moderate, positive correlation between livable dimension of function and people's rated livability of urban environments (r = .28).

The fourth livable dimension of maintenance showed a significant main effect on questionnaire scores, F(1,599) = 113.010, p < .001, η^2 = .159. *Beneficial aspects of maintenance* (M = 1.911, SD = 0.687) were judged with a higher livability by participants

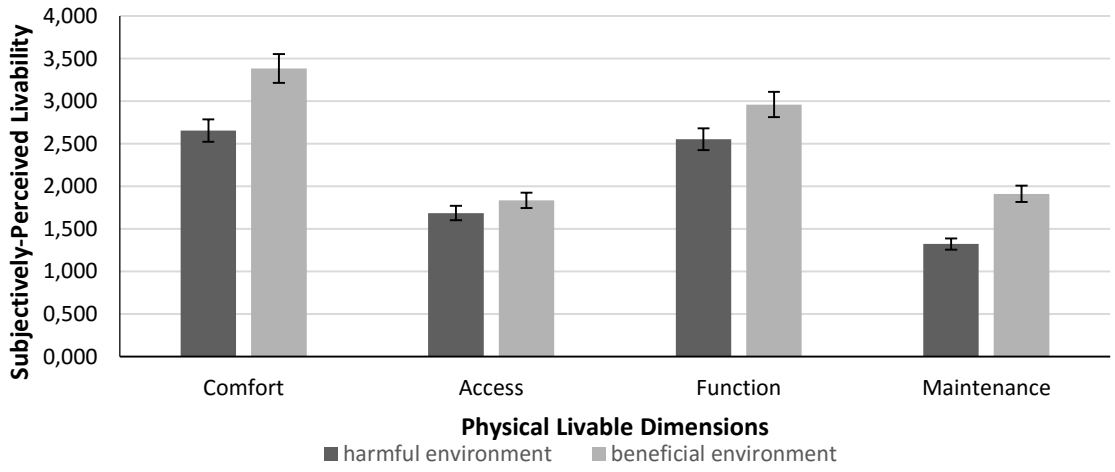

Fig. 12. Main effect of physical livable dimensions (comfort, access, function, maintenance) on subjectively-perceived livability in urban squares

compared to *harmful aspects of maintenance* (M = 1.322, SD = 0.638). Well-maintained urban squares led to a higher evaluation of livability than those urban squares with no maintenance (see Figure 12). Additionally, we found a moderate positive correlation (r = .40) between maintenance and people's perception of a livable urban space. The results for comfort, access, function and maintenance are illustrated in Figure 12 for both experimental conditions.

5.2 Results Regarding the Effect of the Social Environment

The results regarding the influence of the social environment on subjectively-perceived livability are illustrated in Appendix D (Table D.3.1 – D.3.5 & D.3.7). There was a significant main effect of the livable dimension of sociability on subjectively-perceived livability, $F(1,597) = 35.193$, $p < .001$, $\eta^2 = .056$. Urban squares displaying *humans* (M = 2.406, SD = 0.517) were rated significantly higher in livability than those displaying *no humans* (M = 2.251, SD = 0.535). Sociable public spaces are experienced more livable compared to non-sociable public spaces (see Figure 13). The effect size (r = .24) revealed a moderate positive relationship between sociability and people's perceived and evaluated livability of urban environments.

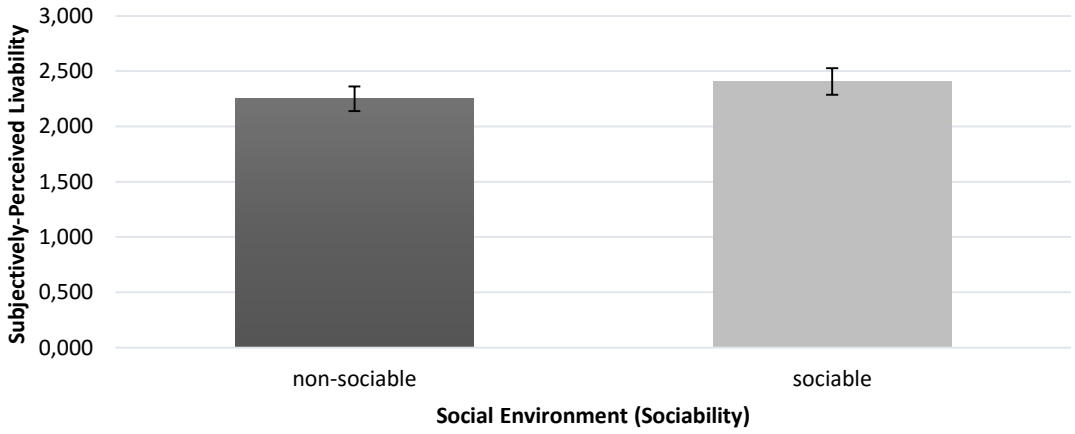

Fig. 13. Main effect of social environment on subjectively-perceived livability in urban squares

5.3 Results Regarding the Interaction of Physical and Social Environment

The results regarding the interaction of the physical and social environment on subjectively-perceived livability are illustrated in Appendix D (Table D.3.1 – D.3.5 & D.3.8). There was a significant interaction between the design of physical environment and the appearance of humans in social environment on the subjectively-perceived livability in urban squares, $F(1,597) = 12.282$, $p < .001$, $\eta^2 = .020$. This ordinal interactional effect (r =

.14) indicates that beneficial and harmful physical environment were affected the same way by the appearance of humans. It increased the subjectively-perceived livability of the participants in both conditions. The differences in subjectively-perceived livability between harmful and beneficial physical environments were smaller in sociable public spaces compared to non-sociable public spaces (see Figure 14a and 14b). The highest subjectively-perceived livability was rated in the physically-beneficial and sociable environment (M = 2.571, SD = 0.506). The second highest livability was also perceived in the physically-beneficial but non-sociable environment (M = 2.477, SD = 0.437) followed by physically-harmful and sociable environment (M = 2.208, SD = 0.488). The lowest livability was perceived in the physically-harmful and non-sociable environment (M = 1.841, SD = 0.447).

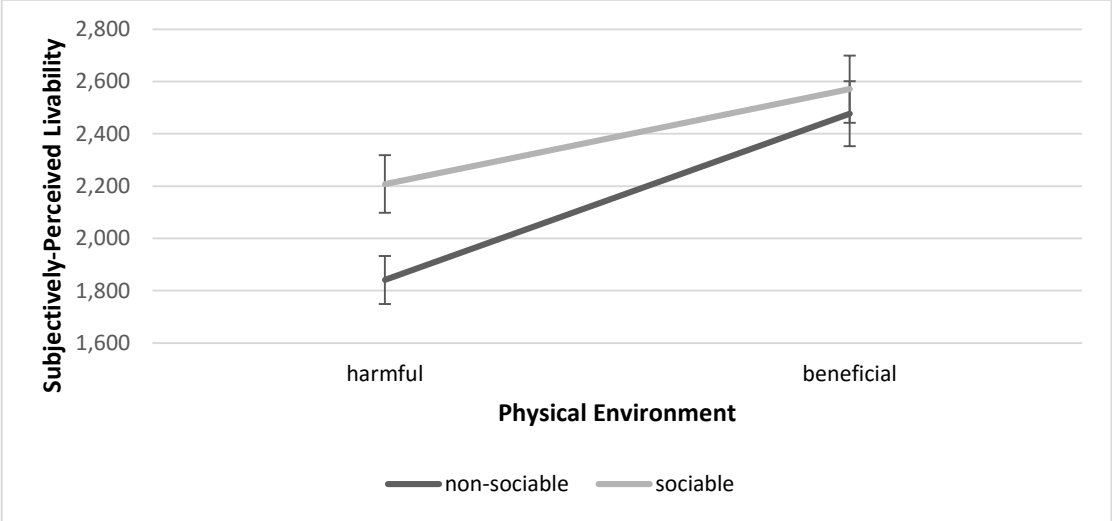

Fig. 14a. Interactional effect of physical and social environment on subjectively-perceived livability in urban squares (1)

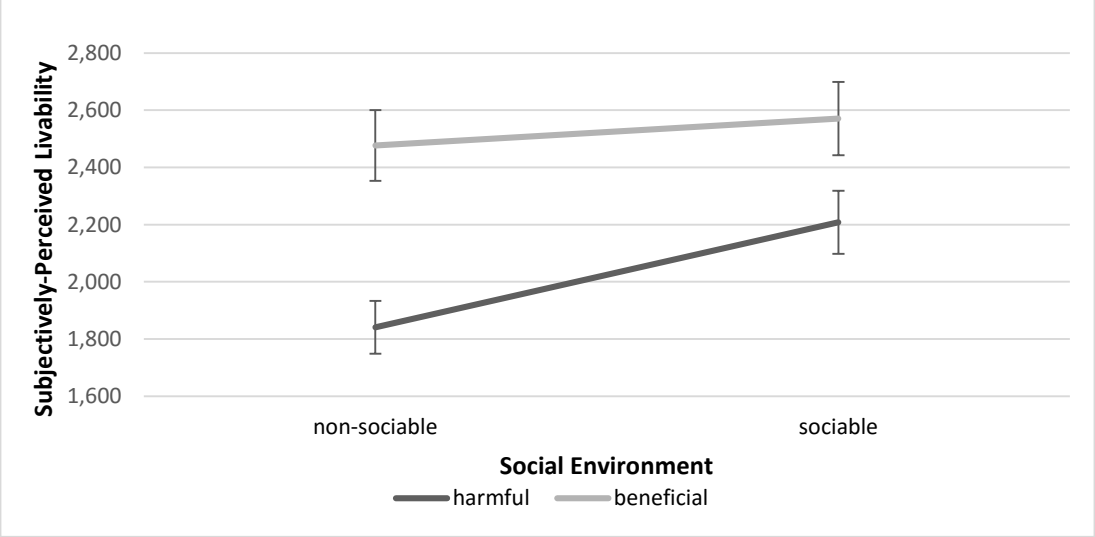

Fig. 14b. Interactional effect of physical and social environment on subjectively-perceived livability in urban squares (2)

5.4 Results Regarding the Impact of Outer Characteristics

The results regarding the influence of the socio-demographic characteristics on subjectively-perceived livability are illustrated in Appendix D (Table D.7.1 – D.7.11). There was a significant effect of age on subjectively-perceived livability, F(1,599) = 5.514, p = .019, η^2 = .009. The evaluated and perceived livability was significantly higher in younger participants under 30 years (M = 2.354, SD = 0.530) than those of elder participants over 30 years (M = 2.216, SD = 0.524). This effect (r = .09) means that people under 30 years seem to perceive generally livability of public spaces slightly higher compared to people over 30 years.

Surprisingly, there was no significant effect of gender, F(1,593) = 1.048, p = .306, η^2 = .002, and income on subjectively-perceived livability in public spaces, F(1,550) = 1.995, p = .158, η^2 = .004. The rated scores on average in LIV-PS questionnaire were similar in females (M = 2.347, SD = 0.521) and males (M = 2.301, SD = 0.551) as well as for subjects with a low (M = 2.316, SD = 0.528) and high income (M = 2.392, SD = 0.532). Furthermore, participants with a German cultural background (M = 291.66) did not differ significantly from participants with an Austrian cultural background (M = 323.29) in their ranked subjectively-perceived livability, U = 10,397.000, z = 1.057, p = .290, r = 0.04. The same non-significant evidence was found for subjects' relationship status. Partnered subjects (M = 298.92) did not differ from non-partnered subjects (M = 303.18) in their ranked subjectively-perceived livability, U = 41,438.000, z = -0.291, p = .771, r = -.01. In other words these results signify that the perceived and evaluated livability in public spaces is not influenced by gender, income, cultural background or a person's emotional bonds. An illustration of these effects can be found in Figure 15a-e.

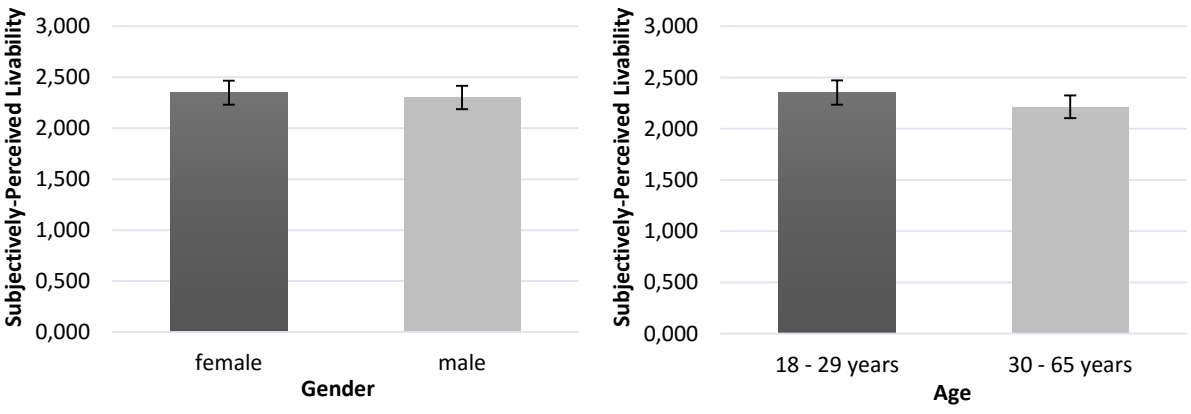

Fig 15a-b. Effect of *a)* gender (left) and *b)* age (right) on subjectively-perceived livability in urban squares

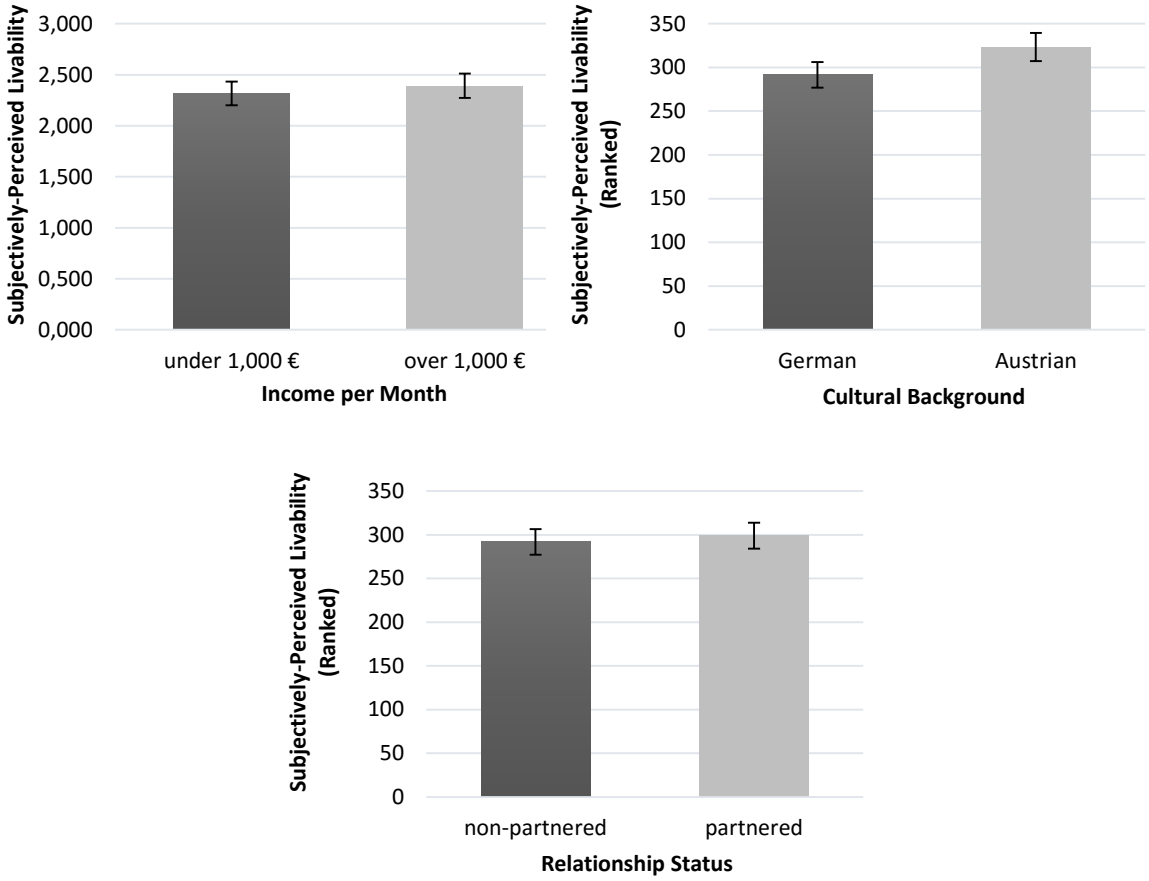

Fig 15c-e. Effect of *c)* income (upper left), *d)* cultural background (upper right) and *e)* relationship status (lower middle) on subjectively perceived livability in urban squares

5.5 Results Regarding the Impact of Inner Characteristics

The results regarding the influence of people's personality and stress experience on subjectively-perceived livability as covariates are illustrated in Appendix D (Table D.9.1-D.9.28). The covariate, neuroticism, was not significantly related to the participant's subjectively-perceived livability, $F(1,595) = 0.165$, $p = .684$, $\eta^2 = .000$. Furthermore, we did not find any significant relations between NEO-FFI personality traits like extraversion, $F(1,595) = 1.196$, $p = .275$, $\eta^2 = .002$, openness for experience, $F(1,595) = 0.976$, $p = .324$, $\eta^2 = .002$, agreeableness, $F(1,595) = 2.838$, $p = .093$, $\eta^2 = .004$ and conscientiousness, $F(1,595) = 0.133$, $p = .736$, $\eta^2 = .000$. These results indicate that Costa & McCrae's Big Five (1992) did not have a moderating impact on the relationship between livable dimensions of public spaces and subjectively-perceived livability.

Actual stress experience was also not significantly related to the participant's subjectively-perceived livability, $F(1,594) = 0.222$, $p = .637$, $\eta^2 = .000$. We did not find any evidence for a moderating or mediating effect of this covariate.

CHAPTER 6 – DISCUSSION

6.1 Discussion of Findings Regarding the Effect of Livable Dimensions

This study revealed that the five livable dimensions of public spaces: comfort, access, function, maintenance and sociability, have an important impact on people's perception and evaluation of livability in public spaces. Thereby, the physical environment and its design had a strong impact on assessed urban quality and connected resources of health, well-being and social capital so that we have to confirm research hypothesis 1. As it was theoretically promoted by former research (Whyte, 1980; Carr et. al, 1992; PPS, 2005), a well-groomed square that provides nature, seating, activities, easy access or connection to streets and public transport was significantly more successful in rated urban quality than those public spaces that did not provide these attributes.

We also found significant evidence for the sub-hypotheses 1.1 to 1.4 regarding the effect of the physical livable dimensions of comfort, access, function and maintenance. An overview about the found impact of each livable dimension on subjectively-perceived livability is illustrated in Table 3.

Table 3

Effect sizes about the impact of livable dimensions on subjective-perceived livability.

Livable dimension	η^2	*r*	*p*
Comfort	.230	.48	< .001*
Maintenance	.159	.40	< .001*
Function	.079	.28	< .001*
Sociability	.056	.24	< .001*
Access	.013	.11	.006*

Note: *p* = significance level p <.05; * statistical significant in sample;
η^2 = variance in sample explained by livable dimension;
r = standardized correlation between livable dimension and subjectively-perceived livability.

As found in former research (Whyte, 1980; PPS, 2005; Nasution & Zahrah, 2014; Zakariya et al., 2014), the highest significant correlation was produced by the livable dimension of comfort. Images of public spaces with seating possibilities, trees, grass and shelter and water elements correlated highly with the urban need satisfaction of participants and were strongly associated with health, well-being and social capital.

Comfort was and is a crucial, recreational factor for good place making but also the physical livable dimensions of function produced a moderate effect in this study. Images of public spaces with shops, facilities and activity offers like playgrounds, farmer's market or sport fields were rated significantly higher in their subjectively-perceived livability compared to its non-functional counterparts. It seems that multiple functions in urban squares give people a reason for visiting and staying there. Activities connect people with their community, fulfill inhabitant's needs and lead to passive as well as active engagement with their environment (Carr et al., 1992). Playgrounds, sport engines, jogging and cycling paths, chess fields, farmer's markets, festivals help people to stay actively, to amuse and express themselves, to support their autonomy in and control of the urban environment as well as to stay socially and to mingle with others. These activities can lead to high well-being as well as health and are fundamental recreational resources. They also provide the lonely city dweller with social interaction and community participation (Cattell et al., 2008).

Interestingly, the third livable dimension of access had a small significant effect on people's livability. People who viewed images of public spaces with a lowly frequented two-lane road with public transport vehicles, traffic lights and crosswalks as well as stops for public transport significantly rated a higher subjectively-perceived livability than those who viewed the same images of public spaces with fences, barriers and a heavily frequented three-lane road with cars. But compared to the other physical livable dimension the effect was only a slight one for access. It has to be mentioned, that access only is a named dimension in studies of Whyte (1980, 1988) and Project of Public Spaces, which has it approach found on the heritage of Whyte. Nasution & Zahrah (2014) detected accessibility in an Indonesian field study of real public spaces in Medan as the most insignificant factor of community perception on public spaces' urban quality. In addition, Leby & Hashim (2010) did not found this livable dimension in their Malaysian sample, Carr et al. (1992) declared access more as a right of people, not as a spatial need like we used it in this study. Maybe for most typical people of western societies, like in our European sample, access is not a critical need anymore because most public places, especially ventricle squares like they were used in the study, are always open to most social groups when they are needed. So called social outsides like punks, unemployed and homeless people or persons with chronical illnesses for example are faster excluded from society and therefore more affected by higher access regulations (Cattell et al., 2008). For these social groups access maybe is still an important livable dimension of public space but unfortunately we did not collect data of these social groups. A possible wrong understanding of the access dimension could be

another explanation for this small effect. Zakariya, Harun, & Mansor (2014) described access more as optical visibility into a square and the resulting connection to the street by it. This aspect was given by the operationalization through fences and gates as visual protection but could be influenced by contraproductive features like street traffic regardless whether of cars or public transport vehicles. Future research is needed to explain the data situation regarding access.

Finally, the fourth livable dimension of maintenance surprised our expectations, too. Maintenance and security in public spaces showed a strong significant effect on subjectively-perceived livability in our data. Cleaned-up and secure urban squares with good lightning and police presence were rated significantly higher compared to messed-up and unsecure urban squares with bad lightning, ruined ground and graffiti. This significant difference was not a surprise but we were astonished by the high amount of the effect size. While a high effect was also found in an eastern society sample (Leby & Hashim, 2010), people of western society general do not like to much control of the public. They look for escape and relaxation not for permanent surveillance (Cattell et al., 2004, 2008). However, our subjects clearly prefered well-maintained and secure public spaces but the significant effect could also be a result of the strong contrasted images because the harmful condition looked very unrealistic.

Also, clear evidence was found for the influence of social aspects on urban quality. Vibrant and sociable public spaces were rated significantly higher in livability than their non-sociable counterparts so that we can confirm research hypothesis 2. A moderate effect of the livable dimension of sociability was detected in our sample. People attract more people as William H. Whyte (1988, p.19) would say. But the effect was not that high as it was expected by the results of Hajmirsadeghi, Shamsuddin, & Foroughi (2014). They detected that the most variance in environmental attraction came from social conditions of public spaces. In our sample it came from the physical design. One methodical reason for this non-conform result could be slight bias and deviation from normal distribution in our data. However, we used robust statistical methods for controlling the influence of bias. As mentioned in the upper paragraph, the contrasts between beneficial and harmful physical environments in the used image material were extreme and appeared a bit unrealistic compared to the differences we can find in reality. Therefore, the effect of physical design maybe overlapped the effect of sociability.

Like in that named study, physical and social environment interacted with and enhanced their effect on each other in our sample, too. Hajmirsadeghi et al. (2014), emphasized the importance of sociability in urban environments and its strong interaction

with physical features on perceived environmental quality. However, our sample revealed a stronger main effect for the physical environment compared to the main effect of social environment. Both independent variables slightly interacted with each other, but against the result of previous research we found that the differences of group means of the physical environment were significantly higher in non-sociable public spaces than in sociable public spaces. For this reason we have to falsify research hypothesis 3. An ordinal interaction of physical and social environment does exist. The livable dimension of sociability can compensate the effect of public space's harmful physical design,but that compensatory effect of sociability is smaller than thought. So physical design of public spaces seems to be a more crucial factor for city dweller's perceived and evaluated livability. Regardless of this statistical evidence, public spaces develop themselves through their third quality, too (Richter & Hahn, 2013, p. 321). The chosen experimental method of rating subjectively-perceived livability in showed, manipulated images of public spaces did not allow to perceive and evaluate urban squares including the whole sum of its third quality. Participants reported via email afterwards that it was difficult to feel the whole atmosphere of showed urban squares. The social and cultural context, i.e. the mingling, observing, lingering of as well as the connection to other people (Cattell et al., 2008; Carr et al., 1992) is not a quality that is only perceived visually. In general, visitors of public spaces experience those atmospheres by moving around and using their visual as well as their auditory, olfactory and tactile perception, too. In this study, we could only study with our experimental method a small part of what Kruse describes as space of perception (1974).

6.2 Discussion of Findings Regarding the Impact of Personal Characteristics

Beside those clear effects of design factors, we tested the impact of socio-demographic attributes on subjectively-perceived livability. Like William H. Whyte (1980, 1988) observed age differences in his Street Life Project, age had a small effect on livability scores in our sample, too. In general, participants over 30 years seemed to be more critically with the appearance of an urban square compared to younger people. We can confirm research hypothesis 4.2. An explication for this result can be found in people's collected life experience. Older city dwellers have lived longer in urban areas and experience a higher amount of diverse urban environments compare to younger people. They moved and had to adjust themselves more often to new places. As a consequence of this, people's expectation rises with time. Therefore, higher age is maybe connected with more explicit environmental demands and needs. Also, with entering the phase of professional life, usually in an age

between 25 and 30 years in an academic-educated sample like ours, individuals are able to afford a proper life style. This could lead to increasing expectations in livability, too. Most of today's urban squares are designed with an eye for children and teenagers. Playgrounds and sport fields are common. There is a high offer of activities for the demands of people under 30 years in modern urban squares. Environmental needs of the elderly are sometimes neglected. Regarding the found evidence in this study, urban creators should more focus on the demands of adults and best agers, too. Non-commercial functions like community festivals that increases needs for sociability and a higher focus on recreational zones with natural elements and seating opportunities could be a beginning.

