Living solo in Rotterdam

Improving the living quality of one person households by urban interventions

Eva van Rijen
LIVING SOLO IN ROTTERDAM

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Colophon
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The amount of one person households is rapidly growing in the Netherlands since the sixties and for the future this growth will continue (Centraal bureau voor de statistiek, 2013b; Planbureau voor de leefomgeving, 2012). Although this shows that more people live alone, solo dwellers are still disadvantaged, stigmatised and forgotten in urban design since society expects them to be in a relationship. I experienced this when I moved to my apartment a year ago. Even though I am happy with living alone, colleagues and even friends expected that I moved in with a friend or my not-existing boyfriend. When I tell them I live alone, the common question “Isn’t that lonely?” arises but I am perfectly fine on my own. As Eric Klinenberg describes in his book ‘Going Solo’: “We worry about friends and family members who haven’t find the right match, even if they insist that they’re happy on their own” (Eric Klinenberg, 2012a, p. 6). Moreover the world seems to be designed for families and couples, exemplified by the dominance of the traditional family in urban design and the focus on single family homes by developers. In order to create living environments where one person households can thrive, this master thesis concentrates on the needs and living quality of one person households.
PROJECT FRAMEWORK
PROBLEM ANALYSIS AND PROBLEM STATEMENT

Problem analysis
One person households are a growing phenomenon in the world (Baker, 2012). For example in Sweden almost half of the households contains only one person (Klinenberg, 2012b). In 2011 solo dwellers made up 36 percent of the Dutch households and in the future the amount of solo dwellers will grow even further. For 2060 the CBS, ‘Centraal Bureau voor de Statistiek’, has forecasted that 44 percent of Dutch households will consist of one person (Centraal bureau voor de statistiek, 2011). The housing problem which is emerging from the growing amount of singletons is until now addressed in architecture by the development of housing for solo dwellers. By also focussing on the urban context and the urban morphology this graduation project aims to find a more complete solution to the problem. Related to this broader focus also the investigation of the social context, the solo dweller and the urban context is needed, to distinguish the why, who, how and where of solo dwelling with a specific focus on Rotterdam.

Social context
Since the 1960s the amount of one person households grew due to changes in the social context. First the rise of emancipation and individualism stimulated living alone. At the same time the growth of wealth through economic development and the social security by the welfare state made living alone affordable (Hamsen, 2008; Klinenberg, 2012a). Furthermore relationships were often avoided or postponed which resulted in longer periods of living alone as well as earlier break-ups (Gadet, 1999). As a result the standard course of life, moving out when you get married, changed (Hamsen, 2008). We now move out to live alone and continue longer to do so. Living alone is even becoming more permanent, it is no longer seen as a temporary phase in between relationships but considered as a new urban lifestyle (Schmidt, Devos, & Blondé, 2015). On the other hand one person households change frequently since being alone is a cyclical condition, most of us move in together when we have a serious relationship and become a one person household again when the relation ends (Klinenberg, 2012a). This results in a high mobility of solo dwellers.

The solo dweller
Despite living solo is getting more common, the quality of life among singles is lower than among families in general or couples in the same age group (Bolwijn, 2015; Centraal bureau voor de statistiek, 2015a). Solo dwelling takes place in different phases of life. Moreover one person households are a diverse group consisting of people with and without a relationship, rich or poor and high as well as low educated. They live alone for different reasons because they are divorced (when having children men often live alone while woman form a single parent family), their partner died, they haven’t found the right partner yet or just because they appreciate living alone (Hamsen, 2008; Klinenberg, 2012a).

Urban context
The growth of solo dwellers creates an overall rise of one million households in the Netherlands by 2045 (Centraal bureau voor de statistiek, 2011). Therefore a housing demand in the future will arise since more houses are needed to accommodate the same amount of people. Unfortunately the current urban context does not support living solo and not all needs of solo dwellers are
Problem analysis

The amount of solo dwellers in the Netherlands grows

As a result the amount of Dutch households rises

Resulting in a housing demand

The standard course of life changed;
From moving out when getting married

To first living solo before moving in with your partner, turning living solo in a cyclical condition resulting in high mobility

Design

Result

Need

Houses and neighbourhoods are not designed for solo dwellers
satisfied. Houses are often designed for other household types than the one person who is living in it (Duin, 2015). As a solo dweller you can live in smaller places and might be interested in sharing facilities like a launderette or common room (Klinenberg, 2012a). Furthermore the possibilities for social interaction are more important for solo dwellers than they are for people who live with others. When you are part of a family you come home to a social entity whereas being a solo dweller you come home alone. This makes solo dwellers more likely to go out to meet others (Gadet, 1999; Klinenberg, 2012a). This can happen in public space and in bars, cafés or restaurants which are present in central areas, like the city centre, but less in the suburbs which tend to be designed for families. Currently some trends already show the effect of the growth of living alone. In Amsterdam developers built specific housing for solo dwellers. These houses are small and affordable when you only have one salary to pay your mortgage or rent, like the apartments in ‘Villa Mokum’ and ‘De studio’ as well as concepts like ‘Home4One’ and ‘Heijmans One’ (Duin, 2015). On the other hand developers still focus on the traditional family by predominantly building single family houses. Furthermore initiatives for specific housing for singles are rare and only happen on a small scale within the Netherlands, mostly in Amsterdam (Duin, 2015).

Rotterdam
As for a location to study these problems thoroughly, Rotterdam is chosen. The city has a high amount of solo dwellers since 48,8 percent of the households in Rotterdam consist of one person (Planbureau voor de leefomgeving, 2012). Through this high amount of solo dwellers there are possibilities to identify the reasons behind living in specific places. Currently small households are located mostly in and around the city centre, in general as well as in Rotterdam (Centraal bureau voor de statistiek, 2012). 51 percent of the inhabitants of Rotterdam lives in suitable housing whereas 33 percent lives in houses too big for their households. This can be caused by different indicators but it shows that many households live in a house which isn’t designed for them, like many solo dwellers do (Duin, 2015). Furthermore Rotterdam is a city in constant development, current development and future plans will be used to strategically position this project. As a result Rotterdam will take solo dwellers into consideration and becomes future proof.

Problem statement
The problem analysis leads to the following problem statement;

“The amount of one person households is growing in the Netherlands which turns living solo into a popular urban lifestyle. Meanwhile the urban living environment is still focused on the traditional family. As a result solo dwellers have a lower living quality caused by a lack of suitable housing and their unsatisfied needs for the living environment.”
**Research Questions**

In order to address the topics mentioned in the problems statement the following research question is formed:

**How can the living quality of one person households in Rotterdam be improved by re-thinking the urban living environment of its neighbourhoods?**

**Sub-questions**

The main research question will be answered by several sub-questions which are organised according to three themes. The themes relate to the important aspects of the project which will be addressed during the graduation process. The answers to the sub-questions provide the answer to the main question as well as input for the design process.

**Living quality**

- Who is the solo dweller?
- What defines the living quality of solo dwellers and how can it be improved?

**Social context**

- How has the social context regarding one person households changed through history and how did this influence the housing opportunities of solo dwellers?

**Urban context**

- Where do solo dwellers live in Rotterdam?
- Which conditions facilitate living solo and how can these be altered to improve the living environment of solo dwellers?

**Design question**

Input for the design will be provided by the sub-questions. In order to steer the design process a design question is formulated;

- How does a neighbourhood look when it is based on the needs of solo dwellers aiming to improve their living quality?
methodological framework

The ‘Vision in product design’ research model was used as a method to steer the research and design process during this graduation. The ViP approach is often used in industrial design engineering and described in the Delft Design Guide by van Boeijen, Daalhuizen, Zijlstra, and van der Schoor (2013) and in ‘ViP - Vision in Design, a Guidbook for Innovators’ by Hekkert and van Dijk (2011). The approach allows designers to reflect on the existing product. It defines a vision based on the future context which is translated in the final design. Due to this the model provides a responsible way of designing since it takes the impact on society and well-being of people into account. The approach distinguishes a deconstruction phase, of which analysis and research are part, and a design phase which together form a continues process. Through this step by step approach with predefined actions per step, new and inventory design solutions can emerge. The original model as described in the ‘Delft Design Guide’ and the ‘ViP’ book was adapted to the urban approach of this graduation project as is shown in image 1.

The deconstruction phase contains the design of the current living environment, the environment user interaction and the past context in which the design exists. In the design phase, the future context and the future user environment interaction are defined resulting in a (re-)design of the living environment. A statement or vision is created to describe the future context which reflects the needs of the users. As a result the user environment interaction can be defined, as well as living environment characteristics from which the future design derives. The design is used to improve the living quality of solo dwellers in a living environment in Rotterdam. The deconstruction and the design phase consist of three general steps; the design, the user environment interaction and the context.

Design

The design refers to the product that needs to be created, which in this urban project is a living environment for solo dwellers. The current design describes the appearance of the living
environment or urban fabric as it is now as well as its characteristics and amenities. In order to do so desk analysis and field work was carried out. On the other hand the new design is not a description but a representation of how the urban fabric should look like based on the vision and aimed interaction qualities. To show this plans, sections, impressions and models were produced.