However, against observations of Whyte (1980) and Cattell et al. (2008) other socio-demographic attributes like gender or income did not make a difference on perceived urban quality. Also the exploration of differences between German and Austrian culture as well as partnered and non-partnered subjects was negative and did not result in group differences or significant effects on livability. Therefore research hypotheses 4.1, 4.3, 4.4 and 4.5 must be disproven. We did not find any other evidence for differences between socio-demographic groups, besides the qualitative results of Whyte's Street Life Project (1980) and Cattell et al.'s (2008) South London study. Maybe differences in quality awareness only exist in people's imagination produced through overtaken stereotypes or societal expectations and role models. Using qualitative self-report methods could transport those imaginations into apparent results even if there is no existing differences. On the other hand and more likely differences to the theory (Whyte, 1980; PPS, 2005; Cattell et al., 2008) can be explained by our nonprobability sample. We did not work with existing representative neighborhoods and their public spaces. While we decided to use the method of online survey to reach more participants, we risked the lack of a valid sample (Duda, 2010). All participants are self-selected and maybe differed in their responds. It is very likely that self-selected subjects in general are more interested in issues regarding design of public spaces or urban quality and therefore are more aware of and concentrate on the relationships between predictors and criterion. This could lead to different evaluations and a lower socio-demographical impact of the conditions compared to a probability sample. This is what Duda (2010) called a stakeholder bias. Subjects, who participated voluntarily, were more likely connected with those topics and therefore more positively in their results than the average person. As further critique, socio-demographic data could not be used as covariates to the model because of the chosen sort of categorical data. It was only possible to calculate socio-demographic impact on subjectively-perceived livability.

As last part of this study we were interested in the effect of intrapersonal covariates to the LIV-PS model. But there was no significant impact of any of Costa & McCrae's personality traits: neuroticism, extraversion, openness for experience, agreeableness and conscientiousness. Also, evaluated livability even was unaffected by actual daily stress experience of participants. Therefore we have to disprove research hypotheses 5.1 to 5.6. Personality or stress experience does not seem to have an effect on perception of urban quality in this study. It seems more likely that personality has more influence on direct behavior in public spaces as studies showed (i.e. Driver & Knopf, 1977) than in the process of evaluation and perception. But this could not be measured with the chosen research methods in this study.

Minimal, still non-significant, trends can be found for extraversion or agreeableness in the results. Studies show that outgoing individuals evaluate landscapes differently than do reversed individuals. Individuals who reported to need others found landscapes to be more serene, beautiful and cultivated than those who reported to need less support of others (Craik, 1975). Also outgoing individuals rated landscapes as more attractive and busy than reversed individuals did (Feimer, 1981). In other words, traditional measures of personality as in NEO-FFI-30 (Körner, et al., 2007) are not designed for the domain of environmental behavior (Gifford, 2007, p. 122). Questionnaires like the *Environmental Personality Inventory* (EPI; Sonnenfeld, 1969) or the *Environmental Response Inventory* (ERI; McKechnie, 1974) and their constructs are more theoretically related to environmental perception or behavior. While Sonnenfeld's EPI measures environmental sensitivity, environmental mobility, environmental control and environmental risk-taking as an early environmental personality typology, ERI was an attempt to create a broad-band assessment instrument with all personality dispositions that are relevant to our daily interaction with the physical environment (Gifford, 2007, p.126). These environmental personality dispositions include pastoralism, urbanism, environmental adaption, stimulus seeking, environmental trust, antiquarianism, need for privacy as well as mechanical orientation. Those personality dispositions can be better used for the assessment of urban environmental quality in future studies.

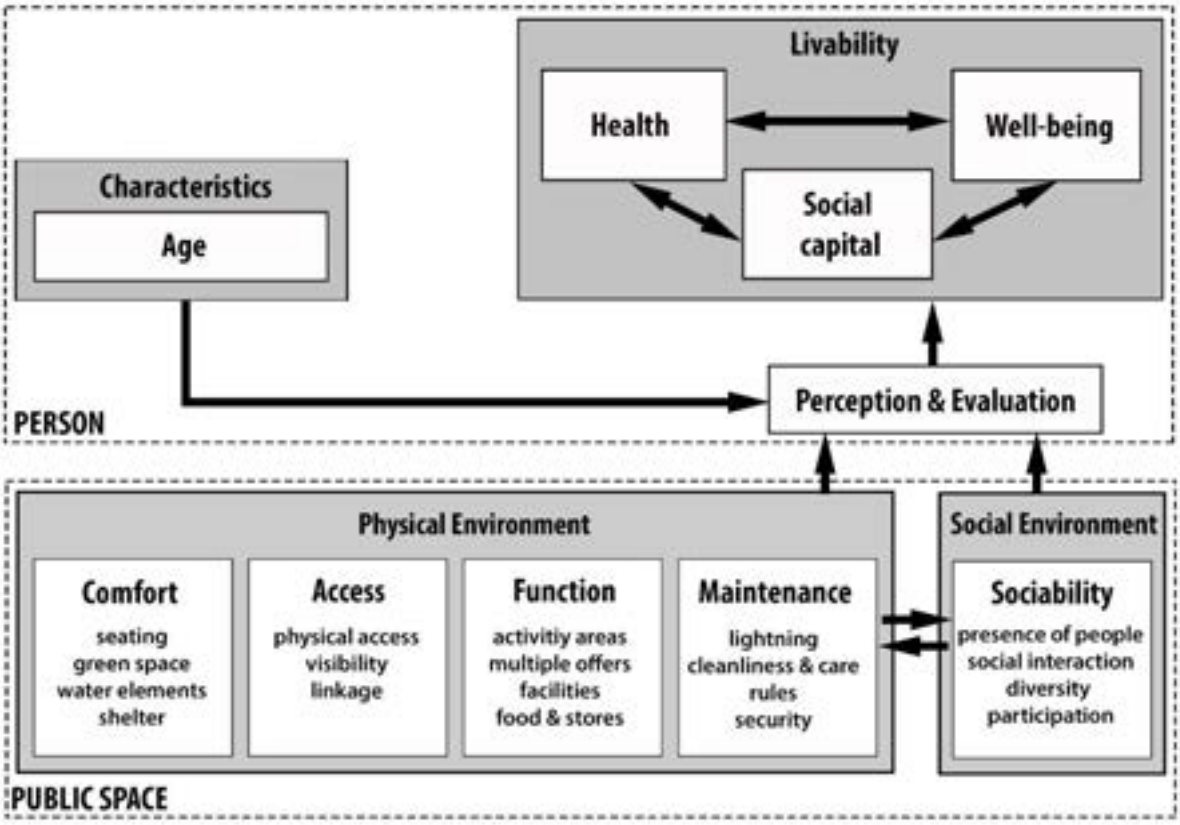

Fig 16. The evidence-based LIV-PS Model

To summarize all discussed results we want to revise the postulated LIV-PS model and include all evidence of this study. The evidence-based LIV-PS model can be viewed in Figure 16 as an overall result of this study. All postulated relationships between physical and social environment as well as their ordinal interaction on subjectively-perceived livability can be confirmed and are included into the model. Furthermore, age had an additional impact on subjectively perceived livability. All other postulated inner and outer characteristics have been disproven in our sample. Nevertheless, more qualitative research in the field of urban quality, especially concerning public spaces, is needed and we hope that evidence of a probality sample could definitely improve the LIV-PS model.

6.3 Limitations

Despite the found evidence for the impact of livable dimensions on city inhabitant's perception of livability and associated resources of health, well-being and social capital, the outcome cannot be generalized for every public space and type of city dweller. First of all, we missed probability of the sample and self-selection of participants took place. The typical participant was a highly-educated German student in an age from 20 to 29 years what means that our conclusions are primarily applicable for these type of person. Furthermore, we only

used Central European ventricle squares as image material for public spaces and the results can be only applied for those cases. On the other hand, there are a lot of studies who found similar outcome in public spaces of Malaysia, Indonesia, the United States or Australia (PPS, 2005; Leby & Hashim, 2010; Nasution & Zahrah, 2014; Zakariya, Harun, & Mansor, 2014).

As a third limitation we only collected data regarding the space of perception (Kruse, 1974), excluding the space of action. Every evaluation was the outcome of a pure and unbiased perceptional and cognitive process. The important context of chosen public spaces (Korosec-Serfaty, 1990) was not integrated in the evaluation. Subjects were not part of showed urban squares and did not experience all domains of the atmospheres. They could not integrate tactile, auditory or olfactory information in their evaluation. Also, participants could not include their actions, their personal memories and experience of that places, which are important integrational part of inhabitant's need satisfaction (Carr et al., 1992). The use of a self-constructed questionnaire for the dependent variable of subjectively-perceived livability is another limitation. It is quite possibile that the questionnaire and its construct of livability by Newman (1999) lacked in theory. Because of this, we proved and redeveloped LIV-PS a lot before its implementation until its reliability and factor loads were satisfactory.

Additional to the obvious, unrealistic manipulation of showed settings, we have to admit that significant effects are maybe stronger in this experimental laboratory situation than effects of field studies in existing urban squares. As a result internal validity was high in our sample, but ecological validity has to be questionned.

6.4 Future Research and Practical Application

Consequential, future research is necessary to improve the understanding of complex relationships between environmental design and its impact on livability. A probability sample is needed to get more generalized and representative outcomes regarding livable dimensions of public spaces. Thereby, a good mixture of quantitative and qualitative methods in experiments with manipulation of the conditions could help to solve the problem between internal and ecological validity. Especially ecological validity is an important aspect of studies in the field of environmental psychology. Therefore, field studies in more than one existing public space would be perfect to deliver good data. Also to find public spaces with the opportunity for manipulation treatment of visitors would increase dramatically ecological validity. Because of found bias in our data and statistical assumptions, we recommend all future researchers to use the statistic program R (R Core Team, 2013) to solve problems with assumptions for the data analysis. Future studies should

also pay attention to a more fitting operationalization of the livable dimensions. Realistic conditions for the dimensions of access and maintenance could clear the surprising effects found in our sample. Researchers should concentrate on behavior-related independent variables, the use of environmental-related personality questionnaire like ERI by McKechnie (1974) as well as socio-demographic variables as covariates to clear the variance of evaluated livability in urban environments. Furthermore, studies with focus on "social outsiders" as well as an eye on contrasts between teenagers and retired people as participants who are more dependent on urban squares could deepen the importance of non-privatized public spaces in the city.

However, this study proved that the five livable dimensions of public space: comfort, access, function, maintenance and sociability are fundamental needs in urban public spaces. The outcome can help professionals to realize the important impact of design elements on people's perceived urban quality and the use of resources improving health, well-being and social capital. If urban designers like architects, urban developers and policy makers create public spaces including aspects of livable dimensions, they will contribute to a healthier and stress reduced life in the city. Also paying attention to the age of different users with their different needs can help to create integrating urban spaces where young and old people enjoy the atmosphere and stay healthy and socially. With this paper we got a better understanding of user's perception and evaluation of urban environments as well as their psychological needs regarding urban squares. We hope to contribute some evidence to the dialog among city users and creators as well as to reduce existing differences between that what Lefebvre (1991a) called the *perçu* (user's evaluation of everyday use and social situations) and the *conçu* (creator's evaluation of construction plans and esthetical aspects).

Even if people have withdrawn from the public realm in the last century, we are optimistic that the new human-centered urban movement will be successful and that people become more aware of their "right to the city" (Lefebrvre, 2009). We hope to encourage more urban researcher, designers and policy makers to contribute to the development of fitting urban environments that produce human well-being. To say it with the words of Jay Walljasper (2005): "The future of the human race depends on public spaces. They are the starting point for all community, commerce and democracy."

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APPENDIX

APPENDIX A: MATERIAL OF EXPERT RATING FOR SUITABLE PUBLIC SPACES

A.1 Image Material of Expert Rating

Fig. A.1. Roßmarkt, Frankfurt, Germany

Fig. A.2. Potsdamer Platz, Berlin, Germany

Fig. A.3. Place Kléber, Strasbourg, France

Fig. A.4. Am Hof, Vienna, Austria

Fig. A.5. Rathausmarkt, Hamburg, Germany

Fig. A.6. Roncalliplatz, Cologne, Germany

Fig. A.7. Theaterplatz, Chemnitz, Germany

Fig. A.8. Freyung, Vienna, Austria

Fig. A.9. Altmarkt, Dresden, Germany

Fig A.10. Markt, Schwerin, Germany

Fig A.11. Rathausplatz, Kiel, Germany

Fig. A.12. Karmeliterplatz, Graz, Austria

Fig. A.13. Rathausplatz, Paderborn, Germany

Fig. A.14. Hauptwache, Frankfurt, Germany

Image References:

Figure A.1. Rossmarkt, Frankfurt, Germany. Retrieved from http://de.academic.ru/pictures/dewiki/114/rossmarkt-ffm018.jpg.

Figure A.2. Potsdamer Platz, Berlin, Germany. Retrieved from http://fotoblog-reiseberichte.de/das-neue-berlin-potsdamer-platz/.

Figure A.3. Place Kléber, Strasbourg, France. Retrieved from http://www.strasbourgphoto.com/portfolio/place-kleber/.

Figure A.4. Am Hof, Vienna, Austia. Retrieved from http://upload.wikimedia.org/wikipedia/commons/7/7e/Wien_01_ Am_Hof_a.jpg.

Figure. A.5. Rathausmarkt, Hamburg, Germany. Retrieved from http://www.hvj.de/img/filme/img1600/incentives_erlebnistour.jpg.

Figure. A.6. Roncalliplatz, Cologne, Germany. Retrieved from http://upload.wikimedia.org/wikipedia/commons/7/7d/R%C3%B6misch-Germanisches_Museum_K%C3%B6ln_(2514-16).jpg.

Figure A.7. Theaterplatz, Chemnitz, Germany. Retrieved from https://commons.wikimedia.org/wiki/File:Chemnitz_Theaterplatz_2012.jpg.

Figure A.8 Freyung, Vienna, Austria. Retrieved from Silvio Paasch (2015).

Figure A.9. Altmarkt, Dresden, Germany. Retrieved from http://www.bahnfrau.de/bahnfrau/Altmarkt.jpg.

Figure A.10. Markt, Schwerin, Germany. Retrieved from http://cdn2.vtourist.com/19/6619077-Cathedral_in_corner_Schwerin.jpg?version=2.

Figure A.11. Rathausplatz, Kiel, Germany. Retrieved from http://gallery.future-i.com/germany/schleswig-holstein/pic:kieler-rathaus/full-size.

Figure A.12. Karmeliterplatz, Germany, Austria. Retrieved from http://www.wohnportal-graz.at/wp3/content/karmeliterplatz/img/background.jpg.

Figure A.13. Rathausplatz, Paderborn, Germany. Retrieved from http://www.credo-ausstellung.de/wp-content/gallery/paderborn-bilder_1/paderborn-rathausplatz02.jpg.

Figure A.14. Hauptwache, Frankfurt, Germany. Retrieved from https://commons.wikimedia.org/wiki/File:Hauptwache_Kaufhof_Zeil.jpg.

A.2 Questionnaire of Expert Rating

Instruktion:

Liebe Expertin, lieber Experte,

vielen Dank für Ihre Bereitschaft an dieser Vorstudie zur Analyse lebenswerter Dimensionen von öffentlichen Räumen (Titel: *„Livability dimensions of public space“)* teilzunehmen. Diese wissenschaftliche Untersuchung findet im Rahmen einer Diplomarbeit der Fachrichtung Psychologie, an der Technischen Universität Dresden, Deutschland statt.

Aufgrund Ihrer beruflichen Expertise für gebaute Umwelten wurde Sie ausgewählt im folgenden Fotos von öffentlichen Plätzen anhand von fünf Dimensionen zu beurteilen. Mit Hilfe Ihrer Einschätzung werden die Fotos auf Ähnlichkeit überprüft und die ähnlichsten fünf Bilder fließen als Untersuchungsmaterial in die oben erwähnte Studie ein.

Diese Umfrage wird ca. 15 Minuten dauern und umfasst 14 bearbeitete Fotos von öffentlichen Plätzen im mitteleuropäischen Raum. Alle Antworten werden anonymisiert und sind nicht auf Ihre Person zurückführbar.

Ich bedanke mich für Ihre Bereitschaft an dieser Untersuchung teilzunehmen.

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Fragebogen für das Expertenurteil zum Bildmaterial

Sie werden im Folgenden gebeten, eine Reihe Fotos von öffentlichen Plätzen anhand von fünf Dimensionen zu beurteilen. Jede Dimension trägt zum subjektiv bewerteten Lebenswert (= livability) eines öffentlichen Raumes bei.

*Schauen Sie sich die Fotos an und bewerten Sie diese **intuitiv** und **spontan**. Denken Sie bitte nicht zu lange über die Begriffe nach, damit Ihre unmittelbare Einschätzung erfasst werden kann.*

Folgende Antwortkategorien stehen Ihnen zur Verfügung:

stimme überhaupt nicht zu	stimme nicht zu	stimme eher nicht zu	stimme eher zu	stimme zu	stimme völlig zu
○	○	○	○	○	○

Machen Sie sich keine Sorgen wie andere Ihre Aussagen beurteilen, es gibt weder richtige noch falsche Antworten. Ihre persönliche Meinung zählt!

Folgende Dimensionen sollen Sie überprüfen:

Sociability: Unter Sociability versteht man das Vorhandensein, die Interaktion und Diversität von Personen auf einem Platz. Empfinden Sie diesen Platz als sozial? Lässt er die Menschen miteinander interagieren und einen Gemeinschaftssinn entstehen?

Comfort: Unter Comfort versteht man das Vorhandensein von Sitzmöglichkeiten, Natur- und Wasserelementen, Sonnenplätzen aber auch Überdachungen zum Wetterschutz. Empfinden Sie diesen Platz als komfortabel? Können Menschen hier sitzen und verweilen?

Access: Unter Access versteht man das Vorhandensein von physischen und visuellen Zugang sowie Transportanbindungen. Empfinden Sie diesen Platz als leicht zugänglich? Gibt es keine Barrieren, um zu ihm zu gelangen und ist er gut mit Verkehrsmitteln zu erreichen?

Function: Unter Function versteht man das Vorhandensein von Aktivitätsmöglichkeiten wie z.B. Sport- und Spielplätzen, Einkaufs- oder Essensmöglichkeiten bzw. Kunstausstellungen und Festivals. Empfinden Sie diesen Platz als funktional? Gibt es Aktivitäten, warum Menschen hierher kommen sollten?

Maintenance: Unter Maintenance versteht man das Vorhandensein eines gepflegten und sicheren Ortes mit Laternen, Mülleimern sowie fehlenden Anzeichen von Vandalismus. Empfinden Sie diesen Platz als gepflegt und sicher? Gibt es keine Spuren von Graffiti, Müll oder anderen Dingen, die unangenehm sein könnten?

Sie können sich die Beschreibung der Dimensionen werden während der Untersuchung als Hilfetext mittels des ?-Symbols anzeigen lassen.

Machen Sie sich keine Sorgen wie andere Ihre Aussgen überprüfen, es gibt weder richtige noch falsche Antworten. Ihre persönliche Meinung zählt.

Wenn Sie alles verstanden haben und bereit sind, dann klicken Sie auf weiter.

Platz No. x von 14

Bitte schätzen Sie den oben gezeigten Platz ein:

		Stimme überhaupt nicht zu	Stimme nicht zu	Stimme eher nicht zu	Stimme eher zu	Stimme zu	Stimme völlig zu
Sxx	Ich empfinde diesen Platz als sozial.						
Cxx	Ich empfinde diesen Platz als komfortabel.						
Axx	Ich empfinde diesen Platz als leicht zugänglich.						
Fxx	Ich empfinde diesen Platz als funktional.						
Mxx	Ich empfinde diesen Platz als gepflegt und sicher.						

Sie haben es geschafft und sind am Ende angelangt! Vielen Dank für Ihre Expertise und Ausdauer bei der Einschätzung des Untersuchungsmaterials.

Falls Sie sich für die Untersuchung „Livability dimensions of public spaces" näher interessieren oder Fragen während der Untersuchung aufgetreten sind, wenden Sie sich gerne an folgende eMail-Adresse:

Silvio.Paasch@mailbox.tu-dresden.de

Mit freundlichen Grüßen,
cand.-psych. Silvio Paasch

A.3 Results of Expert Rating

Table A.1.

General means for each livable dimensions in 14 rated images.

Deskriptive Statistik

	N	Mittelwert
Sociability	14	2,2143
Comfort	14	2,0195
Access	14	2,9091
Function	14	2,7013
Maintenance	14	3,0519
Gültige Werte (Listenweise)	14	

Table A.2.

Descriptive statistics for the perceived sociability of 14 rated images.

Deskriptive Statistik

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz
PS01_Sociability	11	1	5	2,82	,982	,964
PS02_Sociability	11	1	4	2,18	,982	,964
PS03_Sociability	11	1	6	3,18	1,834	3,364
PS04_Sociability	11	1	5	3,64	1,286	1,655
PS05_Sociability	11	2	6	3,64	1,502	2,255
PS06_Sociability	11	1	4	2,55	1,036	1,073
PS07_Sociability	11	1	5	2,73	1,272	1,618
PS08_Sociability	11	2	5	3,18	,982	,964
PS09_Sociability	11	1	5	3,18	1,401	1,964
PS10_Sociability	11	2	5	4,00	1,414	2,000
PS11_Sociablity	11	1	5	2,64	1,286	1,655
PS12_Sociability	11	2	5	3,55	1,036	1,073
PS13_Sociability	11	2	6	4,36	1,120	1,255
PS14_Sociability	11	1	5	3,36	1,362	1,855
Gültige Werte (Listenweise)	11					

Table A.3.

Descriptive statistics for the perceived comfort of 14 rated images.

Deskriptive Statistik

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz
PS01_Comfort	11	1	5	2,91	1,136	1,291
PS02_Comfort	11	1	4	2,00	1,000	1,000
PS03_Comfort	11	1	5	3,45	1,368	1,873
PS04_Comfort	11	1	6	3,64	1,690	2,855
PS05_Comfort	11	1	6	3,18	1,471	2,164
PS06_Comfort	11	1	4	2,00	1,183	1,400
PS07_Comfort	11	1	3	2,36	,674	,455
PS08_Comfort	11	1	5	2,64	1,206	1,455
PS09_Comfort	11	1	5	3,00	1,342	1,800
PS10_Comfort	11	3	5	4,09	,831	,691
PS11_Comfort	11	1	5	2,73	1,191	1,418
PS12_Comfort	11	1	6	3,45	1,508	2,273
PS13_Comfort	11	2	5	3,82	,982	,964
PS14_Comfort	11	1	5	3,00	1,342	1,800
Gültige Werte (Listenweise)	11					

Table A.4.

Descriptive statistics for the perceived access of 14 rated images

Deskriptive Statistik

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz
PS01_Access	11	1	6	4,18	1,722	2,964
PS02_Access	11	2	6	4,45	1,214	1,473
PS03_Access	11	1	6	4,00	1,483	2,200
PS04_Access	11	1	6	3,91	1,446	2,091
PS05_Access	11	1	6	4,00	1,549	2,400
PS06_Access	11	1	6	3,82	1,537	2,364
PS07_Access	11	1	5	2,91	1,221	1,491
PS08_Access	11	3	6	4,27	1,272	1,618
PS09_Access	11	1	6	4,09	1,814	3,291
PS10_Access	11	1	6	3,82	1,328	1,764
PS11_Access	11	1	6	3,55	1,368	1,873
PS12_Access	11	1	5	2,91	1,136	1,291
PS13_Access	11	2	6	4,18	1,250	1,564
PS14_Access	11	2	6	4,64	1,286	1,655
Gültige Werte (Listenweise)	11					

Table A.4.

Descriptive Statistics for the perceived function in 14 rated images.

Deskriptive Statistik

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz
PS01_Function	11	1	5	3,55	1,293	1,673
PS02_Function	11	1	5	3,27	1,191	1,418
PS03_Function	11	2	6	4,00	1,342	1,800
PS04_Function	11	2	6	4,00	1,265	1,600
PS05_Function	11	1	6	3,91	1,221	1,491
PS06_Function	11	2	6	4,27	1,272	1,618
PS07_Function	11	1	6	3,64	1,362	1,855
PS08_Function	11	1	5	2,73	1,348	1,818
PS09_Function	11	2	6	4,00	1,265	1,600
PS10_Function	11	3	5	3,91	,831	,691
PS11_Function	11	1	6	3,64	1,690	2,855
PS12_Function	11	1	6	3,55	1,508	2,273
PS13_Function	11	2	4	3,45	,688	,473
PS14_Function	11	2	5	3,91	1,136	1,291
Gültige Werte (Listenweise)	11					

Table A.5.

Descriptive statistics for the perceived maintenance in 14 rated images.