**User environment interaction**
The user environment interaction refers to the experience of the environment by the user. This step defines the relation between the solo dweller and the urban fabric. The current interaction describes the interaction as it is now. Information for this description was collected by studying literature, policy documents and (news) articles. Before this was done, a specific profile of solo dwellers was formed describing their characteristics. In order to do so the lifestyle model of Smart Agent as well as interviews with solo dwellers in Rotterdam were used. The new interaction needs to describe how the new environment will be used, viewed, understood and experienced by the solo dwellers which resulted in design principles.

**The context**
The context describes the circumstances that define the current and future living environment of solo dwellers in the broadest sense. In the current context the circumstances that formed the context are described, defining why and how the context was formed like this. The current social context contains a historic overview resulting in a Literature Review which can be found in appendix 1. The current urban context is defined by analysing the morphology, amenities and demographics of a neighbourhood in Rotterdam. The future context formulates the goal of the final design by describing what the living environment should offer solo dwellers and what they should be able to experience. This resulted in a vision that forms the base for the final design.
**Theoretical Framework**

As described in the methodological framework the ViP model is used to steer the process of this graduation. Since the ViP model contains the different themes of this graduation project, as addressed in the research questions, the model will also be used to explain the theoretical framework. The user environment interaction, of which the solo dweller and living quality are part, defines the spatial conditions of the final design. During the design phase these are transformed into design principles reflecting the needs of solo dwellers. The context, both social and urban, discusses the bigger picture in which this graduation thesis exists. The theoretical framework is shown in image 2 and will be further explained in this chapter.

![Image 2: Theoretical framework based on the ViP model](Image)

**The solo dweller**

The solo dweller is defined as the user on which this graduation project focusses. The solo dweller is according to the Centraal bureau voor de statistiek (2016) someone who lives alone but at the same time can be living together with others when having his/her own household. On the other hand Eric Klinenberg (2012a) defines one person households as people who live alone, but are not primary singles. Whereas singles may or may not live alone, since they can live with their children or roommates for instance, solo dwellers do not share their house with anyone. In this thesis singletons and solo dwellers will be used to describe a person who is living in an one person household. This one person household is defined as:

*A person who lives alone, not sharing his/her house with friends, roommates or children. This person is not primarily without children or single, they might be in a living-apart-together relationship.*

**Lifestyle**

The group of solo dwellers is very broad, it consists of people from different ages, backgrounds and interests. In order to design for solo dwellers a focus group is defined. This is firstly done by the use of lifestyles. Different lifestyle distinctions can be found, for instance by Motivaction and SmartAgent. Motivaction distinguishes eight mentality milieus which describe the ambitions,
lifestyle, social relations, sociodemographics, work and political interests of people (Motivaction, 2016). SmartAgent on the other hand distinguishes four different lifestyles which next to their characteristics, social relations and priorities in life also describe the preferred living environment of people (Hagen, 2006). For this master thesis the lifestyles of SmartAgent are chosen since they relate to the living environment and as a result the lifestyles can be linked to locations within the city. This not only makes the lifestyles spatial and defines some of the needs of solo dwellers, it also creates knowledge of the interaction of solo dwellers with the environment.

The lifestyles of SmartAgent, as described by Gert Jan Hagen (2006), are classified by colour. The red lifestyle is about freedom and flexibility, is city oriented and prefers a dynamic environment with culture and possibilities to enjoy life. Blue is ambitious and wants to be in control. As a result luxury and status are important. People with the blue lifestyle like to live in quiet and spacious living environments. For people with the yellow lifestyle involvement and harmony as well as good social contacts are important. They prefer to live in ‘normal’ traditional neighbourhoods. The green lifestyle is about security and privacy while being surrounded by a tight group of friends. They often live in new neighbourhoods. In image 3 an impression of the different lifestyles are shown in a collage. Since solo dwellers have specific needs, the chosen lifestyle should match these characteristics. Eric Klinenberg (2012b) describes the importance of centrality, proximity of amenities, social places to meet others and good public transport connections for solo dwellers. Since inhabitants with the red lifestyle live mostly in urban and dynamic areas which facilitates
their needs of culture, flexibility and the aim to enjoy life, the red lifestyle fits the needs of solo dwellers best. These living environments do not only facilitate the needs of the different households within the red lifestyle but also the specific needs of solo dwellers. The described activities by Eric Klinenberg (2012b) mostly occur in and around the inner city, which is currently the location within the city were most solo dwellers live as well as most inhabitants with the red lifestyle (Gemeente Rotterdam, 2015; Klinenberg, 2012b).

Within the group of solo dwellers with the red lifestyle, different types of one person households can be found which all have their specific needs. A division according to age can be made, like the ‘Centraal Bureau voor de Statistiek’ does. However to create insight in the way of living of solo dwellers it is more useful to relate the division to the stage of life singletons are in. As a result a distinction is made between students, starters, the labour force and elderly one person households. The municipality of Rotterdam is regarding to solo dwellers currently focussing on attracting students and starters to the city as well as housing the elderly, as explained in their ‘Woonvisie Rotterdam, koers naar 2030’ (Gemeente Rotterdam, 2016). As a result this graduation project will focus on the labour force since this group of solo dwellers is often forgotten, not only in Rotterdam as well as in the development of housing for singletons (Post, 2014).

The living environment

In general solo dwellers seek for housing in dense and lively neighbourhoods with different amenities and places to spontaneously meet people. This is reflected in their need for centrality and the proximity of amenities, social places and public transport as described by Eric Klinenberg (2012b). In which centrality and amenities create a convenient way of living and social places allow singletons to meet people closer to home, both strangers and friends. Since these facilities are often located in and around the city centre, public transport is often needed to move around. The living environment should furthermore be stimulating and at the same time have a good balance between privacy and the public which facilitates contact with others (van der Maas, 2015 and Klinenberg, 2012b). These urban qualities are important since solo dwellers often use the city as an extension of their home. The lack of space their often small houses offer, solo dwellers compensate by making more use of the public spaces of the city. Due to the lack of affordable housing solo dwellers often can’t afford a bigger place, especially because they only have one salary to pay the mortgage or rent with. Also the social contacts of solo dwellers take place elsewhere, in lively areas they meet their friends or visit activities like a festival (Duin, 2015; Klinenberg, 2012b; Pots, 2014). As a result solo dwellers are frequent users of public space and want to have the vibrant atmosphere in or close to their living environment.

Solo dwellers are interested in different housing typologies. A studio, apartment or single family home can fit their needs. Their preference is dependent of having children or regularly having friends over. The house is preferably centrally located in an authentic neighbourhood. Most labour force singletons seek for a long term housing which they either rent or buy. There is also a part of the group that is more interested in flexible and temporary housing in order to respond quickly to new job opportunities elsewhere (Pots, 2014). Amenities like food to go, sporting facilities, car parking and social places such as a bar, restaurant or café should be located in proximity of the house. These amenities can make life more convenient and create the opportunity to meet with
friends close to home. Furthermore solo dwellers are willing to invest in social contacts, not only with friends but also with their neighbours in order to create a supportive network around them.

Living quality
The living quality, or quality of life, is addressed in different fields of knowledge. The CBS defines it as a combination of well-being and prosperity (Centraal bureau voor de statistiek, 2015b). Prosperity is an economic value on which an urban designer can not have much influence. However on well-being urban designers can have influence. If we quantify living quality as liveability, different spatial values appear. According to van Dorst (2005), liveability concerns the relation between a person or community and their environment in which the judgement on the quality is important. Liveability in this master thesis is defined as perceived liveability in which the appreciation, or the lack of appreciation, of the living environment by an individual plays an important role as defined by van der Valk and Musterd (1998). This appreciation can directly be related to the user environment interaction of the ViP model which defines the relation between the user and its environment. The appreciation of a living environment is influenced by different constrains like liveliness, proximity of amenities and the demographic context (Rooij, van Dorst, Klaasen, & Wind, 2012). This results into the definition of living quality as used in this project:

‘The relation between a person or community and the environment as well as their appreciation of this environment’.

The living environment
The environment, as mentioned in the definition above, can be seen as the urban as well as the social environment. These tangible and intangible environments are depending on each other when creating a highly appreciated living environment, which then results in a high living quality. Especially the social environment, or the opportunities for social interaction, play an important role in the appreciation of the living environment by people. Actually, the appreciation of the living environment is higher when the urban environment facilitates meeting others (Adriaanse, 2012; Ulden, Heussen and van der Ham, 2015). In order to create a social environment the urban environment should be able to facilitate the possibilities for social interaction. Also as emphasised by Jane Jacobs (1961), the urban environment should have a high pedestrian permeability as well as a clear distinction between public and private in order to create an appreciated environment that is walkable and has many eyes on the street. The so called transition zones between the public life of the street and the privacy of the house, creates the possibility to interact with others. From this transition zone in front of their house, people can observe passers-by and easily make contact with others (van Dorst, 2005; Ulden et al., 2015). In research done by Ulden, Heussen and van der Ham (2015), was found that in streets with transition zones of maximum 2 metres deep more social contact among neighbours occurs.