Deskriptive Statistik

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz
PS01_Maintenance	11	2	6	3,82	1,250	1,564
PS02_Maintenance	11	1	6	3,82	1,601	2,564
PS03_Maintenance	11	1	6	4,27	1,555	2,418
PS04_Maintanance	11	1	6	4,45	1,508	2,273
PS05_Maintenance	11	2	6	4,18	1,401	1,964
PS06_Maintennce	11	1	6	3,55	1,695	2,873
PS07_Maintenance	11	1	6	3,82	1,471	2,164
PS08_Maintenance	11	3	6	4,27	1,009	1,018
PS09_Maintenance	11	1	6	4,27	1,489	2,218
PS10_Maintenance	11	2	6	4,45	1,128	1,273
PS11_Maintenance	11	1	6	4,00	1,549	2,400
PS12_Maintenance	11	1	6	4,27	1,555	2,418
PS13_Maintenance	11	2	6	4,09	1,136	1,291
PS14_Maintenance	11	1	6	3,45	1,368	1,873
Gültige Werte (Listenweise)	11					

APPENDIX B: IMAGE MATERIAL FOR THE STUDY

B.1 Image Material of Roßmarkt (Frankfurt a. M., Germany)

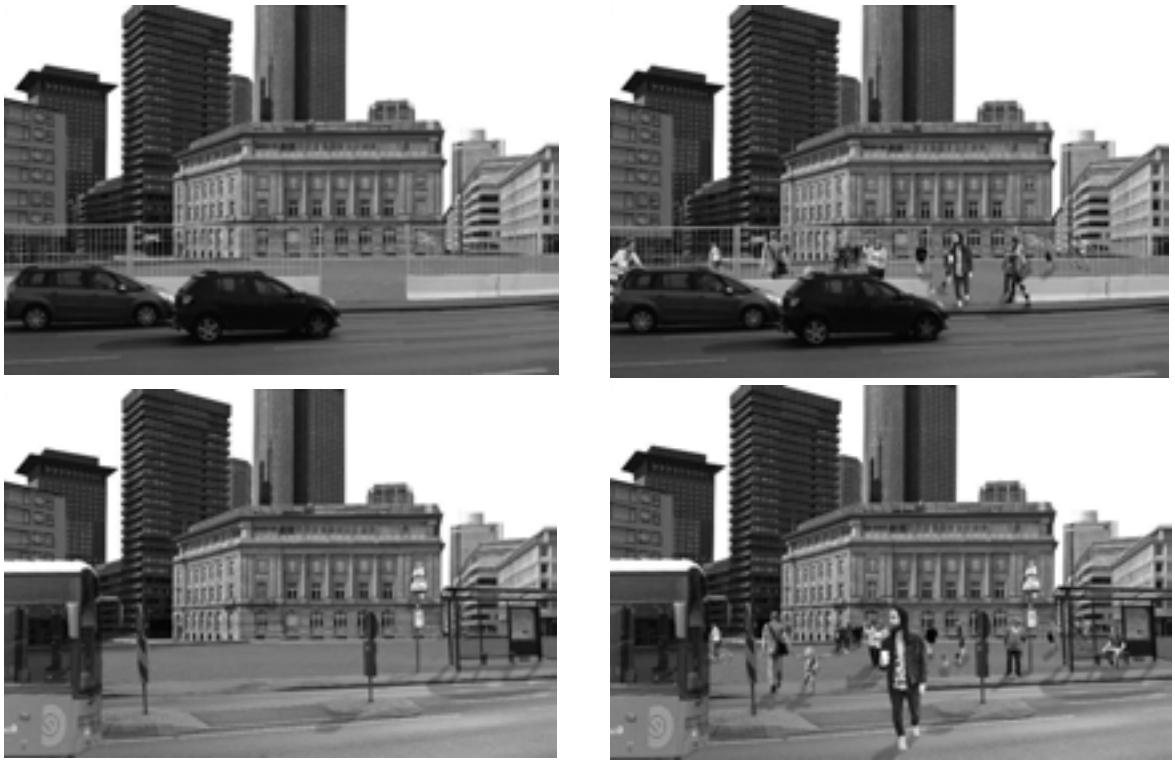

Fig. B.1.a – B.1.d. Roßmarkt with the livable dimension of access: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

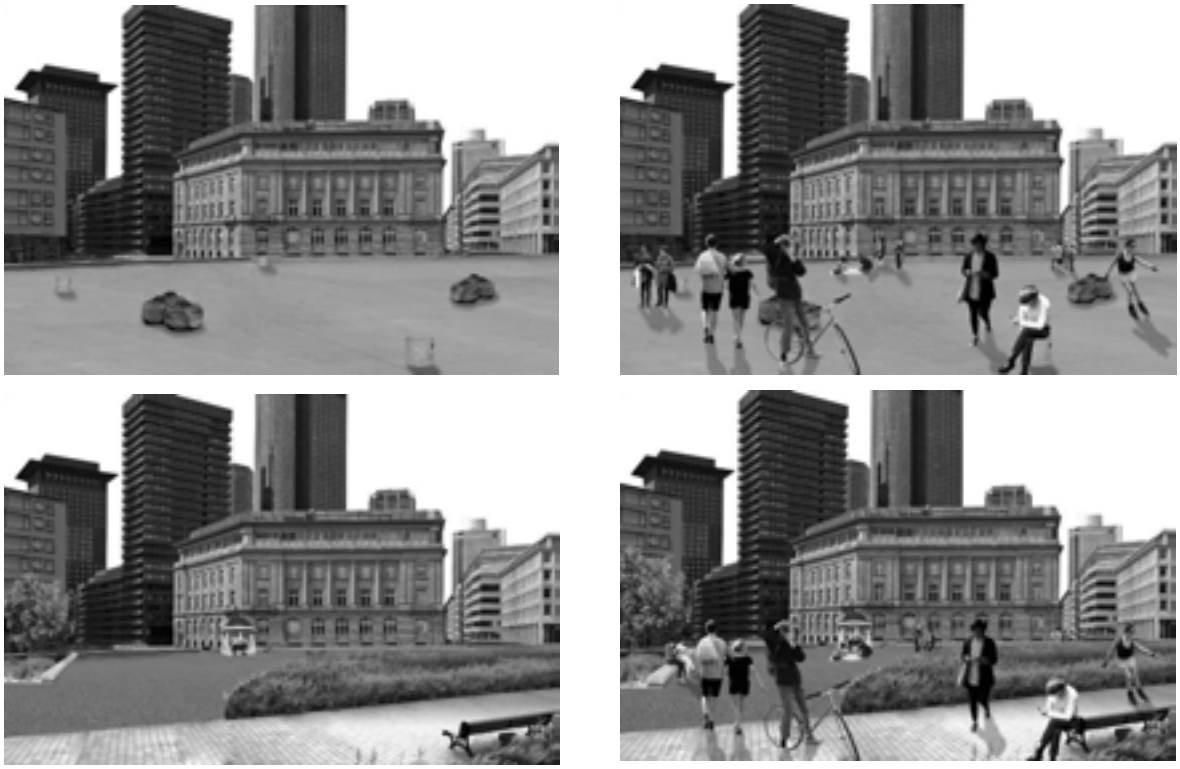

Fig. B.1.e – B.1.h. Roßmarkt with the livable dimension of comfort: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

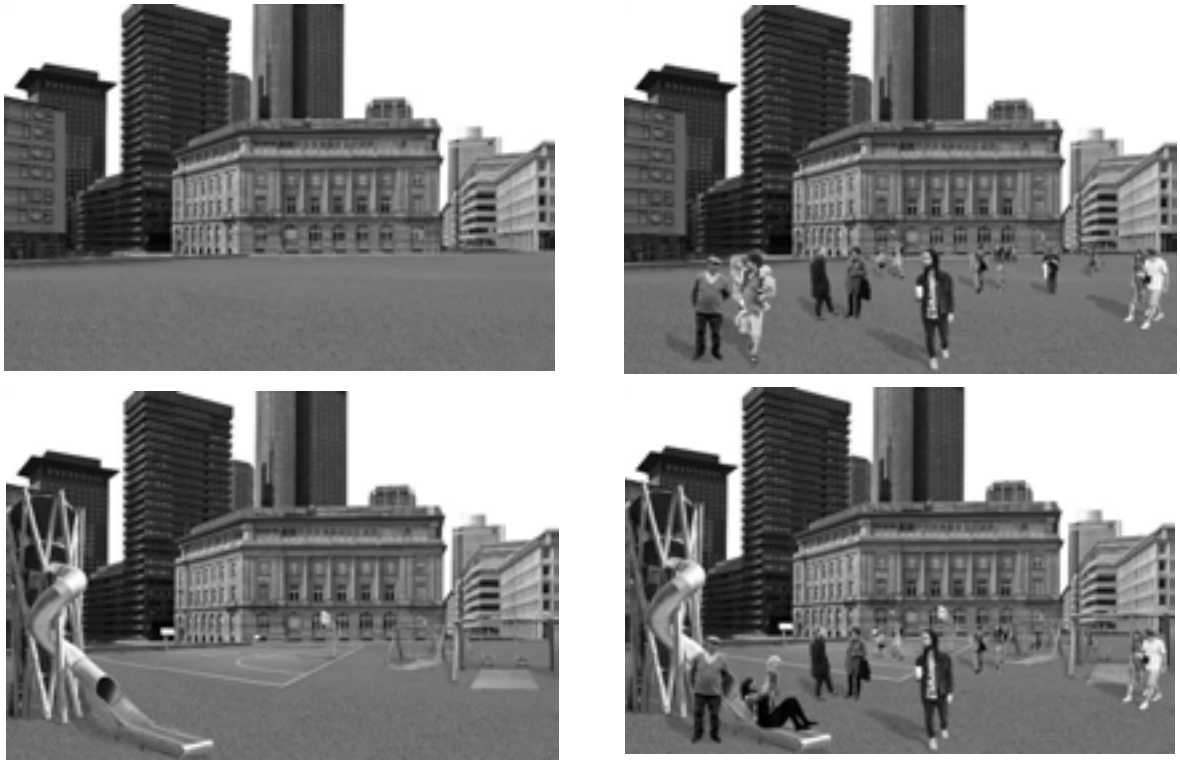

Fig. B.1.i – B.1.l. Roßmarkt with the livable dimension of function: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

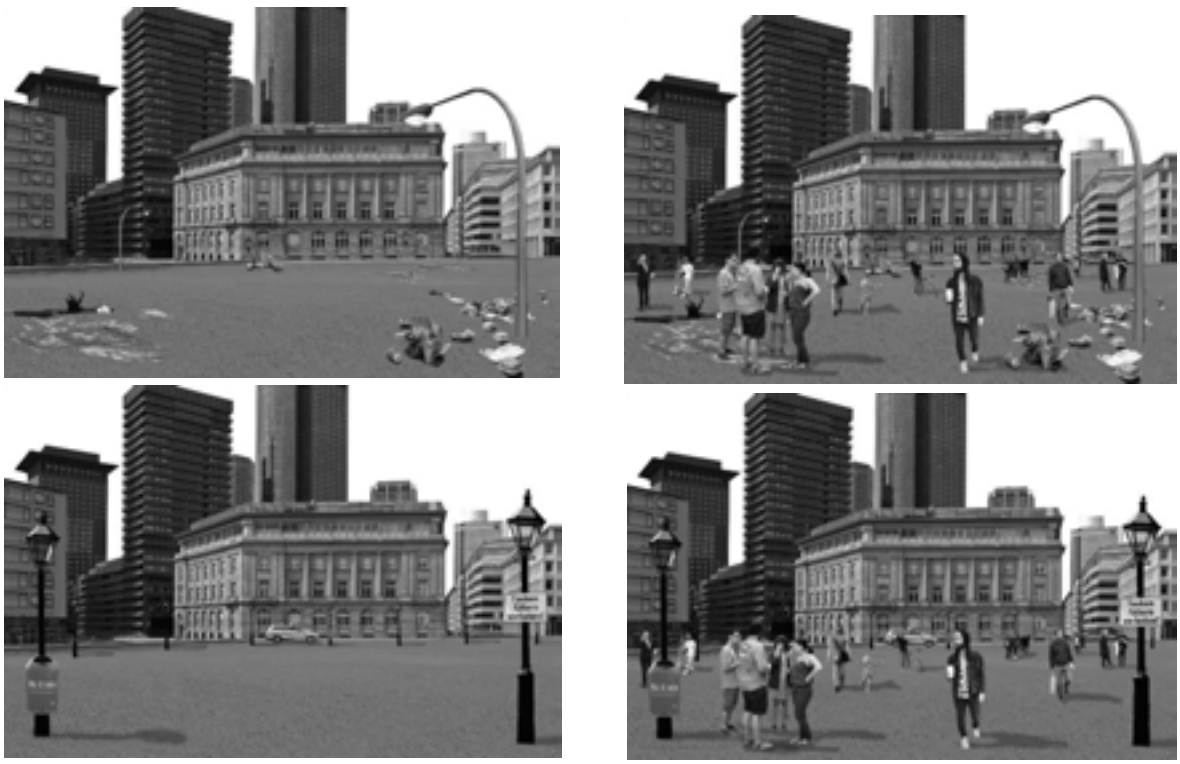

Fig. B.1.m – B.1.p. Roßmarkt with the livable dimension of maintenance: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

B.2 Image Material of Place Kléber (Strasbourg, France)

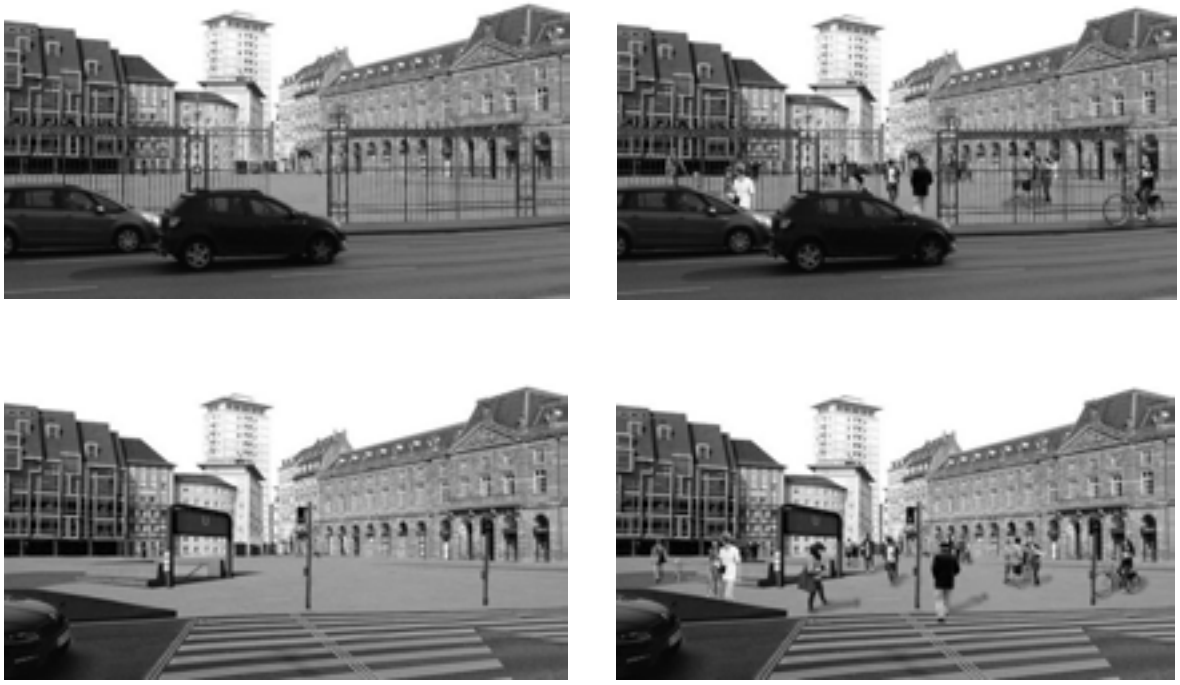

Fig. B.2.a – B.2.d. Place Kléber with the livable dimension of access: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

Fig. B.2.e – B.2.h. Place Kléber with the livable dimension of comfort: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

Fig. B.2.i – B.2.l. Place Kléber with the livable dimension of function: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

Fig. B.2.m – B.2.p. Place Kléber with the livable dimension of maintenance: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

B.3 Image Material of Altmarkt (Dresden, Germany)

Fig. B.3.a – B.3.d. Altmarkt with the livable dimension of access: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

Fig. B.3.e – B.3.h. Altmarkt with the livable dimension of comfort: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

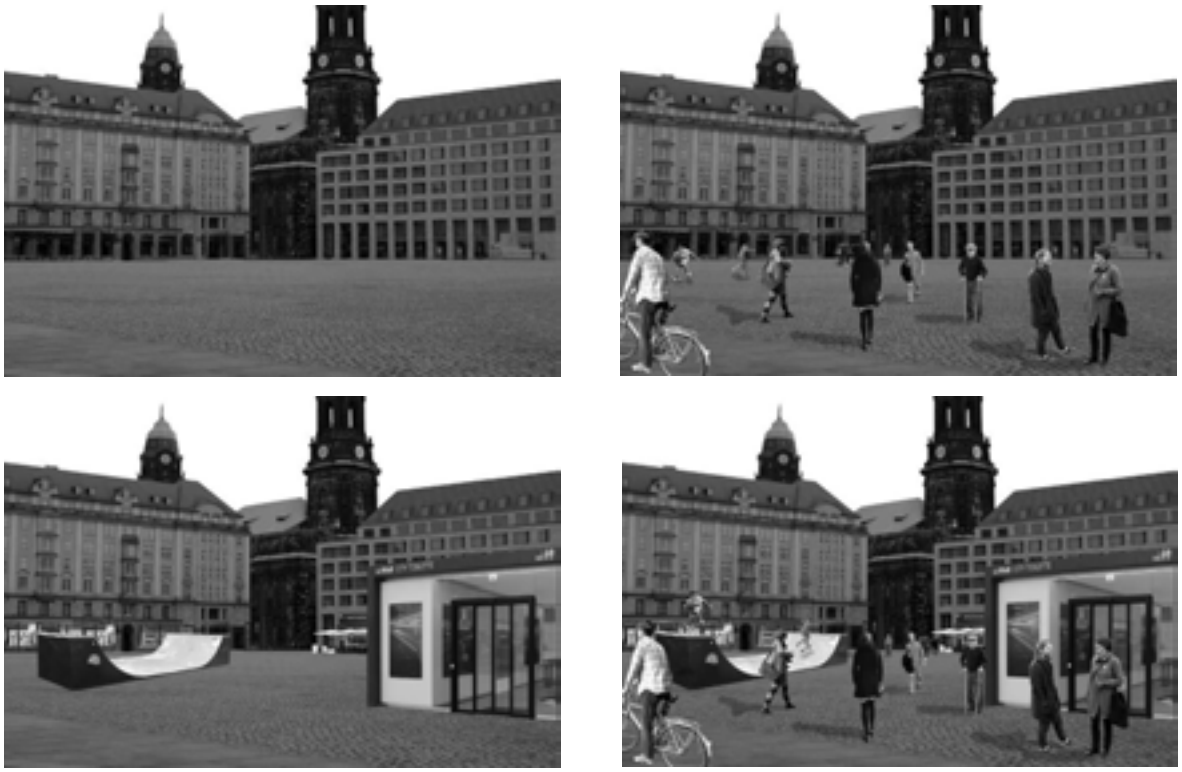

Fig. B.3.i – B.3.l. Altmarkt with the livable dimension of function: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

Fig. B.3.m – B.3.p. Altmarkt with the livable dimension of maintenance: physically-harmful & non-sociable environment (upper left), physically-harmful & sociable environment (upper right), physically-beneficial & non-sociable (lower left), physically-beneficial & sociable (lower right).

APPENDIX C: QUESTIONNAIRES

C.1 Questionnaire for Capturing Livability in Public Spaces (LIV-PS)

INSTRUKTION:

Liebe Teilnehmerin, lieber Teilnehmer,
vielen Dank für Ihre Bereitschaft an dieser Studie zur Erfassung der Lebensqualität in öffentlichen Räumen teilzunehmen. Diese wissenschaftliche Untersuchung findet im Rahmen einer Diplomarbeit der Fachrichtung Psychologie, an der Technischen Universität Dresden, Deutschland statt.

Über die Hälfte der Weltbevölkerung lebt heute in Städten und unser Lebensraum wird durch die Zuwanderung vom Land immer enger. Dabei bieten Straßen, Parks und Plätze in unseren wachsenden und dichter werdenden Städten wichtige Freiräume, damit alle Menschen auch in Zukunft gesund bleiben und sich wohlfühlen können.

Sie können mithelfen, die Qualität dieser Lebensräume zu erhalten und zu verbessern! Diese Umfrage wird ca. 15 Minuten dauern und erfasst, wie sich die Gestaltung von öffentlichen Plätzen auf unser Wohlbefinden auswirkt. Dabei sollen Sie 12 Fotos von öffentlichen Plätzen anhand von Eigenschaftswörtern einschätzen. Dazu kommen sozio-demografische sowie persönliche Angaben zu Ihrer Person, die anonymisiert erfasst werden.

Vielen Dank für die Unterstützung dieser Arbeit.

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Fakultät Mathematik & Naturwissenschaften
Technische Universität Dresden, Deutschland

0. Randomisierung:

- Zuweisung einer Zufallsziffer *(1,2,3 o. 4)* für jede/n TeilnehmerIn im Hintergrund ***{rand==1,4}***

I. Fragebogen zur Erfassung der Lebbarkeit von öffentlichen Räumen (LIV-PS):

Im folgenden Teil der Untersuchung werden Sie 12 grafisch bearbeitete Fotos von öffentlichen Plätzen sehen. Schauen Sie sich bitte jedes Foto aufmerksam an und bewerten Sie anschließend mit Hilfe von mehreren Eigenschaftswörtern *(Adjektiven)* wie Sie den gezeigten Platz insgesamt empfinden.

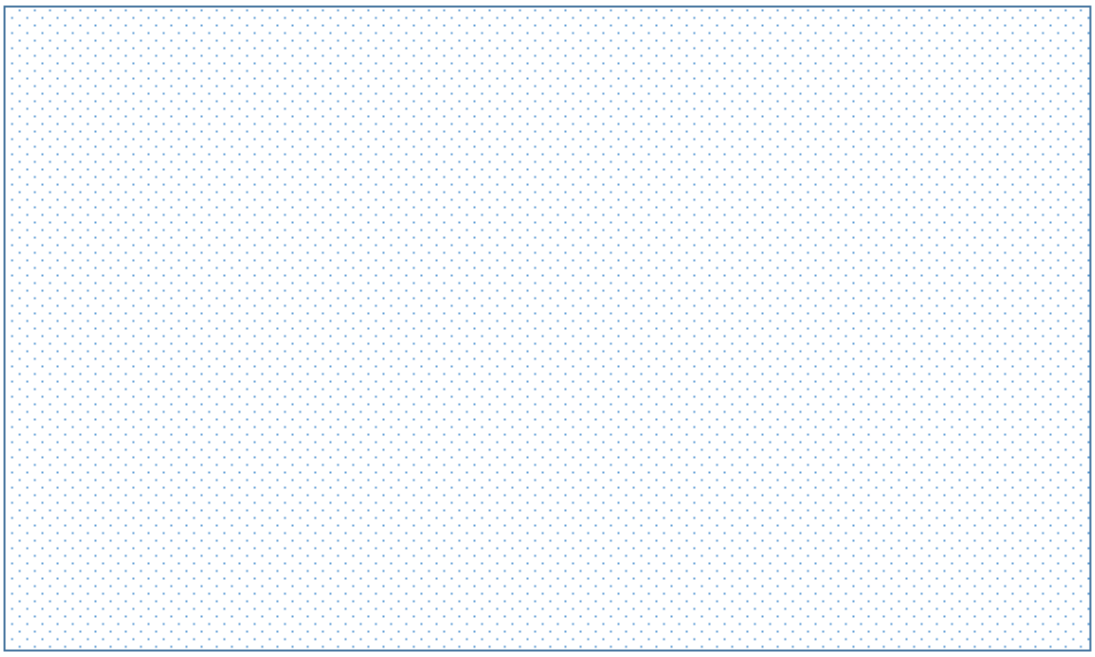
Jede Zeile besteht dabei aus Gegensatzpaaren von Eigenschaften, die einen öffentlichen Platz beschreiben können. Abstufungen zwischen den Wortpaaren sind als Kreise dargestellt. Durch Ankreuzen eines Kreises können Sie Ihre persönliche Empfindung durch die Zustimmung zu einem Begriff äußern.

Beispiel:

unattraktiv	○	○	○	○	⊗	○	attraktiv

Im Beispiel wird ein öffentlicher Platz also als „ziemlich attraktiv" eingeschätzt.

Lassen Sie dabei immer den **gesamten Platz auf sich wirken**. Seien Sie nicht durch die künstliche Atmosphäre der Bilder irritiert. Schauen Sie sich einfach die Fotos an und bewerten Sie diese **intuitiv** und **spontan** nach Ihrem Empfinden. Denken Sie dabei nicht zu lange über die Begriffe nach, damit Ihre unmittelbare Einschätzung erfasst werden kann. Es gibt weder richtige noch falsche Antworten. Ihre persönliche Einschätzung zählt!



Ich empfinde diesen Platz als...

H1	schwächend	o	o	o	o	o	o	kräftigend
H2)	ungesund	o	o	o	o	o	o	gesund
H3)	gesundheitsschädigend	o	o	o	o	o	o	gesundheitsfördernd
H4)	erschöpfend	o	o	o	o	o	o	erholsam
W1)	unfreundlich	o	o	o	o	o	o	freundlich
W2)	belastend	o	o	o	o	o	o	befreiend
W3)	unangenehm	o	o	o	o	o	o	angenehm
W4)	verärgernd	o	o	o	o	o	o	erfreulich
S1)	isolierend	o	o	o	o	o	o	verbindend
S2)	ausgrenzend	o	o	o	o	o	o	einbeziehend
S3)	einsam	o	o	o	o	o	o	gemeinsam
S4)	hemmend	o	o	o	o	o	o	aktivierend

C.2 Item Analysis of LIV-PS Questionnaire

Table C.1.

Descriptive statistics of LIV-PS pilot version (with 29 items).