At the same time, since this space can be used by the residents, the space will be personalized (Ulden et al., 2015). This on one hand improves the privacy since the boundary between public and private is defined. At the same time it provides the possibility to maintain control over the environment since residents are able to express their territory (Cooper Markus and Sarkissian, 1986; Kaplan and Kaplan, 1982). When people are able to do so and maintain control over their
environment, it is more likely that people feel at ease in a certain environment and as a result have a higher appreciation of the place.

The possibility to observe public life is not only important in residential areas as well as in central locations as described by Jan Gehl and William H. Whyte. People go where people are (Gehl, 2011). So public life in public space can be realized by creating destinations or motives for people to go out for a walk. This requires functions which serve the daily needs, like a supermarket, or are particular place where others can be met, like a community centre (Gehl, 2011). Also it is important to create a mixture of functions to allow activity throughout the day (Jacobs, 1961). These functions and destinations will create the circumstances for a lively sidewalk. In order to achieve active street life a space should be attractive to stay in which can be done by creating enough space for walking, standing and sitting (Gehl, 2011). Special attention should be given to the edges of public space since standing and sitting often happens at places where your back is protected and at the same time a good overview of public life can be found (Whyte, 1980; Gehl, 2011).

Social and urban context

The context that influences and defines the design, exists of the intangible elements of the social context and the tangible or physical elements of the urban context. The elements of both the social and urban context, influence and strongly relate to each other. The city can even been seen as the physical expression of society and its continuous changing concepts since every new view of society has the urge to create its own urban design projects (Heeling, Meyer, Westrik and Sauren 2002). As a result the two context types are intertwined and are difficult to explain separate, therefore the social and urban context will be explained together.

The social context refers to society which can be defined as “The people who live in a particular country or area and their way of life and customs” (Cambridge, 2015). Also the social context consists of economic and political factors. As a result the social context influences the way one person households are seen and treated in the Netherlands which effects the living environment of solo dwellers. The social context is in this project defined as:

‘The way of life, customs and life cycle standards of people living in a country, area or city’.

The urban context is composed of a city or a town consisting of the private and public domain. The private domain refers to the house or dwelling and public refers to the places within the city which are accessible for everyone and where strangers meet (Komossa, 2010). These public spaces are according to Susanne Komossa (2010); streets, squares, canals and the interior of public building blocks. The building block forms the transition between the public and private domain. As a result the typomorphology of the city plays an important role. The typomorphology defines both the form of the urban composition and the role of the separate elements, buildings and public space, within this composition. Hereby the physical and spatial structure of the city on different levels is defined (Vernez-Moudon, 1994). The urban context is in this project defined as:

‘The typomoromology of a city or neighbourhood, regarding its urban composition in which public space and the building block are important’
The housing opportunities of solo dwellers

As described in the Literature Review, which can be found in appendix 1, living alone is not a phenomenon of present time only as singletons have been part of city life since the middle ages (Stabel, 2015). People have been living alone for different reasons which makes solo dwellers a highly varied group that have long been stigmatised by society since marriage was the norm. Solo dwelling did not fit in the standard course of life in which youngsters only move out when they get married (Schmidt, Devos, & Blondé, 2015). Through history housing possibilities were rare since developers did not see the importance of housing designed for solo dwellers. ‘Hofjes’ housed poor or widowed people but for most unmarried men and women lodging was their only option (Gordon, 2015; Wilms Floet, 2014). Private initiatives created new ways of living like ‘Amsterdamsch Tehuis voor Arbeiders’ and the apartment house ‘Het Nieuwe Huis’ in Amsterdam (Oorthuys & Muller, 2014). This only happened on a small scale, not causing a housing standard for solo dwellers. Only in the 1970s the Dutch government noticed the housing problem, and through subsidy many HAT-units for one and two person households were created (Dam, 1975). Currently living solo is seen as an urban lifestyle and not as a temporary phase in between relationships anymore (Klinenberg, 2012a). Solo dwellers are getting more common and becoming part of the variety of households in the Netherlands. This is stimulated by the positive image the media shows of singles and forced by the growing amount of one person households (Schmidt et al., 2015). Despite the growing emancipation of solo dwellers they are still disadvantaged. Singletons pay more taxes and have troubles finding a home. This is mostly caused by the lack of suitable housing for one person households. The importance of housing designed for solo dwellers has not been noticed by developers yet, and this still influences the living environment (Duin, 2015). Still solo dwellers are dependent on initiatives of developers since the housing market is not based on the current demographics, social trends and household needs (Pots, 2014). Still mostly single family houses are built and if housing for solo dwellers is built, it is often located in Amsterdam not creating possibilities for solo dwellers elsewhere in the Netherlands. If no action is taken solo dwellers will continue to live in houses which weren’t designed for them, which results in a low living quality.

Rotterdam and Katendrecht

Rotterdam is one of the four larger cities in the Netherlands and is located in the Western part of the country along the river Meuse. Due to its location close to the sea and along the river, it developed into one of the major harbours in the world. Currently the city has 623,976 inhabitants spread over 301,000 households, of which 48% consists of one person (Gemeente Rotterdam, 2015). The amount of one person households in Rotterdam is higher than the Dutch average of 36 percent (Centraal Bureau voor de Statistiek, 2011). In Amsterdam, the most attractive solo dweller city of the Netherlands, even 55 percent of the households consists of one person (Centraal Bureau voor de Statistiek, 2013a). Rotterdam contains many amenities, from the commercial centre with shops to the ‘museumpark’ with multiple museums as well as a zoo, a university, theatres and multiple parks. Also the city is known for its innovation and trendy events, which fit the needs of the chosen solo dwellers. Furthermore the city contains different urban areas; harbours, industrial zones, post-war neighbourhoulds as well as areas built in the early 19th century.
and a modernistic centre with a skyline. Within Rotterdam Katendrecht is chosen to study further, its location is shown in image 4. For the chosen focus group of solo dwellers, Katendrecht is interesting and fitting their needs. It is centrally located and close to the city centre of Rotterdam with its different amenities. On the peninsula itself also new functions are created and the Deliplein is already a hotspot within Rotterdam. Also there are good public transport connections, culture can be found on the neighbouring Wilhelminapier and the new pioneering developments match well with the urge for new things of people with the red lifestyle (Hagen, 2006). The area is currently in development through which housing as well as new centralities are created. Due to its history and the current transition process an interesting mix of new and old buildings is created. Katendrecht will be further explained in the ‘Deconstruction’ section.
RELEVANCE

Societal relevance
The amount of households consisting of only one person is growing. Since 1971 the amount has grown from 683 thousand to 2.7 million in 2011 and this will grow to 3.7 million in 2060 (Centraal bureau voor de statistiek, 2013; Hamsen, 2008). With this growth several problems emerge like a demand for suitable and affordable housing. Even though the group of solo dwellers is growing they are often disadvantaged by society. Society expects solo dwellers to be in a relationship and start a family. As a result owning or renting a place of your own is difficult and often too expensive with only one income. Developers did start building studios and apartments especially for people living alone, unfortunately this serves only a small part of the demand since they are mostly located in Amsterdam, take place on a small scale and the built of single family homes is still the norm (Duin, 2015). The rights of solo dwellers are currently advocated by journalist Maartje Duin as party leader of the ‘Single Issue Partij’ and organisations like CISA, ‘Centrum Individu en Samenleving’. In order to improve low living quality among solo dwellers, the urban context needs to be considered (Centraal bureau voor de statistiek, 2015b). In order to accommodate the growing amount of solo dwellers in the future, there is a demand for living environments that take the needs and well-being of singletons into account. This project aims to find solutions in the urban context by re-thinking the current living environments and taking one person households and their needs as a starting point.

Academic relevance
The effect of the growth of one person households is currently taken up by different fields of research. The process is mostly described from a sociological point of view. Eric Klinenberg (2012b) for instance describes in his book ‘Going solo’ how the growing amount of solo dwellers effects our culture and cities. Also in architecture one person households and living in smaller places is an emerging theme, like projects such as ‘De Studio’ exemplifies (Duin, 2015). Nevertheless in urbanism there hasn’t been interest in the growing amount of solo dwellers and its effect on the urban context. Theories that formed the current urban structure are based on the traditional family, like the ‘Wijkgedachte’ formed a base for Dutch post-war neighbourhoods. However the traditional family doesn’t form the standard household type anymore with the growing amount of divorces since the sixties and the emerge of Living-apart-together relationships (Hamsen, 2008). Inspired by the trends in sociology and architecture, urbanism now needs to re-think its urban environments taking solo dwellers into account.
Deconstruction
THE DECONSTRUCTION PHASE

This section discusses the existing situation as can be found on Katendrecht as well as the related context of Rotterdam and the Netherlands. The important research findings of the analysis will be discussed according to the three steps of the ViP model.