	N	Minimum	Maximum	Mittelwert	Standardabweichung	Varianz	Itemschwierigkeit	Schiefe		Kurtosis	
	Statistik	Statistik	Statistik	Statistik	Statistik	Statistik	Statistik	Statistik		Statistik	
[hemmend|aktivierend]	64	0	5	2,52	1,247	1,555	50,313	,039	,299	-,950	,590
[schwächend|kräftigend]	64	0	5	2,36	1,104	1,218	47,188	,260	,299	-,679	,590
[ungesund|gesund]	64	0	5	2,50	1,113	1,238	50,000	,036	,299	-,517	,590
[verletzend|heilend]	64	1	5	2,42	,887	,787	48,438	,455	,299	,153	,590
[gesundheitsschädigend|gesundheitsfördernd]	64	0	5	2,61	1,163	1,353	52,188	,195	,299	-,433	,590
[betäubend|belebend]	64	1	5	2,48	,992	,984	49,688	,296	,299	-,551	,590
[erschöpfend|erholsam]	64	0	5	2,25	1,168	1,365	45,000	,478	,299	-,122	,590
[unfreundlich|freundlich]	64	0	5	2,44	1,355	1,837	48,750	,334	,299	-,418	,590
[belastend|befreiend]	64	0	5	2,33	1,085	1,176	46,563	,151	,299	-,361	,590
[unangenehm|angenehm]	64	0	5	2,50	1,141	1,302	50,000	,166	,299	-,170	,590
[ungenießbar|genußvoll]	64	0	5	2,41	1,109	1,229	48,125	,136	,299	-,200	,590
[verärgernd|erfreulich]	64	0	5	2,56	1,207	1,456	51,250	,128	,299	-,412	,590
[langweilig|spannend]	64	0	4	2,02	1,161	1,349	40,313	,283	,299	-1,084	,590
[uninteressant|interessant]	64	0	5	2,34	1,288	1,658	46,875	,013	,299	-,869	,590
[hässlich|schön]	64	0	5	2,14	1,096	1,202	42,813	,235	,299	-,280	,590
[belastend|wohltuend]	64	1	5	2,42	,973	,946	48,438	,334	,299	-,385	,590
[isolierend|verbindend]	64	0	5	2,33	1,298	1,684	46,563	-,013	,299	-,797	,590
[ausgrenzend|einbeziehend]	64	0	5	2,47	1,357	1,840	49,375	-,050	,299	-1,105	,590
[einsam|gemeinsam]	64	0	5	2,41	1,342	1,801	48,125	,186	,299	-,880	,590
[tot|lebendig]	64	0	5	2,47	1,333	1,777	49,375	-,138	,299	-1,020	,590
[behindernd|unterstützend]	64	0	5	2,56	1,194	1,425	51,250	-,008	,299	-,506	,590
[ausschließend|einschließend]	64	0	5	2,39	1,329	1,766	47,813	-,092	,299	-,784	,590
[fernbleibend|teilnehmend]	64	0	5	2,47	1,357	1,840	49,375	-,089	,299	-,985	,590
[asozial|sozial]	64	0	5	2,69	1,332	1,774	53,750	,102	,299	-1,027	,590
[rücksichtslos|rücksichtsvoll]	64	0	5	2,45	1,112	1,236	49,063	,014	,299	-,517	,590
[unmenschlich|menschlich]	64	0	5	2,75	1,182	1,397	55,00	,149	,299	-,556	,590
[unattraktiv|attraktiv]	64	0	5	2,38	1,303	1,698	47,500	-,117	,299	-,678	,590
[nicht lebenswert|lebenswert]	64	0	5	2,55	1,259	1,585	50,938	,186	,299	-,532	,590
[unbefriedigend|befriedigend]	64	0	5	2,31	1,207	1,456	46,250	,094	,299	-,620	,590
Gültige Werte (Listenweise)	64										

Table C.2 – C.4.

Reliability of LIV-PS pilot version (with 29 items).

Zusammenfassung der Fallverarbeitung

		N	%
Fälle	Gültig	64	100,0
	Ausgeschlossen[a]	0	,0
	Gesamt	64	100,0

a. Listenweise Löschung auf der Grundlage aller Variablen in der Prozedur.

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[hemmend|aktivierend]	68,00	711,651	,819	,978
[schwächend|kräftigend]	68,16	719,467	,794	,978
[ungesund|gesund]	68,02	717,539	,821	,978
[verletzend|heilend]	68,09	728,912	,793	,978
[gesundheitsschädigend|gesundheitsfördernd]	67,91	714,816	,829	,978
[betäubend|belebend]	68,03	724,983	,782	,978
[erschöpfend|erholsam]	68,27	715,246	,818	,978
[unfreundlich|freundlich]	68,08	701,502	,897	,978
[belastend|befreiend]	68,19	720,567	,789	,978
[unangenehm|angenehm]	68,02	713,809	,862	,978
[ungenießbar|genußvoll]	68,11	720,162	,778	,978
[verärgernd|erfreulich]	67,95	711,030	,858	,978
[langweilig|spannend]	68,50	725,429	,654	,979
[uninteressant|interessant]	68,17	721,478	,645	,979
[hässlich|schön]	68,38	724,333	,715	,979
[belastend|wohltuend]	68,09	720,118	,894	,978
[isolierend|verbindend]	68,19	712,155	,778	,978
[ausgrenzend|einbeziehend]	68,05	710,363	,768	,979
[einsam|gemeinsam]	68,11	707,718	,815	,978
[tot|lebendig]	68,05	710,998	,657	,979
[behindernd|unterstützend]	67,95	723,061	,673	,979
[ausschließend|einschließend]	68,13	714,048	,731	,979
[fernbleibend|teilnehmend]	68,05	705,760	,834	,978
[asozial|sozial]	67,83	714,906	,717	,979
[rücksichtslos|rücksichtsvoll]	68,06	722,536	,735	,979
[unmenschlich|menschlich]	67,77	712,658	,850	,978
[unattraktiv|attraktiv]	68,14	711,996	,777	,978
[nicht lebenswert|lebenswert]	67,97	708,602	,859	,978
[unbefriedigend|befriedigend]	68,20	716,291	,774	,978

Table C.5 – C. 7.

Factor analysis of LIV-PS pilot version (with 29 items).

Erklärte Gesamtvarianz

Faktor	Anfängliche Eigenwerte			Summen von quadrierten Faktorladungen für Extraktion			Rotierte Summe der quadrierten Ladungen[a]
	Gesamt	% der Varianz	Kumulierte %	Gesamt	% der Varianz	Kumulierte %	Gesamt
1	18,670	64,379	64,379	18,401	63,451	63,451	16,906
2	1,688	5,821	70,200	1,435	4,948	68,399	4,156
3	1,454	5,014	75,215	1,164	4,013	72,411	15,040
4	,965	3,329	78,543				
5	,703	2,423	80,966				
6	,621	2,140	83,106				
7	,556	1,919	85,025				
8	,493	1,700	86,725				
9	,461	1,590	88,315				
10	,367	1,265	89,579				
11	,342	1,179	90,758				
12	,323	1,113	91,871				
13	,285	,983	92,855				
14	,281	,970	93,824				
15	,237	,816	94,640				
16	,229	,790	95,430				
17	,213	,735	96,165				
18	,177	,611	96,776				
19	,155	,533	97,309				
20	,145	,500	97,809				
21	,129	,446	98,255				
22	,102	,352	98,607				
23	,097	,334	98,941				
24	,081	,279	99,220				
25	,067	,232	99,452				
26	,054	,185	99,638				
27	,046	,160	99,797				
28	,034	,116	99,913				
29	,025	,087	100,000				

Extraktionsmethode: Hauptachsen-Faktorenanalyse.

a. Wenn Faktoren korreliert sind, können die Summen der quadrierten Ladungen nicht addiert werden, um eine Gesamtvarianz zu erhalten.

Korrelationsmatrix für Faktor

Faktor	1	2	3
1	1,000	,280	,748
2	,280	1,000	,286
3	,748	,286	1,000

Extraktionsmethode: Hauptachsen-Faktorenanalyse.
Rotationsmethode: Oblimin mit Kaiser-Normalisierung.

Mustermatrix[a]

	Faktor		
	1	2	3
[hemmend|aktivierend]	,249	,000	,652
[schwächend|kräftigend]	,876	-,087	,013
[ungesund|gesund]	,825	,097	,009
[verletzend|heilend]	,950	,043	-,126
[gesundheitsschädigend|gesundheitsfördernd]	,867	,108	-,028
[betäubend|belebend]	,316	,022	,530
[erschöpfend|erholsam]	,646	,139	,175
[unfreundlich|freundlich]	,488	,026	,475
[belastend|befreiend]	,823	-,163	,096
[unangenehm|angenehm]	,799	,146	,058
[ungenießbar|genußvoll]	,700	,212	,040
[verärgernd|erfreulich]	,682	-,006	,244
[langweilig|spannend]	,086	,737	,325
[uninteressant|interessant]	,104	,596	,351
[hässlich|schön]	,598	,529	-,062
[belastend|wohltuend]	,679	,023	,275
[isolierend|verbindend]	,048	,068	,789
[ausgrenzend|einbeziehend]	,330	-,066	,539
[einsam|gemeinsam]	,038	,203	,781
[tot|lebendig]	-,184	,121	,879
[behindernd|unterstützend]	,747	-,158	,045
[ausschließend|einschließend]	,398	-,299	,538
[fernbleibend|teilnehmend]	,337	-,103	,626
[asozial|sozial]	,107	-,041	,711
[rücksichtslos|rücksichtsvoll]	,710	-,101	,122
[unmenschlich|menschlich]	,275	,146	,596
[unattraktiv|attraktiv]	,645	,387	,019
[nicht lebenswert|lebenswert]	,594	-,014	,341
[unbefriedigend|befriedigend]	,485	,265	,234

Extraktionsmethode: Hauptachsen-Faktorenanalyse.
Rotationsmethode: Oblimin mit Kaiser-Normalisierung.[a]

a. Die Rotation ist in 18 Iterationen konvergiert.

Table C.8 – C.9.

Reliability of LIV-PS second version (with 13 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,965	13

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[schwächend|kräftigend]	29,31	151,647	,811	,963
[ungesund|gesund]	29,17	151,224	,821	,962
[gesundheitsschädigend|gesundheitsfördernd]	29,06	149,837	,833	,962
[erschöpfend|erholsam]	29,42	150,184	,816	,962
[unfreundlich|freundlich]	29,23	143,897	,898	,960
[belastend|befreiend]	29,34	152,293	,801	,963
[unangenehm|angenehm]	29,17	149,732	,856	,962
[ungenießbar|genußvoll]	29,27	152,547	,772	,963
[verärgernd|erfreulich]	29,11	148,575	,846	,962
[isolierend|verbindend]	29,34	149,594	,745	,964
[ausgrenzend|einbeziehend]	29,20	147,593	,773	,964
[einsam|gemeinsam]	29,27	147,214	,796	,963
[hemmend|aktivierend]	29,16	148,864	,805	,963

Table C.10 – C.11.

Reliability of health scale in LIV – PS second version (with 13 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,917	4

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[schwächend|kräftigend]	7,36	9,799	,903	,894
[ungesund|gesund]	7,22	9,634	,823	,887
[gesundheitsschädigend|gesundheitsfördernd]	7,11	9,305	,831	,884
[erschöpfend|erholsam]	7,47	9,555	,780	,902

Table C.12 – C.13.

Reliability of well-being scale in LIV-PS second version (with 13 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,937	5

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[unfreundlich|freundlich]	9,80	16,545	,866	,917
[belastend|befreiend]	9,91	19,229	,791	,929
[unangenehm|angenehm]	9,73	18,198	,866	,916
[ungenießbar|genußvoll]	9,83	19,319	,757	,935
[verärgernd|erfreulich]	9,67	17,494	,889	,911

Table C.14 – C.15.

Reliability of social capital scale in LIV-PS second version (with 13 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,920	4

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[isolierend|verbindend]	7,39	12,528	,870	,878
[ausgrenzend|einbeziehend]	7,25	12,635	,802	,902
[einsam|gemeinsam]	7,31	12,790	,793	,904
[hemmend|aktivierend]	7,20	13,339	,803	,901

Table C.16 – C.18

Factor analysis of LIV-PS second version (with 13 items)

Kommunalitäten

	Anfänglich	Extraktion
[schwächend|kräftigend]	,762	,695
[ungesund|gesund]	,744	,703
[gesundheitsschädigend|gesundheitsfördernd]	,789	,731
[erschöpfend|erholsam]	,787	,696
[unfreundlich|freundlich]	,854	,836
[belastend|befreiend]	,776	,673
[unangenehm|angenehm]	,817	,770
[ungenießbar|genußvoll]	,772	,627
[verärgernd|erfreulich]	,826	,754
[isolierend|verbindend]	,805	,658
[ausgrenzend|einbeziehend]	,713	,608
[einsam|gemeinsam]	,848	,642
[hemmend|aktivierend]	,744	,661

Extraktionsmethode: Hauptachsen-Faktorenanalyse.

Erklärte Gesamtvarianz

	Anfängliche Eigenwerte			Summen von quadrierten Faktorladungen für Extraktion		
Faktor	Gesamt	% der Varianz	Kumulierte %	Gesamt	% der Varianz	Kumulierte %
1	9,259	71,220	71,220	8,954	68,878	68,878
2	,962	7,404	78,624			
3	,526	4,043	82,667			
4	,422	3,249	85,917			
5	,329	2,534	88,451			
6	,321	2,469	90,920			
7	,305	2,344	93,265			
8	,249	1,914	95,179			
9	,176	1,354	96,533			
10	,161	1,236	97,769			
11	,122	,939	98,708			
12	,099	,758	99,466			
13	,069	,534	100,000			

Extraktionsmethode: Hauptachsen-Faktorenanalyse.

Faktorenmatrix[a]

	Faktor
	1
[schwächend|kräftigend]	,834
[ungesund|gesund]	,839
[gesundheitsschädigend|gesundheitsfördernd]	,855
[erschöpfend|erholsam]	,834
[unfreundlich|freundlich]	,915
[belastend|befreiend]	,820
[unangenehm|angenehm]	,878
[ungenießbar|genußvoll]	,792
[verärgernd|erfreulich]	,868
[isolierend|verbindend]	,747
[ausgrenzend|einbeziehend]	,780
[einsam|gemeinsam]	,801
[hemmend|aktivierend]	,813

Extraktionsmethode: Hauptachsen-Faktorenanalyse.

a. 1 Faktoren extrahiert. Es werden 4 Iterationen benötigt.

Table C.19 – C.21.

Reliability of LIV-PS final version (with 12 items).

Zusammenfassung der Fallverarbeitung

		N	%
Fälle	Gültig	64	100,0
	Ausgeschlossen[a]	0	,0
	Gesamt	64	100,0

a. Listenweise Löschung auf der Grundlage aller Variablen in der Prozedur.

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,963	12

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[schwächend|kräftigend]	26,91	131,102	,800	,961
[ungesund|gesund]	26,77	130,563	,816	,960
[gesundheitsschädigend|gesundheitsfördernd]	26,66	129,467	,821	,960
[erschöpfend|erholsam]	27,02	129,412	,819	,960
[unfreundlich|freundlich]	26,83	123,637	,898	,958
[belastend|befreiend]	26,94	131,361	,805	,961
[unangenehm|angenehm]	26,77	129,230	,849	,959
[verärgernd|erfreulich]	26,70	128,149	,840	,959
[isolierend|verbindend]	26,94	128,663	,754	,962
[ausgrenzend|einbeziehend]	26,80	126,863	,780	,961
[einsam|gemeinsam]	26,86	126,821	,792	,961
[hemmend|aktivierend]	26,75	128,032	,814	,960

Table C.22 – C.23.

Reliability of health scale in LIV-PS final version (with 12 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,917	4

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[schwächend|kräftigend]	7,36	9,789	,803	,894
[ungesund|gesund]	7,22	9,634	,823	,887
[gesundheitsschädigend|gesundheitsfördernd]	7,11	9,305	,831	,884
[erschöpfend|erholsam]	7,47	9,555	,780	,902

Table C.24 – C.25.

Reliability of well-being scale in LIV-PS final version (with 12 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,935	4

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[unfreundlich|freundlich]	7,39	10,051	,865	,913
[belastend|befreiend]	7,50	12,063	,807	,929
[unangenehm|angenehm]	7,33	11,462	,849	,915
[verärgernd|erfreulich]	7,27	10,833	,885	,902

Table C.26 – C.27.

Reliability of social capital scale in LIV-PS final version (with 12 items).

Reliabilitätsstatistiken

Cronbachs Alpha	Anzahl der Items
,920	4

Item-Skala-Statistiken

	Skalenmittelwert, wenn Item weggelassen	Skalenvarianz, wenn Item weggelassen	Korrigierte Item-Skala-Korrelation	Cronbachs Alpha, wenn Item weggelassen
[isolierend|verbindend]	7,39	12,528	,870	,878
[ausgrenzend|einbeziehend]	7,25	12,635	,802	,902
[einsam|gemeinsam]	7,31	12,790	,793	,904
[hemmend|aktivierend]	7,20	13,339	,803	,901

C.3 Questionnaire for Capturing Inner Characteristics (CHA-PS-in)

incl. NEO–Five–Factor–Inventory: The 30-Item-Short-Version (Körner et al., 2007)

II. Fragebogen zur Erfassung innerer Charakteristika (CHA-PS-in)

Dieser Teil erfasst Angaben zu Ihrer Persönlichkeit, Ihrem derzeit empfundenem Stress und Ihrer Zufriedenheit.

Lesen Sie sich die folgenden Aussagen aufmerksam durch und beantworten Sie diese intuitiv und spontan. Machen Sie sich keine Sorgen wie andere Ihre Aussagen beurteilen. Es gibt weder richtige noch falsche Antworten. Lassen Sie bitte keine Frage aus und entscheiden Sie sich für die am besten zutreffende Antwortkategorie.

Alle Angaben sind **freiwillig** und **anonym** und können nicht auf Ihre Person zurückgeführt werden.

Dieser Fragebogen enthält 30 Aussagen, wie man sie bei einer Beschreibung der eigenen Person vielleicht machen würde. Lesen Sie sich bitte jede Aussage aufmerksam durch und überlegen Sie, wie stark die Aussage auf Sie zutrifft oder nicht zutrifft.

		Völlig unzu-treffend	unzu-treffend	Weder noch	Zu-treffend	Völlig zu-treffend
E02	Ich habe gern viele Leute um mich herum.	o	o	o	o	o
G05	Ich halte meine Sachen sauber und ordentlich.	o	o	o	o	o
N06	Ich fühle mich anderen oft unterlegen.	o	o	o	o	o
E07	Ich bin leicht zum Lachen zu bringen.	o	o	o	o	o
O08	Ich finde philosophische Diskussionen langweilig. (R)	o	o	o	o	o
V09	Ich bekomme häufiger Streit mit meiner Familie und meinen Kollegen. (R)	o	o	o	o	o
G10	Ich kann mir meine Zeit recht gut einteilen, sodass ich meine Angelegenheiten rechtzeitig beende.	o	o	o	o	o
N11	Wenn ich unter starkem Stress stehe, fühle ich mich manchmal als ob ich zusammenbräche.	o	o	o	o	o
O13	Mich begeistern Motive, die ich in der Kunst und in der Natur finde.	o	o	o	o	o
V14	Manche Leute halten mich für selbstsüchtig und selbstgefällig. (R)	o	o	o	o	o
G20	Ich versuche, alle mir übertragenen Aufgaben sehr gewissenhaft zu erledigen.	o	o	o	o	o
N21	Ich fühle mich oft angespannt und nervös.	o	o	o	o	o
E22	Ich bin gerne im Zentrum des Geschehens.	o	o	o	o	o
O23	Poesie beeindruckt mich wenig oder gar nicht. (R)	o	o	o	o	o
V24	Im Hinblick auf die Absichten anderer bin ich eher zynisch und skeptisch. (R)	o	o	o	o	o
N26	Manchmal fühle ich mich völlig wertlos.	o	o	o	o	o
E32	Ich habe oft das Gefühl, vor Energie überzuschäumen.	o	o	o	o	o
E37	Ich bin ein fröhlicher, gutgelaunter Mensch.	o	o	o	o	o
V39	Manche Leute halten mich für kalt und berechnend. (R)	o	o	o	o	o
G40	Wenn ich eine Verpflichtung eingehe, so kann man sich auf mich bestimmt verlassen.	o	o	o	o	o

N41	Zu häufig fühle ich mich entmutigt und will aufgeben, wenn etwas schief geht.	o	o	o	o	o
O43	Wenn ich Literatur lese oder Kunst betrachte, empfinde ich manchmal ein Frösteln oder eine Welle der Begeisterung.	o	o	o	o	o
O48	Ich habe wenig Interesse, über die Natur des Universums oder die Lage der Menschheit zu spekulieren. (R)	o	o	o	o	o
V49	Ich versuche stets rücksichtsvoll und sensibel zu handeln.	o	o	o	o	o
G50	Ich bin eine tüchtige Person, die ihre Arbeit immer erledigt.	o	o	o	o	o
N51	Ich fühle mich oft hilflos und wünsche mir eine Person, die meine Probleme löst.	o	o	o	o	o
E52	Ich bin ein sehr aktiver Mensch.	o	o	o	o	o
G55	Ich werde wohl niemals fähig sein, Ordnung in meine Leben zu bringen. (R)	o	o	o	o	o
O58	Ich habe oft Spaß daran, mit Theorien oder abstrakten Inhalten zu spielen.	o	o	o	o	o
V59	Um zu bekommen, was ich will, bin ich notfalls bereit, Menschen zu manipulieren. (R)	o	o	o	o	o

Als wie beansprucht fühlen Sie sich derzeit Ihrem Alltag? *(stress)*

O	O	O	O	O	O
Sehr entspannt	entspannt	eher entspannt	eher gestresst	gestresst	sehr gestresst

Wie zufrieden sind Sie mit Ihrer aktuellen Lebensqualität? *(QoL)*

O	O	O	O	O	O
sehr unzufrieden	ziemlich unzufrieden	etwas unzufrieden	etwas zufreiden	ziemlich zufrieden	sehr zufrieden

C.4 Questionnaire for Capturing Outer Characteristics (CHA-PS-ex)

III. Fragebogen zu Erfassung äußerer Charakteristika (CHA-PS-ex)

Zum Abschluss werden ein paar sozio-demografische Angaben von Ihnen erfasst. Alle Ihre Angaben werden anonym behandelt. Es können daher keine Ihrer Aussagen auf Sie persönlich zurückbezogen werden.

Bitte nennen Sie Ihr Geschlecht (bzw. Gender)? *(gen)*

(0) männlich
(1) weiblich
(2) anderes

Wie alt sind Sie? *(age)*

(1) unter 19 Jahre
(2) 20-29 Jahre
(3) 30-45 Jahre
(4) 46-65 Jahre
(5) über 65 Jahre

In welchem Land haben Sie die längste Zeit bis zum 18. Lebensjahr verbracht? *(cult)*

(1) Deutschland
(2) Österreich
(3) anderes

anderes -> FILTER:
In welchem Land sind Sie die längste Zeit bis zu Ihrem 18. Lebensjahr aufgewachsen? *(cultplus)*
_____

Ist Ihre Muttersprache deutsch? *(langua)*

(1) ja
(0) nein

Ja -> FILTER:
Wie schwer fiel es Ihnen sprachlich den Fragebogen zu verstehen? *(languaplus)*

(1) Es fiel mir oft schwer etwas zu verstehen.
(2) Es fiel mir gelegentlich schwer etwas zu verstehen.
(3) Es fiel mir leicht etwas zu verstehen.

Was ist Ihr aktueller Beziehungsstatus? *(relatio)*

(1) alleinstehend/Single
(2) in einer Beziehung
(3) alternatives Beziehungskonzept (z.B. Polyamorie)
(4) verheiratet/ eingetragene Lebensgemeinschaft
(5) getrennt/geschieden
(6) verwitwet

Was ist Ihr höchster erreichter Bildungsabschluss? *(educa)*

(1) keinen Schulabschluss
(2) Berufsreife (Haupt, Real-, Mittelschule und österreichische BS)
(3) Hochschulreife (Abitur/Matura)
(4) abgeschlossene Lehrausbildung
(5) Hochschulabschluss (inkl. Bachelor)

Was ist Ihre aktuelle Haupttätigkeit? *(job)*

(1) Schüler/ Schülerin
(2) Auszubildender/Auszubildende
(3) Student/Studentin
(4) arbeitssuchend
(5) berufstätig angestellt
(6) berufstätig frei/selbstständig
(7) Pensionist/Pensionistin

Wie hoch ist Ihr durchschnittliches, monatliches Nettoeinkommen? *(income)*

(1) unter 1.000 €
(2) 1.000 – 1.499 €
(3) 1.500 – 1.999 €
(4) über 2.000 €
(99) keine Angabe

Abschluss:

Sie haben es geschafft und sind am Ende angelangt! Vielen Dank für Ihre Hilfe und Ausdauer beim Ausfüllen des Fragebogens.

Falls Sie sich für die Untersuchung „Livability dimensions of public spaces" näher interessieren oder Fragen während der Untersuchung aufgetreten sind, wenden Sie sich gerne an folgende eMail-Adresse:

Silvio.Paasch@mailbox.tu-dresden.de

Mit freundlichen Grüßen,
Silvio Paasch

APPENDIX D: ASSUMPTIONS & RESULTS OF DATA ANALYSIS

D.1 Sample Frequencies

Table D.1.1. – D.1.9.

Frequencies of socio-demographic characteristics in original sample (n = 650).