☐ Current design
Description of the appearance, structure and amenities on Katendrecht.
Pages 26 - 28

☐ ⇛ Current user environment interaction
The interaction between the current living environment of Katendrecht and its users, which defines the living quality. As well as the relation between solo dwellers and the city of Rotterdam.
Pages 29 - 32

➢ Past context
Description of the circumstances that formed the context, both social and urban.
Pages 33 - 38
The current design

Location and amenities

Katendrecht is located on the south bank of the river Meuse and is situated on a peninsula surrounded by water and harbours. On the east side it borders the ‘Afrikaanderwijk’ and a bridge on the north side connects to the ‘Wilhelminapier’. Surrounding public transport, a subway, bus and waterbus, links the neighbourhood to the city centre and central train station as is shown in image 5. By public transport it takes 20 minutes to the city, taking a bike can be quicker since a transfer from bus to subway is needed when taking public transport. Also there is the possibility to take the waterbus to the other side of the river. The neighbourhood contains a variation of amenities, as is shown in image 6. The Deliplein, located next to the Rijnhaven bridge, forms the lively heart of the neighbourhood. At this square restaurants, bars, shops, the ‘Fenix Foodfactory’ and theatre ‘Walhalla’ are located. The square is often used for activities such as expositions, the yearly circus or a vintage market. The SS Rotterdam, a former passenger ship which is permanently located at the western side of the peninsula, is in use as a hotel, restaurant and event location. Furthermore Katendrecht has two primary schools, a health care centre with a pharmacy, doctors and psychotherapists, a D.I.Y. shop, a Christian high school, many car mechanics and a supermarket which is located at the entrance of the peninsula. The Vuurplaats, a shopping centre in the Afrikaanderwijk, offers many more shops and amenities. As is shown in image 7, in public space multiple parks, with views on the skyline of Rotterdam, playgrounds and empty spaces can be found. Those empty places are the result of ongoing transition and create opportunities for new developments. As for culture, a cinema, theatre, museums and galleries are situated around the corner on the Wilhelminapier.
Image 6: Amenities on Katendrecht

Image 7: The functions of public space
The current housing opportunities
Katendrecht contains 4600 inhabitants and 2149 households of which 41% consists of one person (Gemeente Rotterdam, 2015). The residents are a mixture of the original inhabitants, families who have been living on Katendrecht since the construction of the peninsula, and new inhabitants who moved in the recent housing developments. The architecture on Katendrecht is diverse, since 19th century, late 20th century, contemporary architecture as well as factories and industrial buildings can be found in the neighbourhood.

Image 8: Housing typologies within Katendrecht
Therefore a mixture of housing typologies is situated on Katendrecht. Most dwellings are maisonettes which are part of multiple family homes, one maisonette is located on the ground floor, as a result has a garden, whereas the other takes up the upper floors, as shown in image 8. Furthermore apartments and single family homes can be found, mostly located in the new developed areas. The majority of the dwellings on Katendrecht is rented by its residents and between 60 and 74 square metres. Also dwellings of 75 - 89 m² and 90-119 m² are common, both taking up 19 percent of the total as shown in image 9. Small dwellings up to 44 m² and between 45 and 59 m², are absent. These dwelling types are especially interesting for solo dwellers and could therefore be developed to serve their needs.

Image 9: Distribution dwellings according to their size
The current user environment interaction

The atmosphere within Katendrecht

The existing mix of architecture and the current transition process of Katendrecht, create different qualities within the neighbourhood. Empty plots and abandoned buildings as well as nicely re-designed public spaces, contemporary architecture and historic buildings can be found. As a result Katendrecht can roughly be divided in five different zones; the peninsula, the centre, Katendrecht south, Katendrecht north and the entrance or so called Pols as is shown in image 10. These five zones differ in atmosphere due to their building style and spatial lay-out and will be explained further by pictures.

Peninsula

The SS Rotterdam

The peninsula on the west side of Katendrecht is empty and currently in use as parking lot of the SS Roterdam. The area is adjacent to the Kaappark with both playgrounds and green.

The Kaappark, playground and green
The centre is the oldest part of the neighbourhood where the old urban structure is still visible and street names refer back to the history of Katendrecht. The building blocks are a mixture of old and new. Although the architecture often looks alike, the important difference can be found in the transition from public to private. The height differences of the older blocks automatically create a smoother transition than the abrupt and direct transition of the newer blocks. Within the centre the Deliplein is located, a lively square surrounded by nicely renovated buildings.

Katendrecht South

Katendrecht south consists of early 21st century building blocks that follow the structure of the former harbour industries. This creates big blocks separated by pedestrian streets to ensure permeability. Some blocks do have a front garden or defined transition zone, which residents use, whereas other blocks don’t which results in less attractive streets.
On the northwest side of the centre Katendrecht North is located which contains late 20th century and early 21st century housing. This area forms an island within Katendrecht since the street pattern is poorly connected with the structure of the centre. The housing is a combination of apartments and single family homes. Due to the layout, streets are often bordered by backyards and the back side of building blocks which creates an unwelcoming atmosphere without eyes on the street.

The entrance zone of the neighbourhood is still in use for industrial activities. At the same time it is in a transition process, resulting in empty plots, undefined public space and closed facades. Especially at night this area feels unsafe. This part of Katendrecht has great potential due to the industrial buildings, its location and the planned developments.
Interaction of Rotterdam with the solo dweller

The interaction or relation between Rotterdam, including Katendrecht, and solo dwellers has different appearances. Although the amount of one person households is growing, the city of Rotterdam is still mistrustful and defensive towards solo dwellers. Exemplified in the municipality’s strong discouragement for the development of small housing and their goal to attract families to the city (Gemeente Rotterdam 2016). As a result the housing opportunities for solo dwellers are rare, especially compared to the opportunities families have. Considering the city’s strong focus on the family, Rotterdam is disadvantaging solo dwellers and treating them unequal compared to other household types. Not only the municipality influences the housing opportunities of one person households, also developers seem to have a standardized view on how a solo dweller should live. This can either be in an apartment shared with friends, like the Friends-concept of AM, or in a studio by yourself, like ‘De Studio’. However the housing needs of solo dwellers include more than flat sharing or a studio, since singletons might as well be interested in an apartment of their own (Duin, 2015). The unequal treatment of solo dwellers isn’t only reflected in the housing opportunities of one person households as well as in the Dutch tax system. Families as well as couples get tax benefits whereas a solo dweller doesn’t. As a result singletons have less income left to pay housing and daily needs of (Duin, 2015). Therefore those smaller dwellings, which are often affordable with one salary, are needed to house one person households. Furthermore solo dwellers are dependent of the city since it offers amenities and social places where others can be met. In order to create lively places a higher density is needed which mostly can be found in central areas. At the same time Rotterdam doesn’t realize it actually needs solo dwellers to maintain the liveliness of its inner city. Solo dwellers are frequent users of public space since their social contacts take place outside their home and therefore facilitate an active street life (Pots, 2014; Klinenberg, 2012a). From this perspective, Katendrecht is full of opportunities for solo dwellers, particularly since the new developments can be altered to the needs of solo dwellers and suitable housing can be created.
The municipality of Rotterdam wants to attract families to the city by focussing on the needs of families, as explained in their housing vision towards 2030 (Gemeente Rotterdam, 2016). The city wants to attract those families by creating high quality neighbourhoods for children that contain suitable housing for families with higher incomes. At the same time the municipality recognizes the growing amount of one person households. In 2015 solo dwellers already formed half of the households within Rotterdam (Gemeente Rotterdam, 2016). In order to accommodate this growing group, Rotterdam defined a ‘KennisAs’ (knowledge axis). The development of housing and amenities follows metro line C to ensure good public transport connections and the locations are related to educational institutions (Stadswonen, 2008). A map representing this vision is shown in image 11. This axis focusses on students and starters which only represent a quarter of the solo dwellers in Rotterdam since inhabitants living solo are mostly older than 35 years (Gemeente Rotterdam, 2016). Whereas the needs of elderly living solo are taken into account by the municipality, the labour force group is forgotten in the housing vision of Rotterdam. They are even disadvantaged since the municipality wants to demolish a big amount of small housing and wants to prevent the development of new small units, which are especially interesting housing typologies for solo dwellers as explained earlier.
Solo dwellers mostly live in and around the city centre of Rotterdam, as was in general already found by Eric Klinenberg (2012a). A map showing the dispersion of one person households over Rotterdam can be found in appendix 2. Currently Rotterdam still has some neighbourhoods that despite their central location don’t have a high amount of solo dwellers, like Oude Westen, Rubroek, Kop van Zuid, Kralingen, Katendrecht, Blijdorp and Provenierswijk. At the same time neighbourhoods like Dijkzigt, CS Kwartier and Struisenburg have a very high amount of inhabitants who live alone, as is shown in image 12. In Dijkzigt the percentage of solo dweller is even 82 percent mostly due to the high amount of students in this area (Centraal Bureau voor de Statistiek, 2013a; Gemeente Rotterdam, 2015). Especially Blijdorp, Katendrecht, Oude Westen and Kralingen are interesting. Despite their close location to the city centre, new developments and (potentially) high density, the amount of inhabitants with the red lifestyle isn’t dominant yet as can be found on the map in appendix 3. This makes these four neighbourhoods interesting locations to investigate the possibilities for urban developments based on the needs of the solo dweller, who wants to live central due to their red lifestyle as was defined in the Theoretical Framework. From these four neighbourhoods Katendrecht was chosen since the neighbourhood is currently in development, this creates the opportunity to link the interventions in this thesis to actual developments. Furthermore Katendrecht develops towards a central location in combination with the Wilhelminapier. As is shown in image 13, the city aims to create a compact centre on two sides of the river. This centrality is especially interesting for solo dwellers due to the availability of amenities and social places.
Urban context

Rotterdam

Katendrecht is located in Rotterdam south. Rotterdam is divided in a northern and southern part by the river Meuse. This results in a strong division between north and south, in terms of connectivity as well as in living environments and its inhabitants. On the richer northern side the city centre and high quality neighbourhoods like Kralingen are located whereas on the south side the poor, and often in bad quality, neighbourhoods can be found. Due to its location among the river and its connection to the hinterland by the river Rotte, Rotterdam developed as a harbour city. When in the second half of the 19th century harbours on the south bank were created, the big scale harbour development started. This turned the harbour of Rotterdam into one of the biggest in the world and is now used as a transit port to ship goods to Germany via the Rhine and to the rest of the world via the sea. Since the 1960s the docklands are slowly moving out of the centre of Rotterdam into the direction of the river mouth at sea. As a result many industrial areas where harbour activities occurred, got empty and needed to be redeveloped.