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	411	63,2	63,2	63,2
	male	232	35,7	35,7	98,9
	other	7	1,1	1,1	100,0
	Total	650	100,0	100,0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 20 years	33	5,1	5,1	5,1
	20 - 29 years	502	77,2	77,2	82,3
	30 - 45 years	96	14,8	14,8	97,1
	46 - 65 years	14	2,2	2,2	99,2
	over 65 years	5	,8	,8	100,0
	Total	650	100,0	100,0	

Cultural Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Germany	591	90,9	90,9	90,9
	Austria	41	6,3	6,3	97,2
	other country	18	2,8	2,8	100,0
	Total	650	100,0	100,0	

Language German

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	629	96,8	96,8	96,8
	no	21	3,2	3,2	100,0
	Total	650	100,0	100,0	

Language Comprehension

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	medium	1	,2	6,3	6,3
	easy	15	2,3	93,8	100,0
	Total	16	2,5	100,0	
Missing	System	634	97,5		
Total		650	100,0		

Relationship Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	single	234	36,0	36,1	36,1
	partnered	340	52,3	52,4	88,4
	alternative love concept	17	2,6	2,6	91,1
	married	50	7,7	7,7	98,8
	divorced	6	,9	,9	99,7
	widowed	2	,3	,3	100,0
	Total	649	99,8	100,0	
Missing	System	1	,2		
Total		650	100,0		

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	compulsory basic secondary schooling (Hauptschule)	1	,2	,2	,2
	certificate of secondary education (Realschule)	4	,6	,6	,8
	professional qualification	9	1,4	1,4	2,2
	high-school degree	359	55,2	55,2	57,4
	graduation degree (incl. undergraduate)	277	42,6	42,6	100,0
	Total	650	100,0	100,0	

Job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	pubil	3	,5	,5	,5
	internship/apprenticeship	2	,3	,3	,8
	student	516	79,4	79,4	80,2
	unemployed	12	1,8	1,8	82,0
	employed (employee)	90	13,8	13,8	95,8
	employed (self-employed)	24	3,7	3,7	99,5
	retired	3	,5	,5	100,0
	Total	650	100,0	100,0	

Net Income per Month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 1.000 €	460	70,8	70,8	70,8
	1.000 - 1.499 €	71	10,9	10,9	81,7
	1.500 - 1.999 €	30	4,6	4,6	86,3
	over 2.000 €	33	5,1	5,1	91,4
	no answer	56	8,6	8,6	100,0
	Total	650	100,0	100,0	

Table D.1.10 – D.1.18.

Frequencies of socio-demographic characteristics in sample after first exclusion (n=635).

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	400	63,0	63,7	63,7
	male	228	35,9	36,3	100,0
	Total	628	98,9	100,0	
Missing	other	7	1,1		
Total		635	100,0		

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29 years	529	83,3	83,3	83,3
	30-65 years	106	16,7	16,7	100,0
	Total	635	100,0	100,0	

Cultural Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Germany	583	91,8	94,3	94,3
	Austria	35	5,5	5,7	100,0
	Total	618	97,3	100,0	
Missing	other country	17	2,7		
Total		635	100,0		

Language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	615	96,9	96,9	96,9
	no	20	3,1	3,1	100,0
	Total	635	100,0	100,0	

Language Comprehension

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	easy	15	2,4	100,0	100,0
Missing	System	620	97,6		
Total		635	100,0		

Relationship Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non-partnered	235	37,0	37,1	37,1
	partnered	399	62,8	62,9	100,0
	Total	634	99,8	100,0	
Missing	99	1	,2		
Total		635	100,0		

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high school degree (Abitur/Matura)	356	56,1	56,1	56,1
	professional qualification	8	1,3	1,3	57,3
	graduation degree (incl. undergraduate)	271	42,7	42,7	100,0
	Total	635	100,0	100,0	

Job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	students	516	81,3	81,3	81,3
	unemployed	12	1,9	1,9	83,1
	employed	107	16,9	16,9	100,0
	Total	635	100,0	100,0	

Net Income per Month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 1.000 €	453	71,3	78,1	78,1
	over 1.000 €	127	20,0	21,9	100,0
	Total	580	91,3	100,0	
Missing	99	55	8,7		
Total		635	100,0		

Table D.1.19 – D.1.27.

Frequencies of socio-demographic characteristics in sample after data trimming (n=601).

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	379	63,1	63,7	63,7
	male	216	35,9	36,3	100,0
	Total	595	99,0	100,0	
Missing	other	6	1,0		
Total		601	100,0		

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29 years	503	83,7	83,7	83,7
	30-65 years	98	16,3	16,3	100,0
	Total	601	100,0	100,0	

Cultural Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Germany	552	91,8	94,2	94,2
	Austria	34	5,7	5,8	100,0
	Total	586	97,5	100,0	
Missing	other country	15	2,5		
Total		601	100,0		

Language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	583	97,0	97,0	97,0
	no	18	3,0	3,0	100,0
	Total	601	100,0	100,0	

Language Comprehension

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	easy	13	2,2	100,0	100,0
Missing	System	588	97,8		
Total		601	100,0		

Relationship Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non-partnered	223	37,1	37,2	37,2
	partnered	377	62,7	62,8	100,0
	Total	600	99,8	100,0	
Missing	99	1	,2		
Total		601	100,0		

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high school degree (Abitur/Matura)	341	56,7	56,7	56,7
	professional qualification	8	1,3	1,3	58,1
	graduation degree (incl. undergraduate)	252	41,9	41,9	100,0
	Total	601	100,0	100,0	

Job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	students	487	81,0	81,0	81,0
	unemployed	10	1,7	1,7	82,7
	employed	104	17,3	17,3	100,0
	Total	601	100,0	100,0	

Net Income per Month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	under 1.000 €	428	71,2	77,5	77,5
	over 1.000 €	124	20,6	22,5	100,0
	Total	552	91,8	100,0	
Missing	99	49	8,2		
Total		601	100,0		

D.2 Assumptions for Research Hypotheses 1 - 3

Table D.2.1.

Descriptive statistics of subjectively-perceived livability in sample after first exclusion (n=635).

Descriptives

			Statistic	Std. Error
Subjectively-Perceived Livability	Mean		2,2705	,02536
	95% Confidence Interval for Mean	Lower Bound	2,2207	
		Upper Bound	2,3203	
	5% Trimmed Mean		2,2941	
	Median		2,3264	
	Variance		,408	
	Std. Deviation		,63903	
	Minimum		,09	
	Maximum		3,99	
	Range		3,90	
	Interquartile Range		,75	
	Skewness		-,601	,097
	Kurtosis		,551	,194

Table D.2.2.

Test of normality of subjectively-perceived livability in sample after first exclusion (n=635).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	,070	635	,000	,977	635	,000

a. Lilliefors Significance Correction

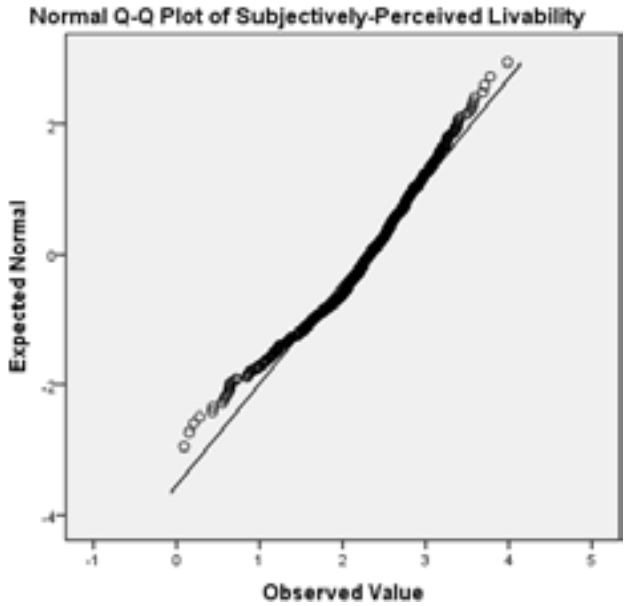


Fig. D.2.1. Q-Q plot of subjectively-perceived livability in sample after first exclusion (n=635).

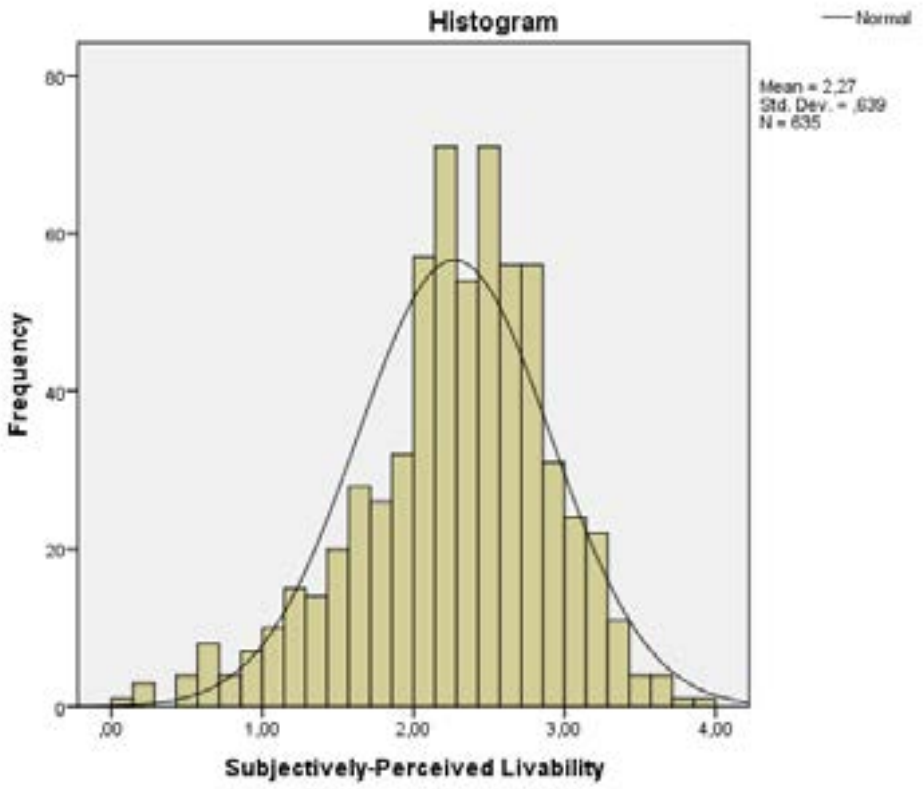


Fig. D.2.2. Histogram of subjectively-perceived livability in sample after first exclusion (n=635).

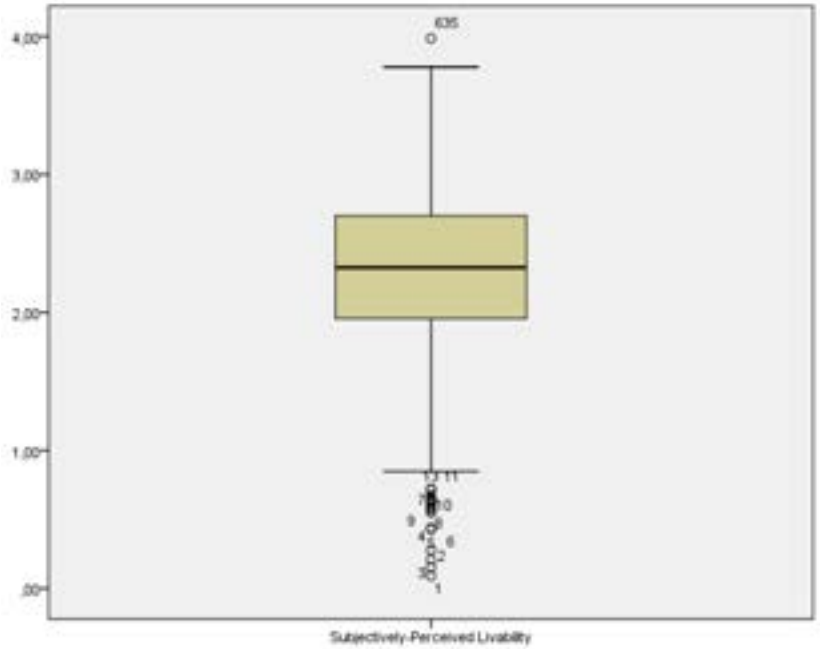


Fig. D.2.3. Boxplot of subjectively-perceived livability with outliers in sample after first exclusion (n=635).

Trimming Data:

Method: using a standard deviation based rule: trimmed mean (5%) = 2.2941; SD = 0.63903; no. of SD = 2; calculation: 2x0.63903 = 1.278; lower limit = 1.016 & upper limit = 3.572; excluding n = 34 -> rest: n = 601.

Table D.2.3.

Descriptive statistics of subjectively-perceived livability in sample after data trimming (n=601).

Descriptives

			Statistic	Std. Error
Subjectively-Perceived Livability	Mean		2,33122	,021662
	95% Confidence Interval for Mean	Lower Bound	2,28868	
		Upper Bound	2,37376	
	5% Trimmed Mean		2,33966	
	Median		2,34722	
	Variance		,282	
	Std. Deviation		,531044	
	Minimum		1,035	
	Maximum		3,563	
	Range		2,528	
	Interquartile Range		,694	
	Skewness		-,249	,100
	Kurtosis		-,324	,199

Table D.2.4.

Test of normality of subjectively-perceived livability in sample after data trimming (n=601).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	,037	601	,045	,989	601	,000

a. Lilliefors Significance Correction

Fig. D.2.4. Q-Q plot of subjectively-perceived livability in sample after data trimming (n=601).

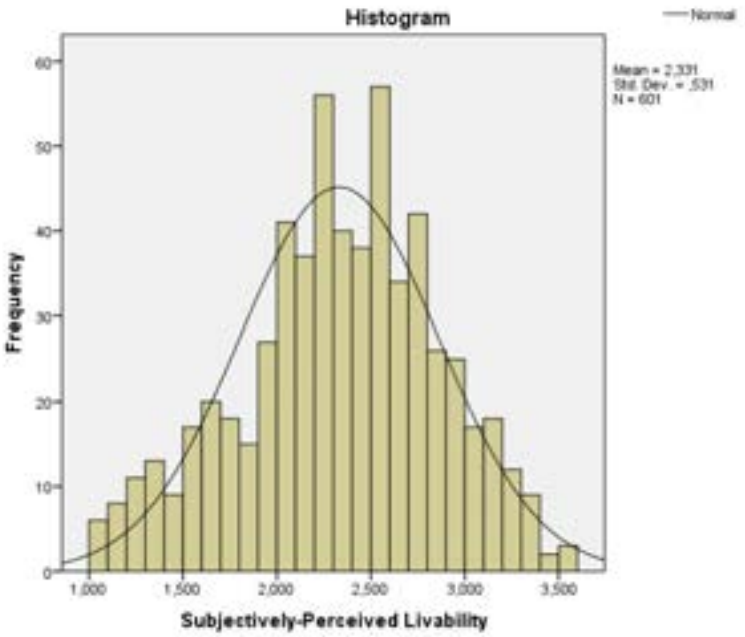


Fig. D.2.5. Histogram of subjectively-perceived livability in sample after trimming data (n=601).

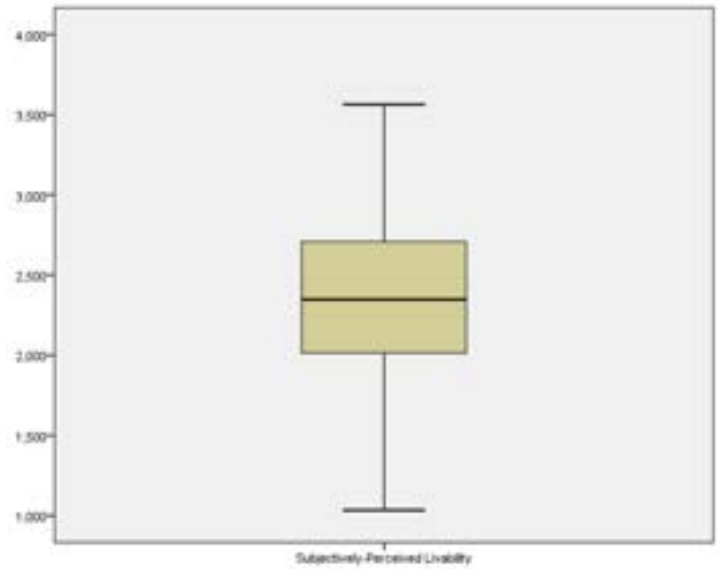


Fig D.2.6. Boxplot of subjectively-perceived livability in sample after trimming data (n=601).

Table D.2.5.

Descriptive statistics of subjectively-perceived livability regarding the influence of groups of physical environment (n=601).

Descriptives

	Physical Environment			Statistic	Std. Error
Subjectively-Perceived Livability	harmful	Mean		2,05391	,031179
		95% Confidence Interval for Mean	Lower Bound	1,99250	
			Upper Bound	2,11533	
		5% Trimmed Mean		2,05115	
		Median		2,08333	
		Variance		,238	
		Std. Deviation		,488022	
		Minimum		1,042	
		Maximum		3,486	
		Range		2,444	
		Interquartile Range		,715	
		Skewness		-,006	,156
		Kurtosis		-,417	,310
	beneficial	Mean		2,52206	,025047
		95% Confidence Interval for Mean	Lower Bound	2,47280	
			Upper Bound	2,57132	
		5% Trimmed Mean		2,53775	
		Median		2,53472	
		Variance		,223	
		Std. Deviation		,472589	
		Minimum		1,035	
		Maximum		3,563	
		Range		2,528	
		Interquartile Range		,625	
		Skewness		-,440	,129
		Kurtosis		,307	,258

Table. D.2.6.

Test of normality of subjectively-perceived livability for groups of physical environment in sample after data trimming (n=601).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Physical Environment	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	harmful	,045	245	,200*	,989	245	,049
	beneficial	,035	356	,200*	,985	356	,001

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

a. Lilliefors Significance Correction

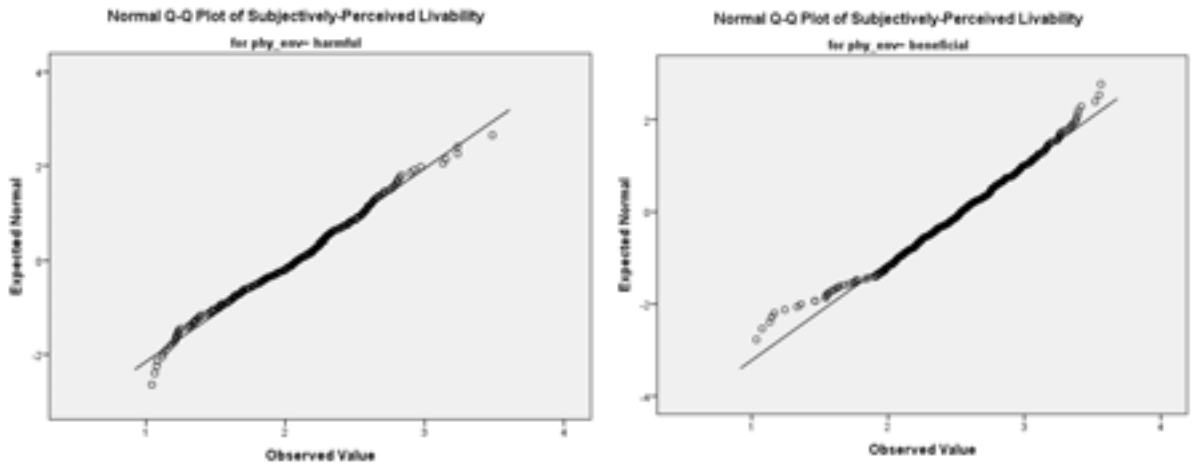


Fig. D.2.7 – D.2.8. Q-Q plots of subjectively-perceived livability for groups of physical environment in sample after data trimming (n=601).

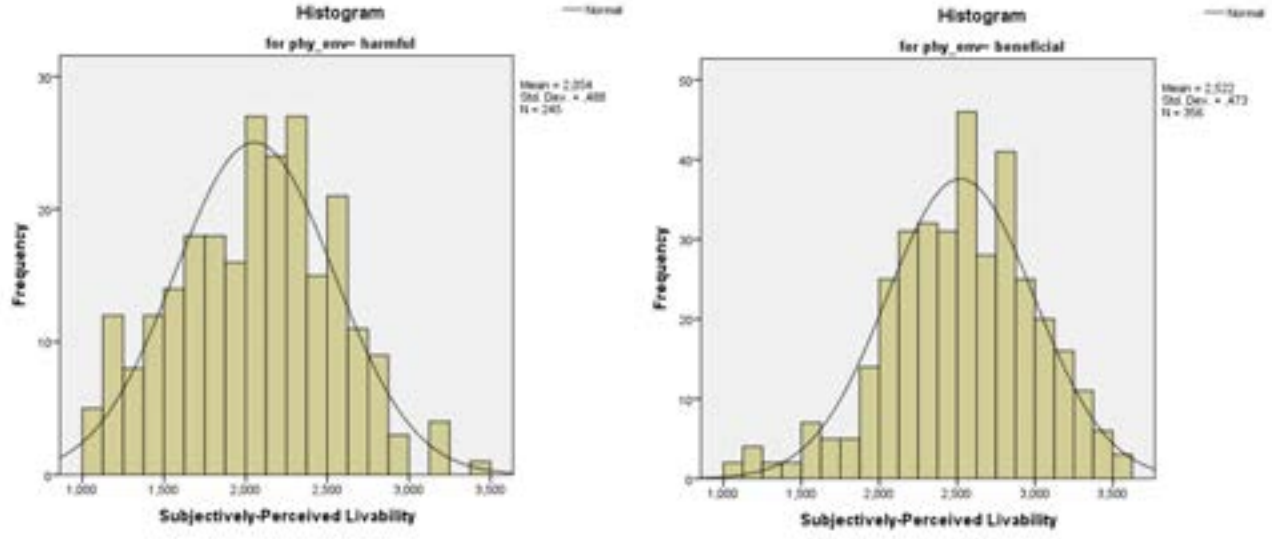


Fig. D.2.9 – D.2.10. Histograms of subjectively-perceived livability for groups of physical environment in sample after data trimming (n=601).

Table D.2.7.

Descriptive statistics of subjectively-perceived livability regarding the influence of groups of social environment (n=601).

Descriptives

	Social Environment			Statistic	Std. Error
Subjectively-Perceived Livability	non-sociable	Mean		2,25053	,031471
		95% Confidence Interval for Mean	Lower Bound	2,18859	
			Upper Bound	2,31247	
		5% Trimmed Mean		2,25930	
		Median		2,30556	
		Variance		,286	
		Std. Deviation		,535000	
		Minimum		1,035	
		Maximum		3,417	
		Range		2,382	
		Interquartile Range		,688	
		Skewness		-,316	,143
		Kurtosis		-,424	,286
	sociable	Mean		2,40596	,029273
		95% Confidence Interval for Mean	Lower Bound	2,34836	
			Upper Bound	2,46356	
		5% Trimmed Mean		2,41286	
		Median		2,44792	
		Variance		,267	
		Std. Deviation		,517063	
		Minimum		1,076	
		Maximum		3,563	
		Range		2,486	
		Interquartile Range		,686	
		Skewness		-,166	,138
		Kurtosis		-,347	,275

Table D.2.8.

Test of normality of subjectively-perceived livability for groups of social environment in sample after data trimming (n=601).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Social Environment	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	non-sociable	,060	289	,013	,991	289	,001
	sociable	,036	312	,200*	,992	312	,086

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

a. Lilliefors Significance Correction

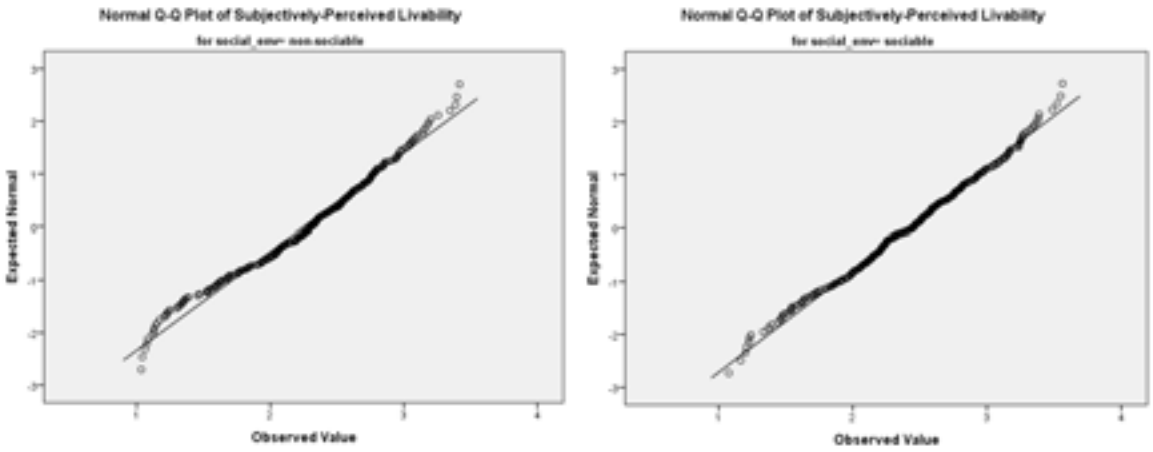


Fig. D.2.11 –D.2.12. Q-Q plots of subjectively-perceived livability for groups of social environment in sample after data trimming (n=601).

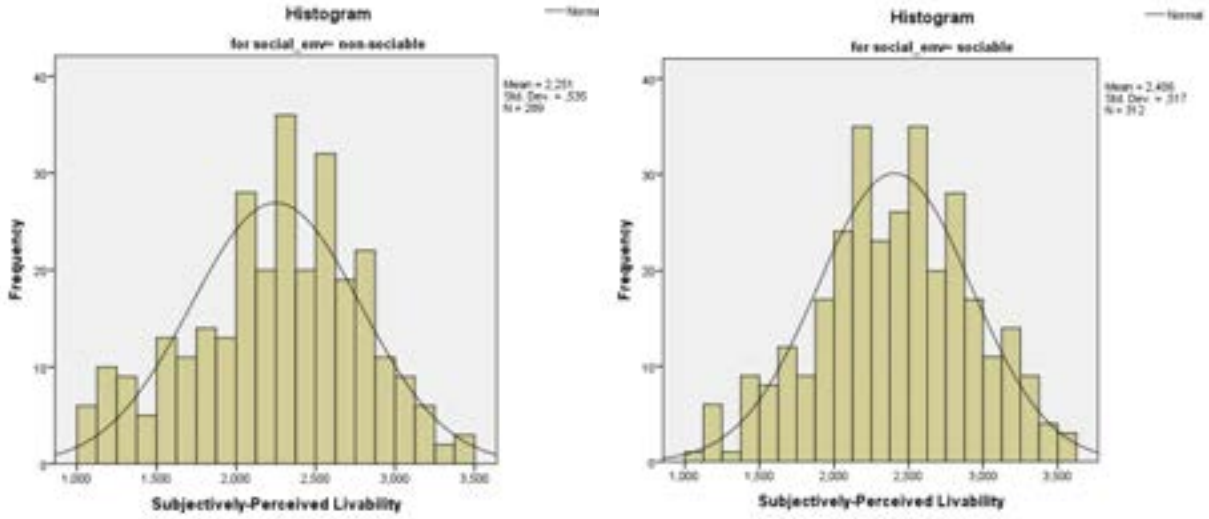


Fig. D.2.13 – D.2.14. Histograms of subjectively-perceived livability for groups of social environment in sample after data trimming (n=601).