Katendrecht

One of these areas in need of redevelopment was Katendrecht. Katendrecht was until 1896 an idyllic polder village on the south bank of the Meuse with a small harbour, toll point and estates of rich businessmen. A ferry over the Meuse connected with the northern river bank and formed an important link in the trading route between Amsterdam and Paris since it was the only place where it was possible to cross the river (van de Laar, van Jaarsveld and Klaassen, 2004). In 1896 the
Rhinehaven was constructed, creating the Wilhelminapier. Five years later, in 1901 the Maashaven was finished turning Katendrecht into a small peninsula, with ‘De Kaap’ as nickname. The estates disappeared and warehouses, industrial buildings and railroads were constructed. Furthermore two hotels arose which were the places where emigrants to America would stay before boarding on a ship. Due to a big harbour strike in 1911, Chinese workers were shipped into the Netherlands. Most of them were housed in boarding houses on Katendrecht which turned the Kaap into the first big Chinatown of Europe. Furthermore Katendrecht was a place for fun and entertainment, mostly focussed on sailors, with many bars, clubs and prostitution which continued up to the 1960s. Until 1958 a ferry for pedestrians connected Katendrecht and Charlois and until 1974 a ferry connection between Katendrecht and the northern river bank was operational. In 1968 the connectivity to the city centre of Rotterdam was even more improved by the construction of the subway. From the 1970s on, the prostitution on Katendrecht stopped and the harbour activities moved towards the sea. This resulted in empty plots and buildings. At the end of the 1980s the 1st Katendrechtse haven was filled up, as well as a part of the 2nd Katendrechtse haven, and new housing was constructed. In the 1990s even more housing was developed on the southern side of the peninsula. And in 2012 the Rijnhaven bridge, which connects Katendrecht with the Wilhelminapier, was opened, creating another important connection. In the same year also the SS Rotterdam was situated on the west side. This gave Katendrecht a new iconic attraction and together with the construction of the Rijnhaven bridge boosted the transition from illustrious neighbourhood to the new place to be. Through history Katendrecht developed from a north south oriented ribbon village to a peninsula with an east west direction in which the Rijnhavenbrug reconnects Katendrecht to the north. The maps on the next two pages show the historic development of Katendrecht.

**Conclusion**

The direction of Katendrecht changed, from being a north south oriented ribbon village Towards a urbanized peninsula oriented east and is currently developing to reconnect to the north
1815: A ferry connects two sides of the river and links trading routes to Amsterdam and Paris

1896: The Rijnhaven is constructed, creating the Wilhelminapier

1901: The Maashaven is constructed, turning Katendrecht into a peninsula

1923: Ferries connect Katendrecht with Charlois and Rotterdam. Industrial activities are developed

1968: A subway line is constructed and more industrial and harbour activities occur

1990: The 1ste Katendrechtse Haven is filled and housing is developed
2007: The 2nd Katendrechtse Haven is partly filled and built with housing

2010: On the south side of the peninsula industrial activities moved away and housing is developed

2012: A bridge connects Katendrecht with the Wilhelminapier and the SS Rotterdam anchors

2015: A ferry and the water taxi connect Katendrecht with the northern river bank
Design
The Design Phase

This section discusses the important conclusions from the research and analysis as well as the design that derives from it. The conclusion and the design will be discussed according to the three steps of the ViP model.

Future context

Description of what the final design should offer to solo dwellers, resulting in a vision on different scales.
Pages 42 - 45

New user environment interaction

Description of what the environment should offer in order to suit the needs of one person households. This results in design principles.
Pages 46 - 47

New design

Representation of the final design based on the vision and design principles as defined in the former steps.
Pages 48 - 66
FUTURE CONTEXT

Rotterdam

As elaborated before, Rotterdam wants to attract families to the city. Simultaneously, the municipality recognizes the growing amount of solo dwellers and therefore developed a knowledge axis focusing on students and starters. As a result, labour force singletons are forgotten in the Rotterdam housing vision until 2030. Furthermore, there is still a stigma on solo dwelling within the Netherlands. Living solo is still seen as lonely and undesirable. Although one-person households became more accepted, living solo is rather seen as an urban lifestyle than as a household type (Schmidt et al., 2015). Rotterdam should actually embrace the solo dweller. Due to their frequent use of public space, singletons can bring liveliness and an active street life to the city (Duin, 2015; Pots, 2014). These findings and the urge for environments based on solo dwellers result in the following vision for the city of Rotterdam:

Rotterdam should be an inclusive city which naturally focusses on the needs of solo dwellers, especially in high-density neighbourhoods, which turns solo dwelling into a standard household type.

From this vision also certain policies derive which are needed to improve the living quality of solo dwellers. In general, this considers the current Dutch tax system in which couples and families are benefitted. As a result, solo dwellers have less income to spend and living together or starting a
family is indirectly promoted (Duin, 2015). This results in the first policy; **Tax benefits should be equal for all household types.** In order to attract solo dwellers to Rotterdam, the focus should be on (creating) high density neighbourhoods. These neighbourhoods are often located in or around the centre or other centralities. This facilitates the need for amenities and social places in proximity of solo dweller housing (Klinenberg, 2012a), which results in the second policy; **New developments in densification areas should reflect the needs of solo dwellers in public space as well as in the housing opportunities, by creating a mixture of housing typologies which facilitates a mixture of household types.**

This vision and accompanying policies can be implemented on different places within Rotterdam, which is shown in the map in image 14. The existing KennisAs already focuses on students and starters therefore the suggested locations within the city should focus on the specific needs of singletons who are part of the labour force. The potential neighbourhoods to implement the strategy are; Katendrecht, Blijdorp, Oude Westen and Kralingen. These neighbourhoods have, despite their close location to centralities and/or good public transport connections, a low amount of solo dwellers as well as residents with a red lifestyle (Gemeente Rotterdam, 2015). As a result these neighbourhoods have great potential to attract solo dwellers and are the ideal place to design living environments based on the needs of solo dwellers. Also the defined neighbourhoods are currently in a transition process or in need of new developments. This creates the possibility to link the design to actual projects and plans of the municipality.

**Katendrecht**

Currently the public space as can be found on Katendrecht differs a lot per street, as explained before. The Deliplein is a nice square with surrounding restaurants and shops. However the access street to the peninsula is unclear and not welcoming due to the many empty plots and buildings. In order to make this public space attractive and to facilitate those social places, an attractive street life should be realised by a mixture of amenities (Gehl, 2011; Jacobs, 1961). Amenities are not only needed to create street life, having them in proximity of their houses is one of the biggest needs of solo dwellers (Klinenberg, 2012a). Solo dwellers are frequent users of public space since social contacts often take place outside the homes of singletons (Klinenberg, 2012a; Pots, 2014). This (spontaneous) contact with others can be facilitated in public space by creating transition zones from the public street to the private home (Ulden, Heussen and van der Ham, 2015). Especially social contact with neighbours improves the appreciation of the living environment and therefore the living quality of solo dwellers (Adriaanse, 2012). Both the social places and amenities occur in high density areas. As a result the preferred living location of one person households within the city is in and around centralities. Unfortunately housing in those central areas is often too expensive for a one person households. And although the central location facilitates in public social places like bars, the transition zone between the house and street is often absent. These findings result in the following vision for Katendrecht;

** Katendrecht should be a dense neighbourhood reflecting the needs of solo dwellers, especially of those who are part of the labour force, by focussing on public social places to meet others as well as creating a centralities with a mixture of amenities.**
Within Katendrecht three locations can be found where the vision can be implemented, as is shown in image 15. The peninsula, Pols and Kaapschip are either empty, in temporary use or in need of new developments. The Pols is chosen as the design location for this project. The area has a good public transport connection, with the subway within walking distance, and it’s close to the existing amenities on Katendrecht like the Deliplein. Furthermore this part of Katendrecht is, together with the Wilhelminapier, becoming a new centrality within Rotterdam. The Wilhelminapier offers the cultural functions like a cinema, galleries and a theatre. Whereas Katendrecht will facilitate the commercial functions like shops as well as spaces for start-ups and the creative industry. These amenities meet the needs of solo dwellers and by adding a mixture of new amenities this can even be improved. The new amenities will be implemented along a road connecting the centre of Katendrecht with the amenities of the Vuurplaats. Since the Pols is currently an unclear, during night even unwelcoming place, the municipality already proposed a zoning plan as shown in image 16 and 17. The plan aims to create a high density with building blocks consisting of a high plinth on which towers will be constructed, functioning as height accents. The structure of this zoning plan will be used and further developed in the design.
Image 16: Zoning plan of the municipality for the Pols (Gemeente Rotterdam, 2012)

Image 17: The urban ensembles with iconic height accents (Gemeente Rotterdam, 2012)
NEW USER ENVIRONMENT INTERACTION

In order to create a living environment for solo dwellers which fits the earlier explained visions of Rotterdam and Katendrecht, design principles are defined. These principles reflect the needs of solo dwellers and their desired interaction with the environment, as explained in the Theoretical Framework. Therefore by implementing the principles in the design, the living quality of solo dweller will be enhanced. The principles are organised according to three main needs; social places, centrality and housing typology.