Table D.2.9.

Test of homogeneity of variance of subjectively-perceived livability between groups of sample after data trimming (n=601).

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Subjectively-Perceived L

F	df1	df2	Sig.
1,405	3	597	,240

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + phy_env + social_env + phy_env * social_env

D.3 Results for Research Hypotheses 1 – 3

Table D.3.1.

Bootstrap specifications for two-way ANOVA regarding the influence of physical and social environment on subjectively-perceived livability (n=601).

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95,0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

Table D.3.2.

Between-Subjects factors for two-way ANOVA regarding the influence of physical and social environment on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	245
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	312

Table D.3.3.

Tests of Between-Subjects Effects of two-way ANOVA regarding the influence of physical and social environment on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,615[a]	3	13,538	62,853	,000	,240
Intercept	2955,077	1	2955,077	13719,442	,000	,958
phy_env	35,622	1	35,622	165,381	,000	,217
social_env	7,580	1	7,580	35,193	,000	,056
phy_env * social_env	2,646	1	2,646	12,282	,000	,020
Error	128,590	597	,215			
Total	3435,388	601				
Corrected Total	169,204	600				

a. R Squared = ,240 (Adjusted R Squared = ,236)

Table D.3.4.

Parameter estimates of two-way ANOVA regarding the influence of physical and social environment on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,571	,036	72,238	,000	2,501	2,641	,897
[phy_env=0]	-,363	,053	-6,886	,000	-,467	-,260	,074
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,094	,049	-1,915	,056	-,191	,002	,006
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,272	,078	-3,505	,000	-,425	-,120	,020
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.3.5.

Bootstrap parameter estimates of two-way ANOVA regarding the influence of ohysical and social environment on subjectively-perceived livability (n=601).

Bootstrap for Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
					Lower	Upper
Intercept	2,571	,002	,038	,001	2,497	2,652
[phy_env=0]	-,363	-,004	,054	,001	-,472	-,268
[phy_env=1]	0	0	0		.	.
[social_env=0]	-,094	,001	,049	,065	-,194	,008
[social_env=1]	0	0	0		.	.
[phy_env=0] * [social_env=0]	-,272	,001	,077	,001	-,415	-,117
[phy_env=0] * [social_env=1]	0	0	0		.	.
[phy_env=1] * [social_env=0]	0	0	0		.	.
[phy_env=1] * [social_env=1]	0	0	0		.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.3.6.

Estimated marginal means of two-way ANOVA regarding the influence of physical environment on subjectively-perceived livability (n=601).

1. Physical Environment

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
							BCa 95% Confidence Interval	
			Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
harmful	2,025	,030	1,966	2,084	-,001	,029	1,967	2,080
beneficial	2,524	,025	2,476	2,573	,002	,025	2,467	2,581

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.3.7.

Estimated marginal means of two-way ANOVA regarding the influence of social environment on subjectively-perceived livability (n=601).

2. Social Environment

Dependent Variable: Subjectively-Perceived Livability

Social Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
							BCa 95% Confidence Interval	
			Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
non-sociable	2,159	,029	2,103	2,215	,001	,026	2,106	2,216
sociable	2,390	,026	2,338	2,441	,000	,027	2,339	2,439

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.3.8.

Estimated marginal means of two-way ANOVA regarding the interaction of physical and social environment with subjectively-perceived livability (n=601).

3. Physical Environment * Social Environment

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Social Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
								BCa 95% Confidence Interval	
				Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
harmful	non-sociable	1,841	,046	1,752	1,931	-4,595E-005	,044	1,755	1,926
	sociable	2,208	,039	2,132	2,284	-,002	,038	2,140	2,270
beneficial	non-sociable	2,477	,034	2,410	2,544	,003	,032	2,407	2,551
	sociable	2,571	,036	2,501	2,641	,002	,038	2,487	2,652

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

D.4 Assumptions for Sub-Hypotheses 1.1 – 1.4

Table D.4.1.

Descriptive statistics of subjectively-perceived livability for the physical livable dimensions of comfort (n=601).

	Physical Environment			Statistic	Std. Error
Subjectively-Perceived Livability (for Comfort)	harmful	Mean		2,6540	,04381
		95% Confidence Interval for Mean	Lower Bound	2,5677	
			Upper Bound	2,7403	
		5% Trimmed Mean		2,6521	
		Median		2,6111	
		Variance		,470	
		Std. Deviation		,68580	
		Minimum		,78	
		Maximum		4,36	
		Range		3,58	
		Interquartile Range		,86	
		Skewness		-,011	,156
		Kurtosis		-,284	,310
	beneficial	Mean		3,3826	,03369
		95% Confidence Interval for Mean	Lower Bound	3,3164	
			Upper Bound	3,4489	
		5% Trimmed Mean		3,4004	
		Median		3,4167	
		Variance		,404	
		Std. Deviation		,63567	
		Minimum		,89	
		Maximum		5,00	
		Range		4,11	
		Interquartile Range		,86	
		Skewness		-,405	,129
		Kurtosis		,437	,258

Table D.4.2.

Descriptive statistics of subjectively-perceived livability for the physical livable dimensions of access (n=601).

Subjectively-Perceived Livability (for Access)	harmful	Mean		1,6855	,04147
		95% Confidence Interval for Mean	Lower Bound	1,6039	
			Upper Bound	1,7672	
		5% Trimmed Mean		1,6934	
		Median		1,6667	
		Variance		,421	
		Std. Deviation		,64913	
		Minimum		,00	
		Maximum		3,94	
		Range		3,94	
		Interquartile Range		,89	
		Skewness		-,084	,156
		Kurtosis		,098	,310
	beneficial	Mean		1,8352	,03432
		95% Confidence Interval for Mean	Lower Bound	1,7677	
			Upper Bound	1,9027	
		5% Trimmed Mean		1,8503	
		Median		1,8889	
		Variance		,419	
		Std. Deviation		,64756	
		Minimum		,00	
		Maximum		3,83	
		Range		3,83	
		Interquartile Range		,91	
		Skewness		-,317	,129
		Kurtosis		,219	,258

Table D.4.3.

Descriptive statistics of subjectively-perceived livability for the physical livable dimensions of function (n=601).

Subjectively-Perceived Livability (for Function)	harmful	Mean		2,5539	,04209
		95% Confidence Interval for Mean	Lower Bound	2,4710	
			Upper Bound	2,6367	
		5% Trimmed Mean		2,5482	
		Median		2,5833	
		Variance		,434	
		Std. Deviation		,65859	
		Minimum		1,08	
		Maximum		4,81	
		Range		3,72	
		Interquartile Range		,89	
		Skewness		,147	,156
		Kurtosis		-,143	,310
	beneficial	Mean		2,9593	,03689
		95% Confidence Interval for Mean	Lower Bound	2,8867	
			Upper Bound	3,0318	
		5% Trimmed Mean		2,9730	
		Median		3,0000	
		Variance		,484	
		Std. Deviation		,69604	
		Minimum		,83	
		Maximum		4,92	
		Range		4,08	
		Interquartile Range		,94	
		Skewness		-,260	,129
		Kurtosis		,072	,258

Table D.4.4.

Descriptive statistics of subjectively-perceived livability for the physical livable dimension of maintenance (n=601).

Subjectively-Perceived Livability (for Maintenance)	harmful	Mean		1,3223	,04076
		95% Confidence Interval for Mean	Lower Bound	1,2420	
			Upper Bound	1,4026	
		5% Trimmed Mean		1,3153	
		Median		1,3611	
		Variance		,407	
		Std. Deviation		,63799	
		Minimum		,00	
		Maximum		3,81	
		Range		3,81	
		Interquartile Range		,86	
		Skewness		,227	,156
		Kurtosis		,282	,310
	beneficial	Mean		1,9111	,03639
		95% Confidence Interval for Mean	Lower Bound	1,8396	
			Upper Bound	1,9827	
		5% Trimmed Mean		1,9303	
		Median		1,9444	
		Variance		,471	
		Std. Deviation		,68660	
		Minimum		,00	
		Maximum		3,56	
		Range		3,56	
		Interquartile Range		,85	
		Skewness		-,434	,129
		Kurtosis		-,037	,258

Table D.4.5.

Test of normality of subjectively-perceived livability for each physical livable dimension of public space (n=601).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Physical Environment	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability (for Comfort)	harmful	,040	245	,200*	,995	245	,648
	beneficial	,038	356	,200*	,988	356	,005
Subjectively-Perceived Livability (for Access)	harmful	,044	245	,200*	,993	245	,342
	beneficial	,052	356	,020	,990	356	,017
Subjectively-Perceived Livability (for Function)	harmful	,046	245	,200*	,994	245	,373
	beneficial	,044	356	,091	,993	356	,094
Subjectively-Perceived Livability (for Maintenance)	harmful	,034	245	,200*	,989	245	,048
	beneficial	,059	356	,005	,983	356	,000

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

a. Lilliefors Significance Correction

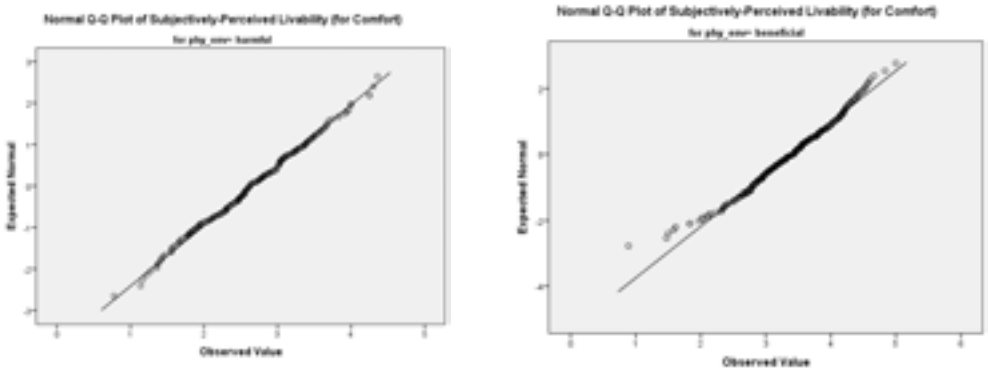


Fig. D.4.1 – D.4.2. Q-Q plots of subjectively-perceived livability for groups of physical livable dimension of comfort.

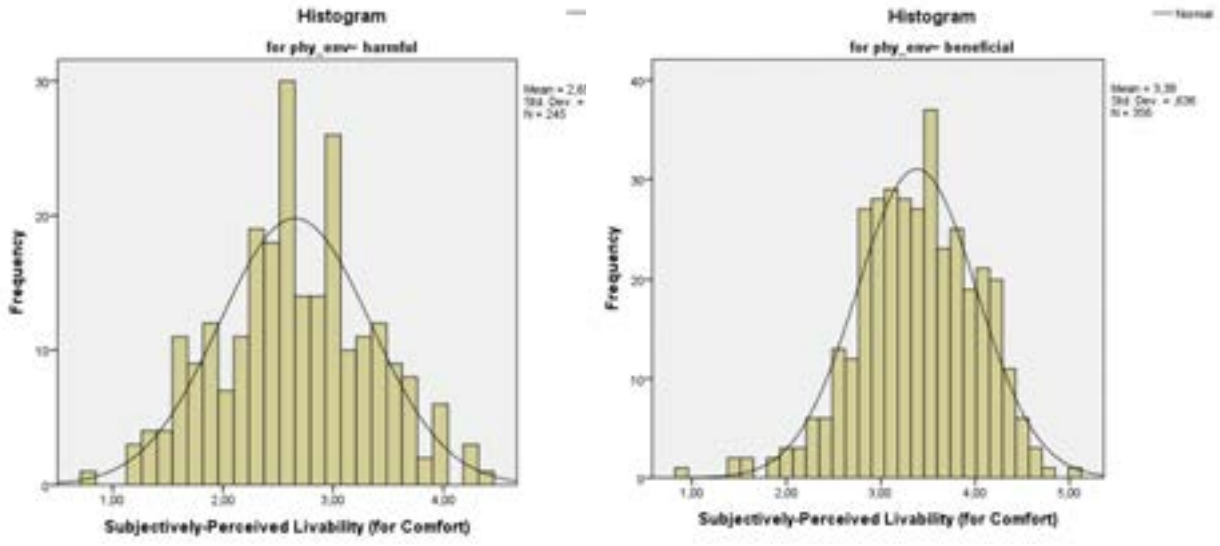


Fig. D.4.3 –D.4.4. Histograms of subjectively-perceived livability for groups of physical livable dimension of comfort.

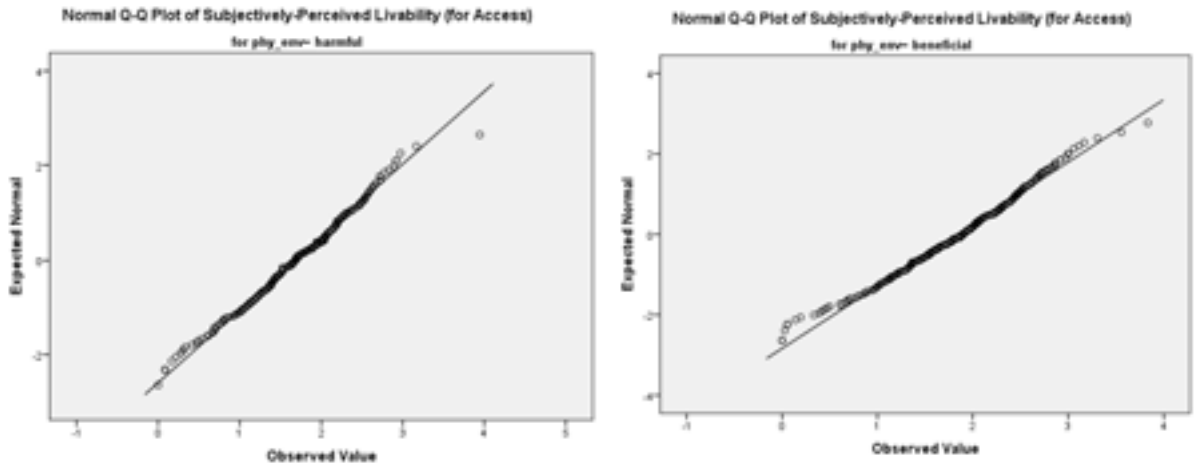


Fig. D.4.5 – D.4.6. Q-Q plots of subjectively-perceived livability for groups of physical livable dimension of access.

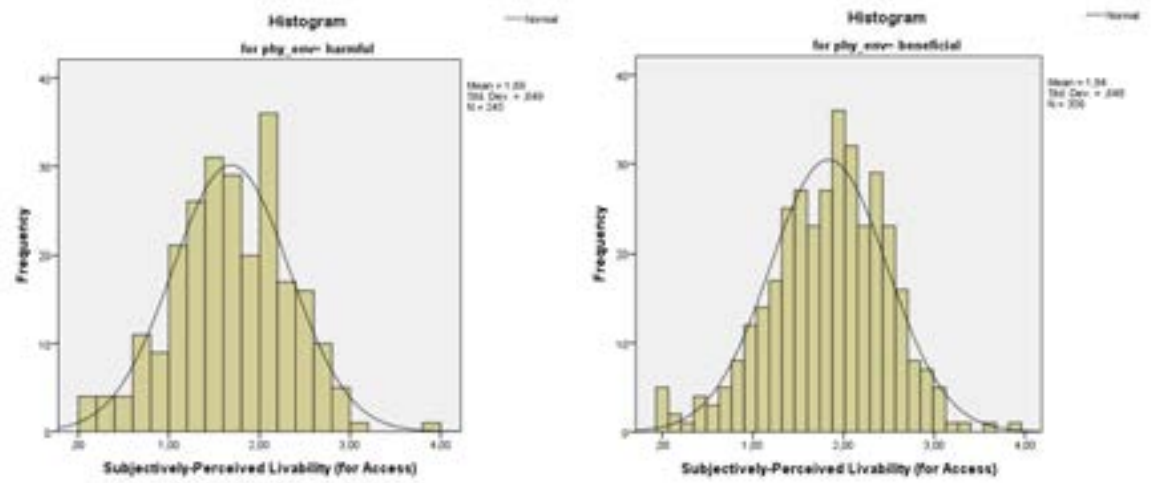


Fig. D.4.7 – D.4.8. Histograms of subjectively-perceived livability for groups of physical livable dimension of access.

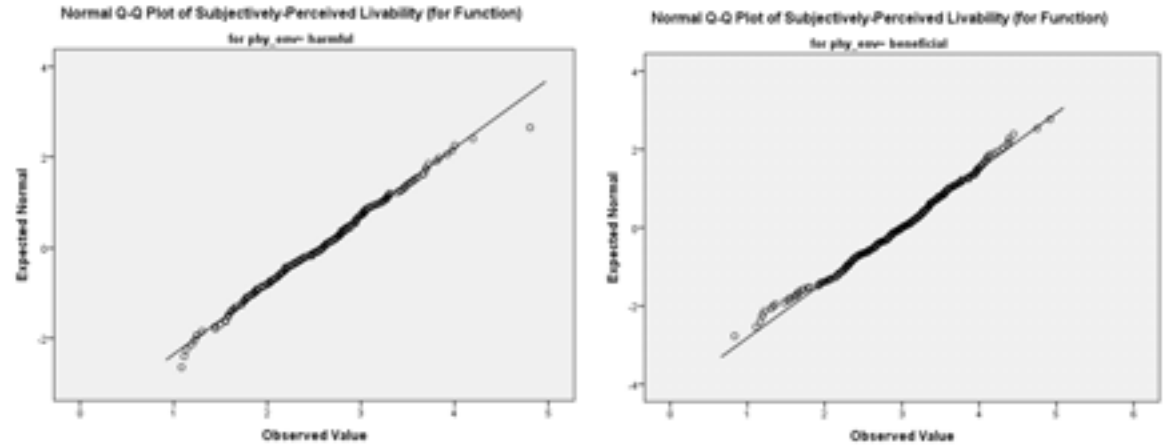


Fig. D.4.9 – D.4.10. Q-Q plots of subjectively-perceived livability for groups of physical livable dimension of function.

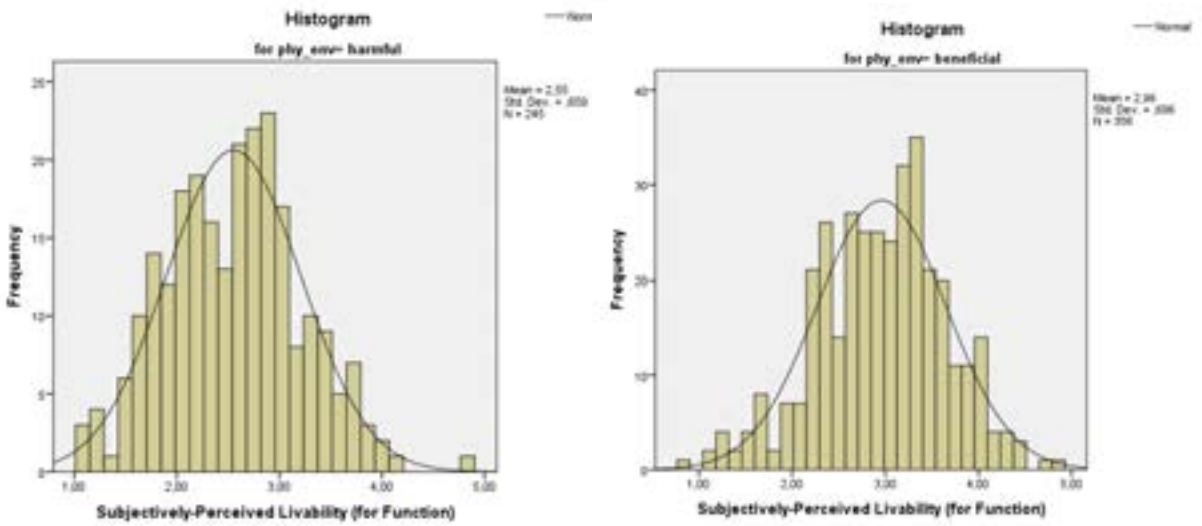


Fig. D.4.11 – D.4.12. Histograms of subjectively-perceived livabi lity for groups of physical livable dimension of function.

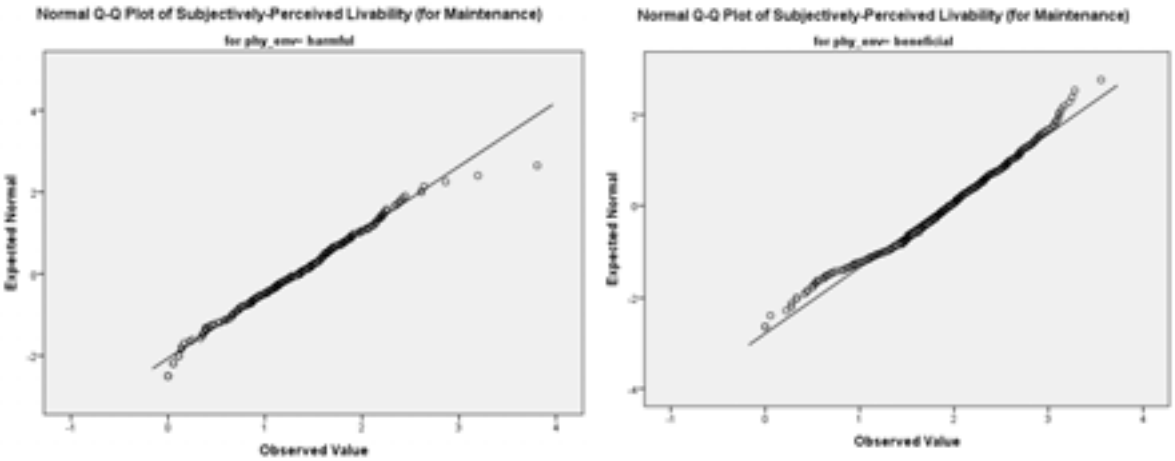


Fig. D.4.13 – D.4.14. Q-Q plots of subjectively-perceived livability for groups of physical livable dimension of maintenance

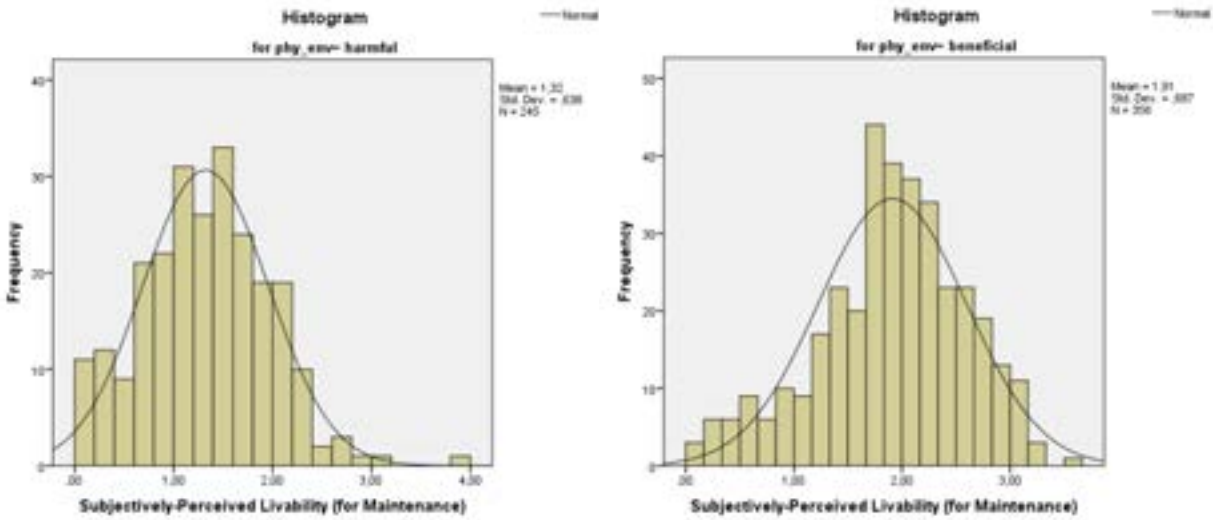


Fig. D.4.15 – D.4.16. Histograms of subjectively-perceived livability for groups of physical livable dimension of maintenance.

Table D.4.6.

Test of homogeneity of variance of subjectively-perceived livability for groups of each physical livable dimension: comfort, access, function & maintenance (n=601).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability (for Comfort)	Based on Mean	1,587	1	599	,208
	Based on Median	1,566	1	599	,211
	Based on Median and with adjusted df	1,566	1	596,020	,211
	Based on trimmed mean	1,625	1	599	,203
Subjectively-Perceived Livability (for Access)	Based on Mean	,015	1	599	,902
	Based on Median	,040	1	599	,841
	Based on Median and with adjusted df	,040	1	598,655	,841
	Based on trimmed mean	,025	1	599	,875
Subjectively-Perceived Livability (for Function)	Based on Mean	,363	1	599	,547
	Based on Median	,349	1	599	,555
	Based on Median and with adjusted df	,349	1	594,341	,555
	Based on trimmed mean	,328	1	599	,567
Subjectively-Perceived Livability (for Maintenance)	Based on Mean	,556	1	599	,456
	Based on Median	,524	1	599	,470
	Based on Median and with adjusted df	,524	1	591,490	,470
	Based on trimmed mean	,507	1	599	,477

D.5 Results for Sub-Hypotheses 1.1 – 1.4

Table D.5.1.

Bootstrap specifications for one-way ANOVA regarding the influence of all physical livable dimension on subjectively-perceived livability (n=601).

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95,0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

Table D.5.2.

Between-subjects factors for one-way ANOVA regarding the influence of comfort on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Comfort	0	harmful	245
	1	beneficial	356

Table. D.5.3.

Descriptive statistics for one-way ANOVA regarding the influence of comfort on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability (for Comfort)

Physical Environment		Statistic	Bootstrap[a] Bias	Bootstrap[a] Std. Error	Bootstrap[a] BCa 95% Confidence Interval Lower	Bootstrap[a] BCa 95% Confidence Interval Upper
harmful	Mean	2,6540	-,0012	,0427	2,5706	2,7356
	Std. Deviation	,68580	-,00263	,02718	,63470	,73166
	N	245	-1	12	223	265
beneficial	Mean	3,3826	,0032	,0330	3,3112	3,4583
	Std. Deviation	,63567	-,00116	,02619	,58781	,68321
	N	356	1	12	333	381
Total	Mean	3,0856	,0024	,0291	3,0261	3,1530
	Std. Deviation	,74751	-,00011	,02023	,71072	,78632
	N	601	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.4.

Test of between-subjects effects for one-way ANOVA regarding the influence comfort on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability (for Comfort)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	77,057[a]	1	77,057	178,760	,000	,230
Intercept	5288,452	1	5288,452	12268,364	,000	,953
phy_env	77,057	1	77,057	178,760	,000	,230
Error	258,207	599	,431			
Total	6057,335	601				
Corrected Total	335,265	600				

a. R Squared = ,230 (Adjusted R Squared = ,229)

Table D.5.5.

Estimated marginal means for one-way ANOVA regarding the influence comfort on subjectively-perceived livability (n=601).

Physical Environment

Dependent Variable: Subjectively-Perceived Livability (for Comfort)

Physical Environment	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound	Bootstrap for Mean[a] Bias	Bootstrap for Mean[a] Std. Error	Bootstrap for Mean[a] BCa 95% Confidence Interval Lower	Bootstrap for Mean[a] BCa 95% Confidence Interval Upper
harmful	2,654	,042	2,572	2,736	-,001	,043	2,571	2,736
beneficial	3,383	,035	3,314	3,451	,003	,033	3,311	3,458

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.6.

Between-subjects factors for one-way ANOVA regarding the influence of access on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Access	0	harmful	245
	1	beneficial	356

Table. D.5.7.

Descriptive statistics for one-way ANOVA regarding the influence of access on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability (for Access)

			Bootstrap[a]			
					BCa 95% Confidence Interval	
Physical Environment		Statistic	Bias	Std. Error	Lower	Upper
harmful	Mean	1,6855	,0003	,0404	1,6046	1,7624
	Std. Deviation	,64913	-,00204	,02989	,59482	,70098
	N	245	0	12	222	266
beneficial	Mean	1,8352	,0013	,0339	1,7668	1,9059
	Std. Deviation	,64756	-,00142	,02495	,60231	,69286
	N	356	0	12	334	380
Total	Mean	1,7742	,0009	,0263	1,7254	1,8269
	Std. Deviation	,65183	-,00081	,01928	,61858	,68634
	N	601	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.8.

Test of between-subjects effects for one-way ANOVA regarding the influence access on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability (for Access)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3,253[a]	1	3,253	7,742	,006	,013
Intercept	1798,863	1	1798,863	4281,376	,000	,877
phy_env	3,253	1	3,253	7,742	,006	,013
Error	251,676	599	,420			
Total	2146,690	601				
Corrected Total	254,929	600				

a. R Squared = ,013 (Adjusted R Squared = ,011)

Table D.5.9.

Estimated marginal means for one-way ANOVA regarding the influence access on subjectively-perceived livability (n=601).

Physical Environment

Dependent Variable: Subjectively-Perceived Livability (for Access)

Physical Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
							BCa 95% Confidence Interval	
			Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
harmful	1,685	,041	1,604	1,767	,000	,040	1,605	1,762
beneficial	1,835	,034	1,768	1,903	,001	,034	1,767	1,906

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.10.

Between-subjects factors for one-way ANOVA regarding the influence of function on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Function	0	harmful	245
	1	beneficial	356

Table. D.5.11.

Descriptive statistics for one-way ANOVA regarding the influence of function on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability (for Function)

Physical Environment		Statistic	Bootstrap[a]			
					BCa 95% Confidence Interval	
			Bias	Std. Error	Lower	Upper
harmful	Mean	2,5539	,0011	,0425	2,4732	2,6384
	Std. Deviation	,65859	-,00232	,02902	,60495	,71179
	N	245	0	12	222	269
beneficial	Mean	2,9593	,0001	,0380	2,8857	3,0310
	Std. Deviation	,69604	-,00251	,02651	,64758	,74095
	N	356	0	12	332	378
Total	Mean	2,7940	,0004	,0301	2,7366	2,8523
	Std. Deviation	,70908	-,00170	,01930	,67502	,74075
	N	601	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.12.

Test of between-subjects effects for one-way ANOVA regarding the influence function on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability (for Function)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	23,853[a]	1	23,853	51,428	,000	,079
Intercept	4411,002	1	4411,002	9510,387	,000	,941
phy_env	23,853	1	23,853	51,428	,000	,079
Error	277,822	599	,464			
Total	4993,345	601				
Corrected Total	301,674	600				

a. R Squared = ,079 (Adjusted R Squared = ,078)

Table D.5.13.

Estimated marginal means for one-way ANOVA regarding the influence function on subjectively-perceived livability (n=601).

Physical Environment

Dependent Variable: Subjectively-Perceived Livability (for Function)

Physical Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
			Lower Bound	Upper Bound	Bias	Std. Error	BCa 95% Confidence Interval Lower	BCa 95% Confidence Interval Upper
harmful	2,554	,044	2,468	2,639	,001	,043	2,473	2,638
beneficial	2,959	,036	2,888	3,030	,000	,038	2,885	3,031

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.14.

Between-subjects factors for one-way ANOVA regarding the influence of maintenance on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Maintenance	0	harmful	245
	1	beneficial	356

Table. D.5.15.

Descriptive statistics for one-way ANOVA regarding the influence of maintenance on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability (for Maintenance)

Physical Environment		Statistic	Bootstrap[a]			
			Bias	Std. Error	BCa 95% Confidence Interval	
					Lower	Upper
harmful	Mean	1,3223	,0021	,0396	1,2380	1,4021
	Std. Deviation	,63799	-,00088	,03118	,58004	,70016
	N	245	0	12	222	269
beneficial	Mean	1,9111	-,0013	,0366	1,8364	1,9786
	Std. Deviation	,68660	-,00100	,02544	,64038	,72962
	N	356	0	12	334	378
Total	Mean	1,6711	,0000	,0290	1,6111	1,7268
	Std. Deviation	,72684	-,00084	,01850	,68993	,76063
	N	601	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.5.16.

Test of between-subjects effects for one-way ANOVA regarding the influence maintenance on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability (for Maintenance)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	50,311[a]	1	50,311	113,010	,000	,159
Intercept	1517,320	1	1517,320	3408,227	,000	,851
phy_env	50,311	1	50,311	113,010	,000	,159
Error	266,671	599	,445			
Total	1995,327	601				
Corrected Total	316,982	600				

a. R Squared = ,159 (Adjusted R Squared = ,157)

Table D.5.17.

Estimated marginal means for one-way ANOVA regarding the influence maintenance on subjectively-perceived livability (n=601).

Physical Environment

Dependent Variable: Subjectively-Perceived Livability (for Maintenance)

Physical Environment	Mean	Std. Error	95% Confidence Interval		Bootstrap for Mean[a]			
			Lower Bound	Upper Bound	Bias	Std. Error	BCa 95% Confidence Interval	
							Lower	Upper
harmful	1,322	,043	1,239	1,406	,002	,040	1,238	1,402
beneficial	1,911	,035	1,842	1,981	-,001	,037	1,836	1,979

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

D.6. Assumptions for Research Hypotheses 4.1 – 4.5

Table D.6.1.

Descriptive statistics of subjectively-perceived livability for groups of gender in sample after data trimming (n=595).

Descriptives

	Gender			Statistic	Std. Error
Subjectively-Perceived Livability	female	Mean		2,34693	,026746
		95% Confidence Interval for Mean	Lower Bound	2,29434	
			Upper Bound	2,39952	
		5% Trimmed Mean		2,35921	
		Median		2,36111	
		Variance		,271	
		Std. Deviation		,520689	
		Minimum		1,042	
		Maximum		3,549	
		Range		2,507	
		Interquartile Range		,688	
		Skewness		-,329	,125
		Kurtosis		-,285	,250
	male	Mean		2,30051	,037485
		95% Confidence Interval for Mean	Lower Bound	2,22662	
			Upper Bound	2,37439	
		5% Trimmed Mean		2,30275	
		Median		2,31250	
		Variance		,304	
		Std. Deviation		,550919	
		Minimum		1,035	
		Maximum		3,563	
		Range		2,528	
		Interquartile Range		,661	
		Skewness		-,113	,166
		Kurtosis		-,353	,330

Table D.6.2.

Test of normality of subjectively-perceived livability for groups of gender in sample (n=595).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Gender	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	female	,046	379	,053	,986	379	,001
	male	,038	216	,200*	,990	216	,126

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

a. Lilliefors Significance Correction

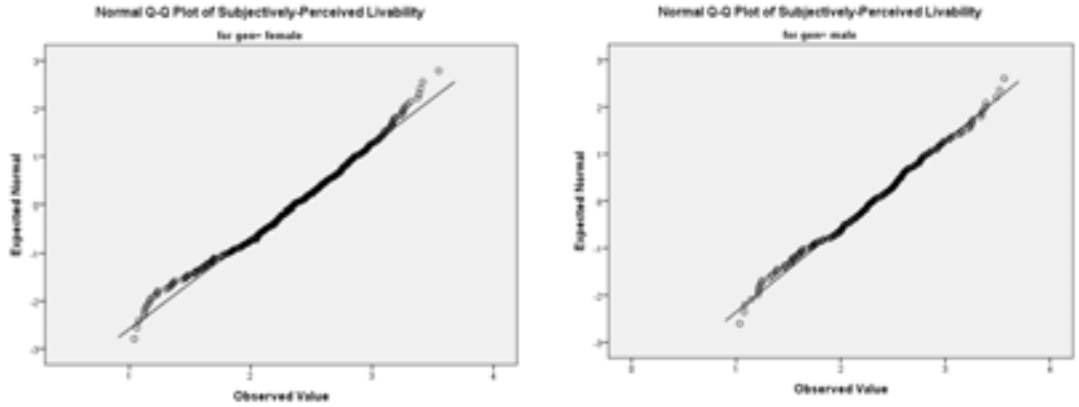


Fig. D.6.1 – D.6.2. Q-Q plot of subjectively-perceived livability for groups of gender in sample (n=595).

Table D.6.3.

Test of homogeneity of variance of subjectively-perceived livability for groups of gender in sample (n=595).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability	Based on Mean	,649	1	593	,421
	Based on Median	,653	1	593	,420
	Based on Median and with adjusted df	,653	1	590,756	,420
	Based on trimmed mean	,656	1	593	,418

Table D.6.4.

Descriptive statistics of subjectively-perceived livability for groups of age in sample after data trimming (n=601).

Descriptives

	Age			Statistic	Std. Error
Subjectively-Perceived Livability	18-29 years	Mean		2,35359	,023630
		95% Confidence Interval for Mean	Lower Bound	2,30716	
			Upper Bound	2,40001	
		5% Trimmed Mean		2,36436	
		Median		2,38194	
		Variance		,281	
		Std. Deviation		,529955	
		Minimum		1,042	
		Maximum		3,549	
		Range		2,507	
		Interquartile Range		,701	
		Skewness		-,300	,109
		Kurtosis		-,272	,217
	30-65 years	Mean		2,21641	,052971
		95% Confidence Interval for Mean	Lower Bound	2,11128	
			Upper Bound	2,32154	
		5% Trimmed Mean		2,21356	
		Median		2,23264	
		Variance		,275	
		Std. Deviation		,524388	
		Minimum		1,035	
		Maximum		3,563	
		Range		2,528	
		Interquartile Range		,753	
		Skewness		-,005	,244
		Kurtosis		-,324	,483

Table D.6.5.

Test of normality of subjectively-perceived livability for groups of age in sample (n=601).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Age	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	18-29 years	,040	503	,052	,987	503	,000
	30-65 years	,053	98	,200*	,992	98	,796

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

a. Lilliefors Significance Correction

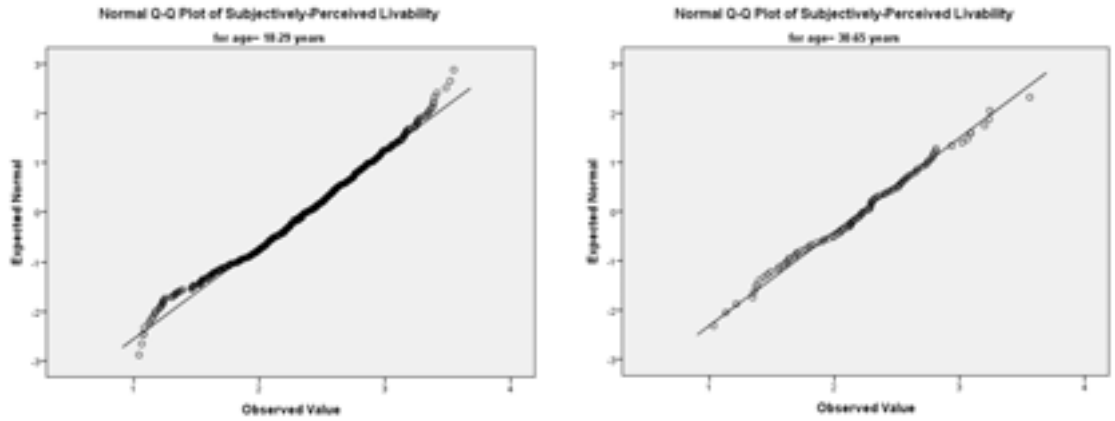


Fig. D.6.3 – D.6.4. Q-Q plot of subjectively-perceived livability for groups of age in sample (n=601).

Table D.6.6.

Test of homogeneity of variance of subjectively-perceived livability for groups of age in sample (n=601).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability	Based on Mean	,066	1	599	,798
	Based on Median	,061	1	599	,805
	Based on Median and with adjusted df	,061	1	598,998	,805
	Based on trimmed mean	,059	1	599	,808

Table D.6.7.

Descriptive statistics of subjectively-perceived livability for groups of income in sample after data trimming (n=552).

Descriptives

Net Income per Month				Statistic	Std. Error
Subjectively-Perceived Livability	under 1.000 €	Mean		2,31591	,025542
		95% Confidence Interval for Mean	Lower Bound	2,26570	
			Upper Bound	2,36611	
		5% Trimmed Mean		2,32434	
		Median		2,32986	
		Variance		,279	
		Std. Deviation		,528417	
		Minimum		1,035	
		Maximum		3,549	
		Range		2,514	
		Interquartile Range		,684	
		Skewness		-,245	,118
		Kurtosis		-,316	,235
	over 1.000 €	Mean		2,39214	,047755
		95% Confidence Interval for Mean	Lower Bound	2,29761	
			Upper Bound	2,48666	
		5% Trimmed Mean		2,39724	
		Median		2,42361	
		Variance		,283	
		Std. Deviation		,531772	
		Minimum		1,146	
		Maximum		3,563	
		Range		2,417	
		Interquartile Range		,708	
		Skewness		-,184	,217
		Kurtosis		-,441	,431

Table D.6.8.

Test of normality of subjectively-perceived livability for groups of income in sample (n=552).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Net Income per Month	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	under 1.000 €	,043	428	,059	,989	428	,003
	over 1.000 €	,047	124	,200*	,989	124	,455

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

a. Lilliefors Significance Correction

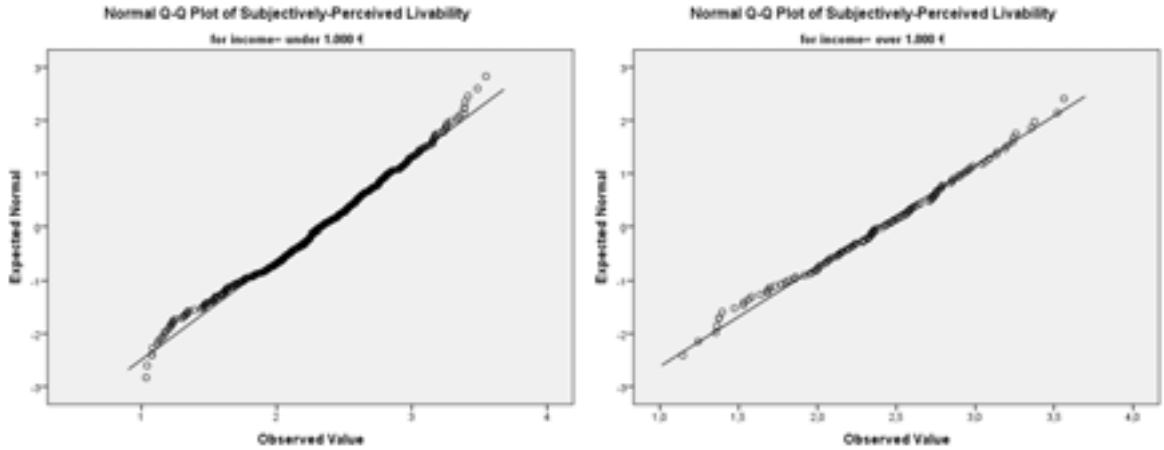


Fig. D.6.5 – D.6.6. Q-Q plot of subjectively-perceived livability for groups of income in sample (n=552).

Table D.6.9.

Test of homogeneity of variance of subjectively-perceived livability for groups of income in sample (n=552).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability	Based on Mean	,069	1	550	,793
	Based on Median	,065	1	550	,799
	Based on Median and with adjusted df	,065	1	549,867	,799
	Based on trimmed mean	,070	1	550	,791

Table D.6.10.

Descriptive statistics of subjectively-perceived livability for groups of cultural background in sample after data trimming (n=586).

Descriptives

	Cultural Background			Statistic	Std. Error
Subjectively-Perceived Livability	Germany	Mean		2,32402	,022661
		95% Confidence Interval for Mean	Lower Bound	2,27951	
			Upper Bound	2,36854	
		5% Trimmed Mean		2,33254	
		Median		2,34028	
		Variance		,283	
		Std. Deviation		,532413	
		Minimum		1,035	
		Maximum		3,549	
		Range		2,514	
		Interquartile Range		,693	
		Skewness		-,254	,104
		Kurtosis		-,370	,208
	Austria	Mean		2,45221	,076971
		95% Confidence Interval for Mean	Lower Bound	2,29561	
			Upper Bound	2,60880	
		5% Trimmed Mean		2,44656	
		Median		2,43750	
		Variance		,201	
		Std. Deviation		,448815	
		Minimum		1,375	
		Maximum		3,563	
		Range		2,188	
		Interquartile Range		,566	
		Skewness		,287	,403
		Kurtosis		,488	,788

Table D.6.11.

Test of normality of subjectively-perceived livability for groups of cultural background in sample (n=586).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Cultural Background	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	Germany	,040	552	,037	,988	552	,000
	Austria	,087	34	,200*	,981	34	,800

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

a. Lilliefors Significance Correction

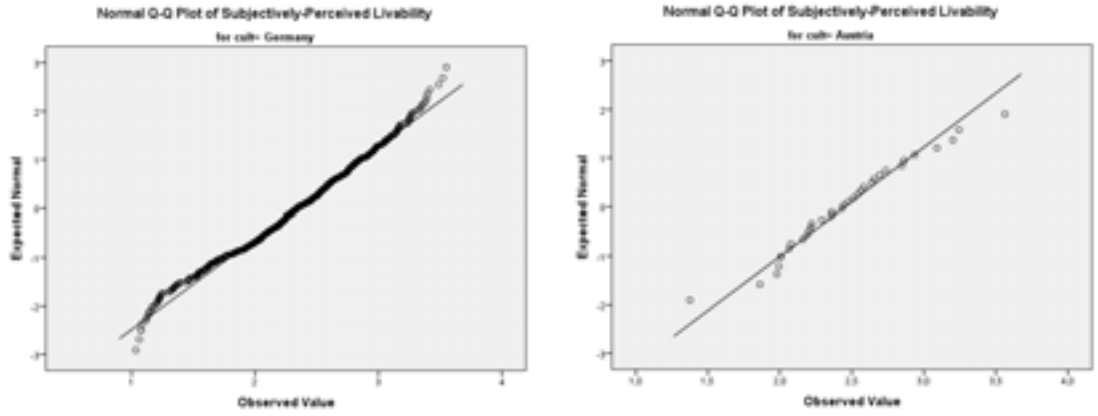


Fig. D.6.7 – D.6.8. Q-Q plot of subjectively-perceived livability for groups of cultural background in sample (n=586).

Table D.6.12.

Test of homogeneity of variance of subjectively-perceived livability for groups of cultural background in sample (n=586).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability	Based on Mean	2,001	1	584	,158
	Based on Median	2,000	1	584	,158
	Based on Median and with adjusted df	2,000	1	582,195	,158
	Based on trimmed mean	2,004	1	584	,157

Table D.6.13.

Descriptive statistics of subjectively-perceived livability for groups of relationship status in sample after data trimming (n=600).

Descriptives

	Relationship Status			Statistic	Std. Error
Subjectively-Perceived Livability	non-partnered	Mean		2,34458	,034761
		95% Confidence Interval for Mean	Lower Bound	2,27607	
			Upper Bound	2,41308	
		5% Trimmed Mean		2,35373	
		Median		2,35417	
		Variance		,269	
		Std. Deviation		,519099	
		Minimum		1,042	
		Maximum		3,549	
		Range		2,507	
		Interquartile Range		,632	
		Skewness		-,260	,163
		Kurtosis		-,007	,324
	partnered	Mean		2,32425	,027756
		95% Confidence Interval for Mean	Lower Bound	2,26968	
			Upper Bound	2,37883	
		5% Trimmed Mean		2,33247	
		Median		2,34722	
		Variance		,290	
		Std. Deviation		,538915	
		Minimum		1,035	
		Maximum		3,563	
		Range		2,528	
		Interquartile Range		,733	
		Skewness		-,245	,126
		Kurtosis		-,479	,251

Table D.6.14.

Test of normality of subjectively-perceived livability for groups of relationship status in sample (n=600).

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Relationship Status	Statistic	df	Sig.	Statistic	df	Sig.
Subjectively-Perceived Livability	non-partnered	,048	223	,200*	,986	223	,031
	partnered	,052	377	,016	,987	377	,002

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

a. Lilliefors Significance Correction

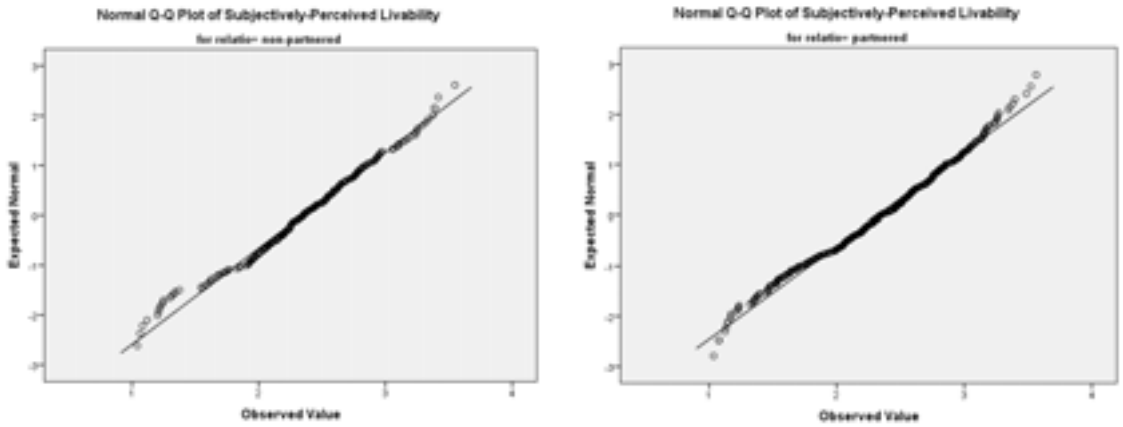


Fig. D.6.9 – D.6.10. Q-Q plot of subjectively-perceived livability for groups of relationship status in sample (n=600).

Table D.6.15.

Test of homogeneity of variance of subjectively-perceived livability for groups of relationship status in sample (n=600).

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Subjectively-Perceived Livability	Based on Mean	1,425	1	598	,233
	Based on Median	1,383	1	598	,240
	Based on Median and with adjusted df	1,383	1	597,659	,240
	Based on trimmed mean	1,406	1	598	,236

D.7 Results for Research Hypotheses 4.1 – 4.5

Table D.7.1.

Between-subjects factors for one-way ANOVA regarding the influence of gender on subjectively-perceived livability (n=595).

Between-Subjects Factors

		Value Label	N
Gender	0	female	379
	1	male	216

Table D.7.2.

Test of between-subjects effects for one-way ANOVA regarding the influence of gender on subjectively-perceived livability (n=595).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	,296[a]	1	,296	1,048	,306	,002
Intercept	2971,687	1	2971,687	10505,782	,000	,947
gen	,296	1	,296	1,048	,306	,002
Error	167,737	593	,283			
Total	3398,443	595				
Corrected Total	168,034	594				

a. R Squared = ,002 (Adjusted R Squared = ,000)

Table D.7.3.

Parameter estimates for one-way ANOVA regarding the influence of gender on subjectively-perceived livability (n=595).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,301	,036	63,572	,000	2,229	2,372	,872
[gen=0]	,046	,045	1,024	,306	-,043	,135	,002
[gen=1]	0[a]	.	.	.	.	.	.