Social places

Social places facilitate the need of solo dwellers for social contact. This contact can be meeting friends in a park as well as spontaneous chats with neighbours or strangers. In order to create these social places and allow interaction to occur, an active street life as well as a transition from different types of publicness is needed. The active street life can be achieved by creating destinations, like shops, which form a reason to go out and use the street (Gehl, 2011). This street life can be enhanced by creating a high permeability of the block structure. By creating a fine-grained urban pattern, the neighbourhood becomes walkable and will invite people to use the street (Jacobs, 1961). When street life occurs, also the possibility to observe others becomes relevant. By creating places where passers-by can be viewed, the social public space becomes an appreciated space to
Solo dwellers are city oriented and seek for dynamic urban environments which contain amenities and social places where their daily needs are served and they can meet others (Klinenberg, 2012a). This often occurs in centralities and as a result solo dwellers prefer to live in and around the city centre. In order to create living environments with amenities in proximity, a high density is needed to provide enough users. To allow activity throughout the day and facilitate an active street life, a mixture of amenities needs to be realised. This can be created through combining shops and small enterprises, open during the day, with bars and takeaways, open in the evening.

Developers still mostly built single family homes and living environments focussed on singletons are rare. As a result one person households have difficulties finding a home which is affordable and fitting their needs (Duin, 2015). In order to accommodate solo dwellers, and create a mixed neighbourhood, a mixture of affordable housing typologies should occur within building blocks. This will not result in one specific housing typology, as housing developments for solo dwellers exemplify, but will be a mixture to fit the needs of the multiplicity of one person households.
NEW DESIGN

The design principles, as discussed in the former chapter, will be used to design the Pols area on Katendrecht. Within the Pols four building blocks can be determined, as shown in image 18, of which the Codrico block is used to show the possible result of the design principles. The structure of the blocks is based upon the zoning plan of the municipality of Rotterdam and emphasized by the addition of a height difference. Underneath the blocks a parking garage is situated and as a result the blocks are lifted half a story above ground level. Therefore the blocks form a clear entity and contain a gradual transition from public to private.

Centralities and function of space

The blocks are surrounded by public space which contains both quiet and active streets as well as public places, this is shown in image 19. Along the two active streets amenities like shops, restaurants and small enterprises can be found in the plinth. These amenities will attract a variation of users and therefore create a dynamic environment, resulting in a new centrality. The main street, accessible for all modes of transport, connects the centre of Katendrecht with the Vuurplaats shopping centre in the Afrikaanderwijk. Simultaneously the street is attractive for pedestrian due to the wide sidewalks, amenities in the plinth and cars that are parked in the middle of the street, as
is shown in the section in image 25. The promenade along the water, on the other hand, forms an attractive connection between the metro station and the centre of Katendrecht. The promenade offers a nice stroll along the waterfront with a great view on the skyline of the Wilhelminapier. The remaining public space are pedestrian zones and have a more quiet character since housing is situated in the plinths. These streets also connect the different public places within the area, which are a variation of squares and pocket parks. Since these places are located on the border of active and quiet public space, they form an interesting place to stay and observe passers-by.

**Social places**

From the public pedestrian zone users can access the heightened semi-public streets of the residential blocks, like the Codrico block. The stairs form a place to observe passers-by and therefore create a social place on the transition from a public to a more private area. Due to this height difference a defined border between public and private arises. Visitors can access the residential street but are discouraged to do so due to the spatial lay-out, as is shown in the impression in image 29. Along the residential streets, within the Codrico block, housing is situated as well as a community centre and the access to the parking garage, as can be found in image 30.
Image 20: Plan for The Pols on Katendrecht showing the public, semi-public and semi-private zones. As
well as the design of public and semi-public space.
Image 21: The Codirco block which contains a combination of old and new buildings. Furthermore the
design of the public space, semi-private space and the transition zone is shown.
The community centre functions as a communal space which can be used by residents for a dinner with a big group of people, for workshops or regular yoga classes for instance. On the second floor a spare bedroom can be found where residents can let their guests stay for the night. The entrance to the parking garage is situated next to the community centre and can only be accessed from the residential street, which makes residents use the street and therefore an active street life occurs. This is enhanced by locating the front doors, the access to the top floors and the walkway, along the semi-public streets. Furthermore the street contains seating elements in order to make the street a place to stay in. From here also the intimate and quiet courtyards, located within the block, can be accessed. The semi-public street is bordered by semi-private zones in front of the houses, which functions as a transition zone. This transition zone creates a gradual transition from the semi-public street to the private house. This is the perfect place to observe passers-by and get in contact with neighbours. To emphasize this space, it is slightly heightened and situated underneath an arcade on the side of the residential street and underneath balconies within the courtyard. This is represented in the section in image 26 and the impression in image 28. The arcade functions as a walkway which connects the houses on the top floors and simultaneously functions as a street due to its width.

**Housing typologies**

The housing within the residential block consists of different housing typologies in order to meet the needs of the multiplicity of solo dwellers. As a result a mixed living environment is created. The dwellings are organised in such a way that the ground floor always creates eyes on the street, therefore only the kitchen and living room can be situated there. As is shown in image 22 and 23, this results in three different typologies. On the ground floor, within the residential block, typology A can be found which consist of back to back dwellings. These dwellings are small and especially interesting for solo dwellers. Since solo dwellers contribute to an active street life, this typology is located on the ground floor. On the public side of the block, along the pedestrian zone, typology B can be found. This typology contains a split level ground floor and as a result it is possible to have a shop or office there, contributing to the centrality of the Pols. On the two top floors typology C can be found which consists of maisonettes with a private roof terrace. This typology can easily be split up into two separate apartments. The top floors can be accessed by a walk-way on top of the arcade and on the side of the courtyard balconies can be found. Furthermore the residential blocks contain a combination of social rent, private rent and owner occupied dwellings to ensure a mixture of inhabitants and the possibility for every solo dweller to live here, as is shown in image 24. To ensure affordable housing for solo dwellers at least 30% of the dwellings should be social rent. Of the owner occupied dwellings, 30% of typology A should be between €100.000 and €150.000 and within typology B and C at least 30% should be between €150.000 and €200.000. Since also other household types are welcome to live in the Pols, in order to avoid a singleton enclave, solo dwellers get priority by rental properties to ensure their housing opportunities.
Image 22: The different housing typologies that can be found within the Codrico block - 1:200
Image 23: The different housing typologies within the plan for the Codrico block
Image 24: The occupation of the dwellings within the plan of the Codrico block
Image 25: Section A showing the main street with parking in the middle and amenities in the plinth
Functions in plinth resulting in centrality
Image 26: Section B showing the courtyards within the blocks and the residential street with seating,
bordered by the transition zone
Image 27: Transition zone in front of a house. Resident uses space for reading
Image 28: One of the courtyards with green spaces, a vegetable garden and picnic tables
Image 29: Square with amenities in the plinth and stairs with seating from where others can be observed
Image 30: Residential street with the community centre and arcade functioning as walkway
During the graduation project ‘Living solo in Rotterdam’ research was conducted to the needs of solo dwellers, the conditions that effect their living quality and into the social and urban context which influences the way of living of one person households. The research findings were used to develop a design on Katendrecht focussed on residents who live solo. Both the research and the design contribute to the answer of the main question;

**How can the living quality of one person households in Rotterdam be improved by re-thinking the urban living environment of its neighbourhoods?**

In order to answer this question, sub-questions were formed. Therefore first the answers to the sub-questions will be discussed

**Living quality**

**Who is the solo dweller?**

The solo dweller is a person who lives alone, not sharing his/her house with friends, roommates or children. This person is not primarily without children or single, they might be in a living-apart-together relationship. The solo dweller, as defined for this graduation thesis, has a red lifestyle and is part of the labour force. People with the red lifestyle, as determined by SmartAgent, prefer dynamic environments with culture and possibilities to enjoy life. As a result the solo dweller is city oriented, an early adopter and willing to meet new people.

**What defines the living quality of solo dwellers and how can it be improved?**

The living quality of solo dwellers is defined as the relation between a solo dweller and the environment as well as their appreciation of this environment. This appreciation is strongly affected by the possibility to meet others. Social interaction plays an important role, since there is no one when a singleton comes home. Therefore solo dwellers go out to meet with friends and are open to new contacts with neighbours and even strangers. Places which facilitates the opportunities for social contact are therefore needed within the living environment. These so called social places can be facilitated in a bar or restaurant as well as the transition zone between the house and the public space. Especially this transition zone contributes to social contact since residents can observe passers-by and easily make contact with them. By enhancing the quality of public space and creating social places, with special attention to the transition zones in the living environment, the living quality of solo dwellers will be improved.