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

Table D.7.4.

Between-subjects factors for one-way ANOVA regarding the influence of age on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Age	0	18-29 years	503
	1	30-65 years	98

Table D.7.5.

Test of between-subjects effects for one-way ANOVA regarding the influence of age on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1,543[a]	1	1,543	5,514	,019	,009
Intercept	1712,978	1	1712,978	6119,928	,000	,911
age	1,543	1	1,543	5,514	,019	,009
Error	167,661	599	,280			
Total	3435,389	601				
Corrected Total	169,204	600				

a. R Squared = ,009 (Adjusted R Squared = ,007)

Table D.7.6.

Parameter estimates for one-way ANOVA regarding the influence of age on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,216	,053	41,473	,000	2,111	2,321	,742
[age=0]	,137	,058	2,348	,019	,022	,252	,009
[age=1]	0[a]	.	.	.	.	.	.

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

Table D.7.7.

Between-subjects factors for one-way ANOVA regarding the influence of income on subjectively-perceived livability (n=552).

Between-Subjects Factors

		Value Label	N
Net Income per Month	0	under 1.000 €	428
	1	over 1.000 €	124

Table D.7.8.

Test of between-subjects effects for one-way ANOVA regarding the influence of income on subjectively-perceived livability (n=552).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	,559[a]	1	,559	1,995	,158	,004
Intercept	2131,118	1	2131,118	7610,597	,000	,933
income	,559	1	,559	1,995	,158	,004
Error	154,011	550	,280			
Total	3159,125	552				
Corrected Total	154,570	551				

a. R Squared = ,004 (Adjusted R Squared = ,002)

Table D.7.9.

Parameter estimates for one-way ANOVA regarding the influence of income on subjectively-perceived livability (n=552).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,392	,048	50,339	,000	2,299	2,485	,822
[income=0]	-,076	,054	-1,413	,158	-,182	,030	,004
[income=1]	0[a]	.	.	.	.	.	.

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

Table D.7.10.

Results of Mann-Whitney-U test regarding the influence of cultural background on subjectively-perceived livability (n=586).

Total N	586
Mann-Whitney U	10.396,500
Wilcoxon W	10.991,500
Test Statistic	10.396,500
Standard Error	958,142
Standardized Test Statistic	1,057
Asymptotic Sig. (2-sided test)	,291

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Subjectively-Perceived Livability is the same across categories of Cultural Background.	Independent-Samples Mann-Whitney U Test	,291	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

Table D.7.11.

Results of Mann-Whitney-U test regarding the influence of relationship status on subjectively-perceived livability (n=586).

Total N	600
Mann-Whitney U	41.438,000
Wilcoxon W	112.691,000
Test Statistic	41.438,000
Standard Error	2.051,929
Standardized Test Statistic	-,291
Asymptotic Sig. (2-sided test)	,771

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Subjectively-Perceived Livability (Ranks) is the same across categories of Relationship Status.	Independent-Samples Mann-Whitney U Test	,771	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

D.8 Assumptions for Research Hypotheses 5.1 – 5.6

Table D.8.1.

Two-way ANOVA with dependent variable of neuroticism for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Neuroticism

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2,291[a]	3	,764	1,180	,316
Intercept	1639,926	1	1639,926	2534,523	,000
phy_env	1,821	1	1,821	2,814	,094
social_env	,109	1	,109	,168	,682
phy_env * social_env	,236	1	,236	,365	,546
Error	385,633	596	,647		
Total	2089,438	600			
Corrected Total	387,924	599			

a. R Squared = ,006 (Adjusted R Squared = ,001)

Table D.8.2.

Two-way ANOVA with dependent variable of extraversion for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Extraversion

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	,659[a]	3	,220	,632	,595
Intercept	3098,551	1	3098,551	8908,269	,000
phy_env	,126	1	,126	,362	,548
social_env	,439	1	,439	1,262	,262
phy_env * social_env	,049	1	,049	,140	,708
Error	207,306	596	,348		
Total	3476,654	600			
Corrected Total	207,965	599			

a. R Squared = ,003 (Adjusted R Squared = -,002)

Table D.8.3.
Two-way ANOVA with dependent variable of openness for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Openness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1,967[a]	3	,656	1,228	,299
Intercept	4058,118	1	4058,118	7600,024	,000
phy_env	1,478	1	1,478	2,767	,097
social_env	,196	1	,196	,367	,545
phy_env * social_env	,160	1	,160	,299	,584
Error	318,241	596	,534		
Total	4613,761	600			
Corrected Total	320,208	599			

a. R Squared = ,006 (Adjusted R Squared = ,001)

Table D.8.4.
Two-way ANOVA with dependent variable of agreeableness for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Agreeableness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1,917[a]	3	,639	1,761	,153
Intercept	4629,498	1	4629,498	12755,869	,000
phy_env	,016	1	,016	,045	,833
social_env	1,532	1	1,532	4,220	,040
phy_env * social_env	,132	1	,132	,365	,546
Error	216,307	596	,363		
Total	5094,764	600			
Corrected Total	218,224	599			

a. R Squared = ,009 (Adjusted R Squared = ,004)

Table D.8.5.
Two-way ANOVA with dependent variable of conscientiousness for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Conscientiousness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	,526[a]	3	,175	,482	,695
Intercept	4847,896	1	4847,896	13343,054	,000
phy_env	,000	1	,000	,001	,980
social_env	,106	1	,106	,291	,590
phy_env * social_env	,326	1	,326	,897	,344
Error	216,543	596	,363		
Total	5323,569	600			
Corrected Total	217,069	599			

a. R Squared = ,002 (Adjusted R Squared = -,003)

Table D.8.6.
Two-way ANOVA with dependent variable of actual stress experience for testing the independence of treatment variable and covariate (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Actual Daily Stress Experience

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6,377[a]	3	2,126	1,746	,156
Intercept	4471,085	1	4471,085	3671,715	,000
phy_env	,001	1	,001	,001	,978
social_env	,789	1	,789	,648	,421
phy_env * social_env	6,143	1	6,143	5,045	,025
Error	724,538	595	1,218		
Total	5398,000	599			
Corrected Total	730,915	599			

a. R Squared = ,009 (Adjusted R Squared = ,004)

Table D.8.7.
Two-way ANOVA with adjusted model to test homogeneity of regression slopes for neuroticism (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	37,652[a]	5	7,530	34,319	,000
Intercept	556,493	1	556,493	2536,191	,000
phy_env	6,433	1	6,433	29,318	,000
social_env	1,379	1	1,379	6,286	,012
neuro	,044	1	,044	,202	,654
phy_env * neuro	,005	1	,005	,022	,882
social_env * neuro	,009	1	,009	,042	,837
Error	130,336	594	,219		
Total	3433,877	600			
Corrected Total	167,988	599			

a. R Squared = ,224 (Adjusted R Squared = ,216)

Table D.8.8.
Two-way ANOVA with adjusted model to test homogeneity of regression slopes for extraversion (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	38,492[a]	5	7,698	35,313	,000
Intercept	173,364	1	173,364	795,226	,000
phy_env	,444	1	,444	2,035	,154
social_env	,158	1	,158	,723	,395
extra	,125	1	,125	,576	,448
phy_env * extra	,626	1	,626	2,870	,091
social_env * extra	,047	1	,047	,216	,642
Error	129,495	594	,218		
Total	3433,877	600			
Corrected Total	167,988	599			

a. R Squared = ,229 (Adjusted R Squared = ,223)

Table D.8.9.
Two-way ANOVA with adjusted model to test homogeneity of regression slopes for openness (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	38,437[a]	5	7,687	35,247	,000
Intercept	225,072	1	225,072	1031,974	,000
phy_env	1,055	1	1,055	4,839	,028
social_env	,008	1	,008	,036	,850
open	,371	1	,371	1,703	,192
phy_env * open	,278	1	,278	1,276	,259
social_env * open	,348	1	,348	1,597	,207
Error	129,551	594	,218		
Total	3433,877	600			
Corrected Total	167,988	599			

a. R Squared = ,229 (Adjusted R Squared = ,222)

Table D.8.10.
Two-way ANOVA with adjusted model to test homogeneity of regression slopes for agreeableness (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	38,313[a]	5	7,663	35,100	,000
Intercept	114,107	1	114,107	522,685	,000
phy_env	2,344	1	2,344	10,738	,001
social_env	,652	1	,652	2,986	,085
agree	,612	1	,612	2,802	,095
phy_env * agree	,106	1	,106	,486	,486
social_env * agree	,095	1	,095	,434	,510
Error	129,675	594	,218		
Total	3433,877	600			
Corrected Total	167,988	599			

a. R Squared = ,228 (Adjusted R Squared = ,222)

Table D.8.11.
Two-way ANOVA with adjusted model to test homogeneity of regression slopes for conscientiousness (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	39,154[a]	5	7,831	36,105	,000
Intercept	120,826	1	120,826	557,080	,000
phy_env	,482	1	,482	2,224	,136
social_env	,314	1	,314	1,448	,229
consci	,017	1	,017	,077	,781
phy_env * consci	,255	1	,255	1,177	,278
social_env * consci	1,206	1	1,206	5,559	,019
Error	128,834	594	,217		
Total	3433,877	600			
Corrected Total	167,988	599			

a. R Squared = ,233 (Adjusted R Squared = ,227)

Table D.8.12.

Two-way ANOVA with adjusted model to test homogeneity of regression slopes for actual stress experience (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	38,312[a]	5	7,662	35,044	,000
Intercept	424,493	1	424,493	1941,436	,000
phy_env	5,957	1	5,957	27,247	,000
social_env	2,179	1	2,179	9,966	,002
stress_exp	,084	1	,084	,383	,536
phy_env * stress_exp	,123	1	,123	,561	,454
social_env * stress_exp	,377	1	,377	1,726	,189
Error	129,659	593	,219		
Total	3429,031	599			
Corrected Total	167,971	598			

a. R Squared = ,228 (Adjusted R Squared = ,222)

D.9 Results for Research Hypotheses 5.1 – 5.6

Table D.9.1.

Between-subjects factors for two-way ANCOVA regarding the influence of neuroticism on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	311

Table. D.9.2.

Descriptive statistics for two-way ANCOVA regarding the influence of neuroticism on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Social Environment	Mean	Std. Deviation	N
harmful	non-sociable	1,84149	,446890	103
	sociable	2,21493	,453228	141
	Total	2,05729	,486143	244
beneficial	non-sociable	2,47704	,436733	186
	sociable	2,57132	,505649	170
	Total	2,52206	,472589	356
Total	non-sociable	2,25053	,535000	289
	sociable	2,40974	,513551	311
	Total	2,33306	,529573	600

Table D.9.3.

Test of between-subjects effects for two-way ANCOVA regarding the influence of neuroticism on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,398[a]	4	10,100	47,098	,000	,240
Intercept	570,522	1	570,522	2660,568	,000	,817
neuro	,035	1	,035	,165	,684	,000
phy_env	34,749	1	34,749	162,048	,000	,214
social_env	7,812	1	7,812	36,431	,000	,058
phy_env * social_env	2,760	1	2,760	12,871	,000	,021
Error	127,589	595	,214			
Total	3433,877	600				
Corrected Total	167,988	599				

a. R Squared = ,240 (Adjusted R Squared = ,235)

Table D.9.4.

Parameter estimates for two-way ANCOVA regarding the influence of neuroticism on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,587	,053	48,734	,000	2,483	2,692	,800
neuro	-,010	,024	-,407	,684	-,056	,037	,000
[phy_env=0]	-,356	,053	-6,740	,000	-,459	-,252	,071
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,095	,049	-1,931	,054	-,191	,002	,006
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,278	,078	-3,588	,000	-,431	-,126	,021
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.5.

Between-subjects factors for two-way ANCOVA regarding the influence of extraversion on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	311

Table. D.9.6.

Descriptive statistics for two-way ANCOVA regarding the influence of extraversion on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Social Environment	Mean	Std. Deviation	N
harmful	non-sociable	1,84149	,446890	103
	sociable	2,21493	,453228	141
	Total	2,05729	,486143	244
beneficial	non-sociable	2,47704	,436733	186
	sociable	2,57132	,505649	170
	Total	2,52206	,472589	356
Total	non-sociable	2,25053	,535000	289
	sociable	2,40974	,513551	311
	Total	2,33306	,529573	600

Table D.9.7.

Test of between-subjects effects for two-way ANCOVA regarding the extraversion of neuroticism on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,619[a]	4	10,155	47,438	,000	,242
Intercept	172,167	1	172,167	804,275	,000	,575
extra	,256	1	,256	1,196	,275	,002
phy_env	34,897	1	34,897	163,022	,000	,215
social_env	7,651	1	7,651	35,741	,000	,057
phy_env * social_env	2,802	1	2,802	13,092	,000	,022
Error	127,369	595	,214			
Total	3433,877	600				
Corrected Total	167,988	599				

a. R Squared = ,242 (Adjusted R Squared = ,237)

Table D.9.8.

Parameter estimates for two-way ANCOVA regarding the influence of extraversion on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,488	,084	29,475	,000	2,322	2,653	,594
extra	,035	,032	1,094	,275	-,029	,099	,002
[phy_env=0]	-,355	,053	-6,727	,000	-,458	-,251	,071
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,092	,049	-1,865	,063	-,188	,005	,006
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,280	,078	-3,618	,000	-,433	-,128	,022
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.9.

Between-subjects factors for two-way ANCOVA regarding the influence of openness on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	311

Table. D.9.10.

Descriptive statistics for two-way ANCOVA regarding the influence of openness on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Social Environment	Mean	Std. Deviation	N
harmful	non-sociable	1,84149	,446890	103
	sociable	2,21493	,453228	141
	Total	2,05729	,486143	244
beneficial	non-sociable	2,47704	,436733	186
	sociable	2,57132	,505649	170
	Total	2,52206	,472589	356
Total	non-sociable	2,25053	,535000	289
	sociable	2,40974	,513551	311
	Total	2,33306	,529573	600

Table D.9.11.

Test of between-subjects effects for two-way ANCOVA regarding the influence of openness on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,572[a]	4	10,143	47,365	,000	,242
Intercept	227,930	1	227,930	1064,374	,000	,641
open	,209	1	,209	,976	,324	,002
phy_env	35,272	1	35,272	164,712	,000	,217
social_env	7,729	1	7,729	36,091	,000	,057
phy_env * social_env	2,742	1	2,742	12,804	,000	,021
Error	127,416	595	,214			
Total	3433,877	600				
Corrected Total	167,988	599				

a. R Squared = ,242 (Adjusted R Squared = ,236)

Table D.9.12.

Parameter estimates for two-way ANCOVA regarding the influence of openness on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,641	,079	33,469	,000	2,486	2,796	,653
open	-,026	,026	-,988	,324	-,077	,025	,002
[phy_env=0]	-,360	,053	-6,812	,000	-,464	-,256	,072
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,094	,049	-1,919	,056	-,191	,002	,006
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,277	,078	-3,578	,000	-,430	-,125	,021
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.13.

Between-subjects factors for two-way ANCOVA regarding the influence of actual stress experience on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	355
Social Environment	0	non-sociable	289
	1	sociable	310

Table. D.9.14.

Descriptive statistics for two-way ANCOVA regarding the influence of actual stress experience on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

Physical Environment	Social Environment	Mean	Std. Deviation	N
harmful	non-sociable	1,84149	,446890	103
	sociable	2,21493	,453228	141
	Total	2,05729	,486143	244
beneficial	non-sociable	2,47704	,436733	186
	sociable	2,57351	,506343	169
	Total	2,52297	,472948	355
Total	non-sociable	2,25053	,535000	289
	sociable	2,41042	,514244	310
	Total	2,33328	,529988	599

Table D.9.15.

Test of between-subjects effects for two-way ANCOVA regarding the influence of actual stress experience on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,531[a]	4	10,133	47,229	,000	,241
Intercept	419,934	1	419,934	1957,324	,000	,767
stress_exp	,048	1	,048	,222	,637	,000
phy_env	35,180	1	35,180	163,976	,000	,216
social_env	7,811	1	7,811	36,408	,000	,058
phy_env * social_env	2,642	1	2,642	12,315	,000	,020
Error	127,440	594	,215			
Total	3429,031	599				
Corrected Total	167,971	598				

a. R Squared = ,241 (Adjusted R Squared = ,236)

Table D.9.16.

Parameter estimates for two-way ANCOVA regarding the influence of actual stress experience on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,597	,061	42,644	,000	2,477	2,716	,754
stress_exp	-,008	,017	-,471	,637	-,042	,026	,000
[phy_env=0]	-,360	,053	-6,804	,000	-,464	-,256	,072
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,098	,049	-1,980	,048	-,194	-,001	,007
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,274	,078	-3,509	,000	-,427	-,120	,020
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.17.

Bootstrap specifications for one-way ANOVA regarding the influence of agreeableness livable dimension on subjectively-perceived livability (n=601).

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95,0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

Table D.9.18.

Between-subjects factors for two-way ANCOVA regarding the influence of agreeableness on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	311

Table. D.9.19.

Descriptive statistics for two-way ANCOVA regarding the influence of agreeableness on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

				Bootstrap[a]			
						BCa 95% Confidence Interval	
Physical Environment	Social Environment		Statistic	Bias	Std. Error	Lower	Upper
harmful	non-sociable	Mean	1,84149	,00121	,04442	1,75243	1,93407
		Std. Deviation	,446890	-,002305	,021205	,403666	,492919
		N	103	0	9	88	118
	sociable	Mean	2,21493	,00099	,03876	2,14402	2,28854
		Std. Deviation	,453228	-,001994	,026385	,404750	,500367
		N	141	0	10	122	159
	Total	Mean	2,05729	,00137	,03146	1,98976	2,13123
		Std. Deviation	,486143	-,001109	,019895	,448187	,521033
		N	244	-1	12	222	266
beneficial	non-sociable	Mean	2,47704	,00051	,03206	2,41351	2,54073
		Std. Deviation	,436733	-,002725	,025269	,390077	,477846
		N	186	1	12	164	210
	sociable	Mean	2,57132	-,00086	,03941	2,48908	2,64404
		Std. Deviation	,505649	-,001487	,028088	,451755	,556406
		N	170	0	11	150	191
	Total	Mean	2,52206	-,00021	,02577	2,46911	2,57116
		Std. Deviation	,472589	-,001152	,018510	,435530	,505463
		N	356	1	12	331	382
Total	non-sociable	Mean	2,25053	,00179	,03117	2,18825	2,31754
		Std. Deviation	,535000	-,001937	,019019	,497657	,566030
		N	289	0	12	267	312
	sociable	Mean	2,40974	,00014	,03022	2,34891	2,46788
		Std. Deviation	,513551	-,000997	,018999	,478021	,548048
		N	311	0	12	288	333
	Total	Mean	2,33306	,00091	,02224	2,28737	2,37914
		Std. Deviation	,529573	-,000979	,013838	,503739	,553301
		N	600	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.9.20.

Test of between-subjects effects for two-way ANCOVA regarding the influence of agreeableness on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,969[a]	4	10,242	47,978	,000	,244
Intercept	114,981	1	114,981	538,608	,000	,475
agree	,606	1	,606	2,838	,093	,005
phy_env	34,984	1	34,984	163,875	,000	,216
social_env	7,383	1	7,383	34,584	,000	,055
phy_env * social_env	2,840	1	2,840	13,304	,000	,022
Error	127,019	595	,213			
Total	3433,877	600				
Corrected Total	167,988	599				

a. R Squared = ,244 (Adjusted R Squared = ,239)

Table D.9.21.

Parameter estimates for two-way ANCOVA regarding the influence of agreeableness on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,417	,098	24,562	,000	2,223	2,610	,503
agree	,053	,031	1,685	,093	-,009	,115	,005
[phy_env=0]	-,354	,053	-6,728	,000	-,458	-,251	,071
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,087	,049	-1,772	,077	-,184	,009	,005
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,282	,077	-3,647	,000	-,434	-,130	,022
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.22.

Bootstrap parameter estimates for two-way ANCOVA regarding the influence of agreeableness on subjectively-perceived livability (n=601).

Bootstrap for Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
					Lower	Upper
Intercept	2,417	,001	,103	,001	2,211	2,637
agree	,053	-,001	,031	,093	-,012	,112
[phy_env=0]	-,354	,002	,055	,001	-,453	-,239
[phy_env=1]	0	0	0		.	.
[social_env=0]	-,087	,001	,050	,088	-,178	,012
[social_env=1]	0	0	0		.	.
[phy_env=0] * [social_env=0]	-,282	-,001	,077	,001	-,436	-,132
[phy_env=0] * [social_env=1]	0	0	0		.	.
[phy_env=1] * [social_env=0]	0	0	0		.	.
[phy_env=1] * [social_env=1]	0	0	0		.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.9.23.

Bootstrap specifications for one-way ANOVA regarding the influence of conscientiousness livable dimension on subjectively-perceived livability (n=601).

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95,0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

Table D.9.24.

Between-subjects factors for two-way ANCOVA regarding the influence of conscientiousness on subjectively-perceived livability (n=601).

Between-Subjects Factors

		Value Label	N
Physical Environment	0	harmful	244
	1	beneficial	356
Social Environment	0	non-sociable	289
	1	sociable	311

Table. D.9.25.

Descriptive statistics for two-way ANCOVA regarding the influence of conscientiousness on subjectively-perceived livability (n=601).

Descriptive Statistics

Dependent Variable: Subjectively-Perceived Livability

				Bootstrap[a]			
						BCa 95% Confidence Interval	
Physical Environment	Social Environment		Statistic	Bias	Std. Error	Lower	Upper
harmful	non-sociable	Mean	1,84149	,00171	,04375	1,75377	1,92782
		Std. Deviation	,446890	-,001273	,020998	,405172	,483557
		N	103	1	9	85	123
	sociable	Mean	2,21493	,00055	,03751	2,13892	2,29343
		Std. Deviation	,453228	-,002187	,026575	,403823	,498463
		N	141	-1	10	123	157
	Total	Mean	2,05729	,00032	,03068	1,99584	2,11802
		Std. Deviation	,486143	-,000923	,019589	,447411	,524096
		N	244	0	12	223	265
beneficial	non-sociable	Mean	2,47704	-,00061	,03176	2,41364	2,53585
		Std. Deviation	,436733	-,000670	,025477	,389447	,485071
		N	186	0	11	166	207
	sociable	Mean	2,57132	,00035	,03886	2,49126	2,64875
		Std. Deviation	,505649	-,002169	,027842	,452501	,554078
		N	170	0	10	150	189
	Total	Mean	2,52206	-,00018	,02486	2,47065	2,56944
		Std. Deviation	,472589	-,000287	,018738	,435155	,509743
		N	356	0	12	333	378
Total	non-sociable	Mean	2,25053	-,00040	,03116	2,18906	2,31266
		Std. Deviation	,535000	-,000747	,019708	,497409	,571255
		N	289	1	12	266	314
	sociable	Mean	2,40974	,00071	,02796	2,34996	2,46918
		Std. Deviation	,513551	-,000980	,019348	,477982	,547489
		N	311	-1	12	288	332
	Total	Mean	2,33306	,00002	,02141	2,28945	2,37612
		Std. Deviation	,529573	-,000167	,013924	,502820	,557041
		N	600	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table D.9.26.

Test of between-subjects effects for two-way ANCOVA regarding the influence of conscientiousness on subjectively-perceived livability (n=601).

Tests of Between-Subjects Effects

Dependent Variable: Subjectively-Perceived Livability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40,391[a]	4	10,098	47,088	,000	,240
Intercept	122,634	1	122,634	571,858	,000	,490
consci	,029	1	,029	,133	,716	,000
phy_env	35,068	1	35,068	163,527	,000	,216
social_env	7,814	1	7,814	36,436	,000	,058
phy_env * social_env	2,751	1	2,751	12,830	,000	,021
Error	127,596	595	,214			
Total	3433,877	600				
Corrected Total	167,988	599				

a. R Squared = ,240 (Adjusted R Squared = ,235)

Table D.9.27.

Parameter estimates for two-way ANCOVA regarding the influence of conscientiousness on subjectively-perceived livability (n=601).

Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	2,538	,097	26,094	,000	2,347	2,729	,534
consci	,011	,031	,365	,716	-,050	,073	,000
[phy_env=0]	-,357	,053	-6,764	,000	-,461	-,253	,071
[phy_env=1]	0[a]	.	.	.	.	.	.
[social_env=0]	-,095	,049	-1,934	,054	-,192	,001	,006
[social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=0] * [social_env=0]	-,278	,078	-3,582	,000	-,431	-,126	,021
[phy_env=0] * [social_env=1]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=0]	0[a]	.	.	.	.	.	.
[phy_env=1] * [social_env=1]	0[a]	.	.	.	.	.	.

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

Table D.9.28.

Bootstrap parameter estimates for two-way ANCOVA regarding the influence of conscientiousness on subjectively-perceived livability (n=601).

Bootstrap for Parameter Estimates

Dependent Variable: Subjectively-Perceived Livability

Parameter	B	Bootstrap[a]				
		Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
					Lower	Upper
Intercept	2,538	,002	,096	,001	2,350	2,730
consci	,011	-,001	,029	,678	-,043	,065
[phy_env=0]	-,357	,000	,055	,001	-,466	-,246
[phy_env=1]	0	0	0		.	.
[social_env=0]	-,095	-,001	,050	,060	-,189	,007
[social_env=1]	0	0	0		.	.
[phy_env=0] * [social_env=0]	-,278	,002	,079	,003	-,441	-,116
[phy_env=0] * [social_env=1]	0	0	0		.	.
[phy_env=1] * [social_env=0]	0	0	0		.	.
[phy_env=1] * [social_env=1]	0	0	0		.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Statutory Declaration:

I hereby affirm, that I completed this diploma thesis for the acquisition of an academic degree as certified psychologist (Diplom-Psychologe), under supervision of Prof. Dr. Peter G. Richter, by my own and that I did not use other materials than those mentioned above. All information which has been directly or indirectly taken from other sources has been noted as such.

Dresden, September 3, 2015

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