**Social context**

**How has the social context regarding one person households changed through history and how did this influence the housing opportunities of solo dwellers?**

Living alone is not a phenomenon of present time only, as singletons have been part of city life since the middle ages. Solo dwelling did not fit in the standard course of life in which youngsters only move out when they get married and as a result solo dwellers have long been stigmatised by society. This made housing possibilities for solo dwellers through history rare since developers did not see the importance of housing designed for residents living solo. Some housing typologies did facilitate living solo. ‘Hofjes’ for instance housed poor or widowed people, but for most unmarried
men and women lodging was their only option. Furthermore private initiatives facilitated living solo but only happened on a small scale, not resulting in a housing standard for solo dwellers. Only in the 1970s the Dutch government noticed the housing problem, and through subsidy many HAT-units for one and two person households were created. Currently living solo is seen as an urban lifestyle and not as a temporary phase in between relationships anymore. Despite this growing emancipation of solo dwellers, still one person households aren’t seen as one of the standard household types. As a result solo dwellers are still disadvantaged in their housing opportunities since developers prefer to build single family homes. Although housing projects focussed on one person households are developed it still doesn’t serve the growing demand. Since developments mostly focus on students, starters or elderly and the labour force is forgotten. Through history solo dwelling has become more common but housing opportunities of one person households are still limited.

Urban context

Where do solo dwellers live in Rotterdam?
Solo dwellers mostly live in and around the city centre or centralities, in general as well as in Rotterdam. This location within the city is related to the general needs of solo dwellers and their red lifestyle since they are city oriented and want to live in dynamic lively environments. Currently those neighbourhoods are mostly located within Rotterdam North.

Which conditions facilitate living solo and how can these be altered to improve the living environment of solo dwellers?
The needs of solo dwellers are facilitated in dense neighbourhoods in proximity of centralities. The density is needed to accommodate a variation of amenities in proximity of solo dweller housing, like shops and social places such as bars or restaurants. These allow activity to happen throughout the day and as a result create an active street life. Since people go where people are public space should be attractive to stay in. By creating places to sit and stand at the edges of public space, users are accommodated in their need to observe passers-by. At the same time this provides the possibility to interact with others. Within the living environment this can be facilitated in the transition zone between the public street and the private house. Furthermore housing opportunities are important. Currently developers still mostly built single family homes which creates a need for suitable and affordable housing among one person households. If housing for solo dwellers is developed, it mostly focusses on students, starters or the elderly, the labour force group is often forgotten. The chosen group of one person households is a diverse group with various needs and as a result a mixture of affordable housing typologies is needed. From studios to apartments with multiple bedrooms. This creates a diverse living environment which will not only attract solo dwellers. To maximise the opportunities of solo dwellers to live in their preferred neighbourhoods conditions should be created. These regulate the amount of affordable dwellings, both rent and owner occupied, and give priority to solo dwellers.
Design question

How does a neighbourhood look when it is based on the needs of solo dwellers aiming to improve their living quality?

A neighbourhood based on the needs of solo dwellers is exemplified in the design of the Pols on Katendrecht. In the Pols certain elements got more attention than in a ‘normal’ neighbourhood. A living environment based on solo dwellers facilitates the need for amenities in proximity. Amenities are preferably concentrated in certain areas and linked to existing functions, creating new centralities. Therefore a high density is needed in order to create enough critical mass of users. This density is also important for the facilitation of an active street life. By implementing a fine-grained urban structure, a permeable and walkable neighbourhood is created. This enhances the use of public space and creates the opportunity to observe passers-by. The observation places are preferably located at the edges of public space. Theses edges also function as the transition zone between the public and more private areas and are important by creating social interaction, becoming social places. Especially the transition zone between the private house and the more public street is the ideal point to interact with others and is the major intervention of the project. Furthermore a mixture of housing typologies is needed to create suitable housing for the multiplicity of solo dwellers and at the same time attract other household types to create a mixed neighbourhood. The design principles for a living environment based on solo dwellers can be found on pages 46 and 47. A final image of the design is shown on pages 62, 63, 64, 65 and 66.

Conclusion

How can the living quality of one person households in Rotterdam be improved by re-thinking the urban living environment of its neighbourhoods?

The living quality of one person households can be improved by considering social places, centralities and housing within the design of neighbourhoods. Social places facilitate the need for social interaction among solo dwellers and therefore enhance their appreciation of the living environment. Social places should be present both in public space, like bars and restaurants, and in the residential environment by creating transition zones. As a result friends can be met in a restaurant and solo dwellers can get to know their neighbours casually. Centralities facilitate these social places in public space as well as other amenities. These amenities on one hand create a convenient living environment for solo dwellers with shops, takeaways and small enterprises. On the other side it also attracts other users resulting in an dynamic and lively environment. Special attention within the living environment should be given to developing suitable and affordable housing. Suitable housing results in a mixture of housing typologies to fit the needs of the multiplicity of solo dwellers. Affordability is needed to make sure one person households can afford a house despite their single salary. If these three themes are taken into account, as this graduation project exemplifies, a neighbourhood based on solo dwellers arises.
REFLECTION AND RECOMMENDATIONS

Within this reflection I will reflect upon the graduation process and simultaneously give recommendations for further research.

Methodology

During the graduation process the ViP research model was used to steer the research and design. The ViP model, vision in product design, is mostly used in industrial design practices but was altered to fit the urban component of this graduation project. This methodological model was helpful in structuring the findings that derived from the research and analysis. Also it allowed me to find innovative and new ideas since the steps within the model forced me to think out of the box. However going through the model and applying the model on an urban context was challenging. The steps within the model are sometimes uncomfortable due to unconventional topics, therefore it’s tempting to postpone taking the next step. Furthermore the model is oriented on product design and as a result needed some alternation to be applicable on the urban context. Especially ordering the findings and needed information to explain the final project within the structure of the model, as can be found in this thesis, needed some effort. For instance the order of the deconstruction steps within the model result in a backwards explanation of the existing situation. First the details are explained, secondly the atmosphere and finally the context in which the current urban fabric exists, in urban design practises its often the other way around. Also it was challenging to order information and findings within the steps since some topics were both about the design and the interaction. In future projects I would consider to use the ViP model in a more free way, to allow better applicability on the urban context. In order to use the ViP model more often in urban design practises it should be reviewed and altered to the urban component. For instance by a better urban related definition of the topics of the different steps within the model should be formulated.

Research

Research has played an important role during this graduation process. Research was conducted to understand how the current context, both urban and social, came to be as well as to gain insight into the needs of solo dwellers. This information was needed to make a design reflecting the specific needs of solo dwellers and fitting the chosen location. However information about solo dwellers and their specific needs was often difficult to find since they aren’t thoroughly researched yet. During my graduation process I’ve deducted this through the use of a lifestyle model and by interviews. These interviews could have been more extensively in order to get a more complete overview of the needs of one person households. A design workshop would have been a good addition in order to test the design and the design principles to the preferences of one person households. Furthermore more research needs to be done on residents living solo. This can be from a sociological point of view to indicate their daily habits, as Eric Klinenberg already does. However especially the urban approach is needed to adjust the current cities to the needs of one person households. Therefore research into the specific needs of solo dwellers for their living environment is needed and would be a good addition to the existing more sociological related research.
Design
The aim of this graduation project was to create a living environment which reflects the population of solo dwellers by a re-design of Katendrecht. And by doing so, improving the living quality of solo dwellers. This resulted in a vision on the level of the city and the neighbourhood as well as an urban design which takes the needs of solo dwellers into account. The research done during the graduation process complements the design since the findings are translated in principles on which the design is based. Almost all of the defined principles can be found within the final design for the Codrico block. However a high density turned out to be difficult to implement within the design. The design is based upon the zoning plan of the municipality, of which particularly the structure is used within the final plan of the Pols. The heights of the buildings, and as a result the density of the plan, was adjusted within the final design to allow social interaction to happen. Therefore the housing blocks are four stories high, instead of six, and lack the height accents as suggested by the municipality. Instead a living environment with a human scale and enough sunlight within the blocks was created without distorting the specific atmosphere that enhances social interaction. Due to the smaller housing typologies still a high amount of dwelling are created and as a result a considerable density was reached. In order to develop the design further it would be interesting to define densification locations within the neighbourhood which take the atmosphere facilitating social interaction into account.
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APPENDIX I: LITERATURE REVIEW
One person households and their housing opportunities through history

Abstract - The amount of one person households is growing in the world as well as in the Netherlands. In 2060, almost half of the households will consist of one person (Centraal bureau voor de statistiek, 2011). Living alone is not a phenomenon of present time only, as singletons have been part of city life since the middle ages. People have been living alone for different reasons, which makes solo dwellers a highly varied group that have long been stigmatised by society since marriage was the norm. Solo dwelling did not fit in the standard course of life in which youngsters only move out when they get married. Through history, housing possibilities were rare since developers did not see the importance of housing designed for solo dwellers. ‘Hofjes’ housed poor or widowed people, but for most unmarried men and women lodging was their only option. Private initiatives created new ways of living and only happened on a small scale, not causing a housing standard for solo dwellers. Only in the 1970s the Dutch government noticed the housing problem, and through subsidy many HAT-units for one and two person households were created. Currently living solo is seen as an urban lifestyle and not as a temporary phase in between relationships anymore. Despite the growing emancipation of solo dwellers, there are still disadvantaged since developers lack to build specific housing for singletons. Still, solo dwellers are dependent on initiatives of developers. If no action is taken, solo dwellers will continue to live in houses which were not designed for them. Rethinking our urban living environments could solve this problem.

Key words: One person households - housing typology - social context - standard life cycle

The amount of one person households, or so called solo dwellers, is rapidly growing worldwide. In the Netherlands the amount of solo dwellers has tripled since the 1970s and in Sweden already 47 percent of the households consists of one person (Hamsen, 2008; Klinenberg, 2012a). Although solo dwelling is not a recent phenomenon but already happened in medieval cities, solo dwellers are still forgotten in urban design. As a result, most of our living environments and housing stock is designed for the traditional family in which architects and urban planners did not take the needs of solo dwellers into account. Since more people will start living alone in the future, a housing demand arises. In order to adapt our present cities and housing stock to the needs of solo dwellers, it is important to understand development of solo dwelling through history. By researching the historical social context, regarding solo dwellers, and the housing typologies which emerged from it, understanding of the living conditions of solo dwellers in Netherlands is created through history. Furthermore, it shows the influence it had on our current living environments and this information can then be used to design for solo dwellers in the future. In this paper solo dwelling will be explained in different time frames; until 1900, 1900 to 1970, from 1970 and the current situation.

Until 1900

Social context
During the 13th, 14th and early 15th century, singles were a substantial part of urban society (Stabel, 2015). Singles formed ten to fifty percent of the households in the bigger
cities of that time, depending on the city, its economic position and the era. They were either never married, widowed or lived a celibate life in a monastery or begijnhof (Schmidt, Devos, & Blondé, 2015). Due to the different reasons for being alone, single men and women did not represent a homogenous socio-economic group, living without a spouse was often the only similarity (Baatsen, De Groot, & Sturtewagen, 2015; Lindström, 2015). Singles formed a highly varied group of which everyone had their strategy to cope with the issues they faced. This is also reflected in the high mobility of singles. Since singles were not tied to family or social structures, they were more likely to move over both short and long distances for work or other opportunities (Gordon, 2015). Especially for single women, work formed a challenge. In late medieval Flanders, for instance, women mostly worked in the textile industry, with low wages. Women were not allowed to entrepreneur, since the guilds banned them as independent workers (Stabel, 2015). In seventeenth and eighteenth French towns, single women still combined legal and illegal work in order to survive (Montenach, 2015). How single men lived until 1900 is hard to define. Single men often lived on the countryside, where opportunities made life attractive. Opportunities for women, on the other hand, were in the city, as a servant for instance, and therefore more visible in historic research (Schmidt et al., 2015). Despite the amount of singles, they were stigmatised by society because marriage was the norm (Schmidt et al., 2015). This is related to the standard life cycle of that time, in which youngsters get married and move out to start a family with their partner. Living alone was not part of this, as a result being unmarried and living alone did not fit in the expectation of society and the standard course of life.

**Housing**

In general, most single people lived with others until 1900 since lodging was a popular way of living in Europe at that time (Goldberg, 2015; Hussey & Ponsonby, 2015; Lindström, 2015). Lodging created the possibility to share living costs and facilities for the ones who were not wealthy enough to have their own place (Gordon, 2015). In late medieval England, for instance, unmarried men and women either lived on their own, shared a house with others or lived with their employer depending on their wealth and their relational status. In the Netherlands, poor women were housed in hofjes, whereas rich widows would continue to live in the family house (Goldberg, 2015). Furthermore, in Swedish towns in the 19th century, some neighbourhoods had a high amount of singles and in medieval England, singles often lived close to other singles (Goldberg, 2015; Lindström, 2015). This was probably related to the social network of singles, which mostly took place in the street and in alehouses (Goldberg, 2015). Also, they often dined out. As was found in fifteenth century Bruges, houses of singles often missed cooking and dining facilities. Dining out was not only convivial, it also created the possibility to meet others (Baatsen et al., 2015). Already in medieval cities, the proximity of facilities was important for singles since it created the possibility to meet others and therefore broaden their social network.

**Hofjes**

Hofjes have been a well known housing typology in Flanders and the Netherlands from late medieval times on. They appeared in the city for different reasons and existed in multiple forms but were well known for their communal housing of one and two person households (Wilms Floet, 2014). As for housing, a hofje
contained individual small houses oriented at the collective enclosed inner courtyard which was for everyone to use. It also contained communal facilities like a pump, bleaching areas and kitchen gardens (Bijlsma et al., 2006, p. 445). Regardless of the individuality of the houses, inhabitants of a hofje were part of an entity. This was not only created by the identical and symmetric architecture but also since hofjes were often meant for a specific group of people. This created a homogenous group of inhabitants in a certain phase of their lives which made it possible to take care of each other. Specific hofjes for elderly, single women, and even single men were created (Wilms Floet, 2014). Until the late sixteenth century, for instance, beguine hofjes were common, in which women, who devoted their life to god, lived in their own house (Overlaet, 2015).

From the fifteenth century on, hofjes were used for charity to house the poor and old. For example ‘Hof van Wouw’, which offered housing for unmarried and widowed women in the Hague (Hof van Wouw, 2015; Wilms Floet, 2014). These charity hofjes were established by the noble elite, city council and religious institutions, and consisted of small alms houses. The location within the city varied from prominent places well connected with the surrounding city to anonymous places creating quiet and private places (Bijlsma et al., 2006, p. 445; Wilms Floet, 2014). Many hofjes are still in use and are a popular way of living. They are often seen as a way to house elderly in the future, due to the communal living (Bolwij, 2015).

1900 - 1970

Social context

Until the late twentieth century, the traditional family was dominant in European society since marriage was still the norm. The dominance of the traditional family in the Netherlands is clearly shown in interior books, which still had the family and the needs of the different family members as a central theme up to the 1970s (Huisman, 2000). At the same time the group of solo dwellers slowly grew and both men and women moved to the bigger cities. This was not only for job opportunities as well as to escape from the surveilling eyes of the small-town community and their family. In New York this resulted in specific single neighbourhoods in the early twentieth century. Neighbourhoods like the Greenwich village, with their existing structure of facilities like pubs, were popular among young and single men who left their villages to seek a job in metropolitan areas like New York (Klinenberg, 2012a). In the Netherlands this migration to the city did not result in specific neighbourhoods or housing typologies. Both single men and women used to live with their family. When they left their family home to work in another city, they moved in with relatives or started living in a rooming house, a men or women home, a guesthouse or rented a room from a landlady or landlord. Having your own place was difficult since housing corporations in the Netherlands did not allow unmarried men and women in the
twentieth century to rent a house (Klinenberg, 2012a; Oorthuys & Muller, 2014). The standard life cycle was still common and as a result many social workers and sociologist commented the trend of living solo. They predicted it would make men selfish and women would become lonely, hysterical and depressed (Klinenberg, 2012a). Despite these anxieties for solo dwelling, the amount of one person households grew and people started their own initiatives for better housing.

Housing typologies
The dominance of the traditional family and the needs of small families, divorced couples, elderly and solo dwellers was in the 1920s already recognised (Huisman, 2000). In the United States, and specifically in New York, developers started to convert single-family houses into one- or two-room apartments for solo dwellers from the 1920s on. These houses were very popular and quickly filled with both single men and women (Klinenberg, 2012a). In the Netherlands, the options for singles to live on their own were scarce, especially since after World War II mostly housing for families was built (Duin, 2015). Collective homes, like the ‘Gezellenhuis’ or ‘Amsterdamsch Tehuis voor Arbeiders’, both in Amsterdam, were mostly meant for men and contained small rooms without a kitchen and/or a private bathroom. In guesthouses, hofjes or when you lived with a landlady or landlord, often strict rules had to be followed resulting in a lack of individual or independent housing types (Klinenberg, 2012a; Oorthuys & Muller, 2014). The limited choice in housing resulted in private initiatives which developed residential complexes for a specific group of people, like ‘Het Nieuwe Huis’ in Amsterdam, which focussed on wealthy singles (Huisman, 2000). These projects were limited and took place on a small scale. In 1948 a study group of the BNA, association of Dutch architects, already suggested to not only concentrate on housing for the traditional family but to also create possibilities for other household types like solo dwellers (Groetelaers, Priemus, & Bonsang, 1980). It took until the 1970s before the Dutch government created policies that would stimulate development of housing for one person households. As a result, small apartments became popular among singles during the 1960s since it gave them an independent place to live without being overlooked by family, friends or their landlord (Klinenberg, 2012a).

Apartment hotel
At the beginning of the 20th century, corporative housing became popular in the Netherlands. By creating a community kitchen which provided meals and the presence of servants for household chores, the initiators believed women with and without a family would be able to work and study. It also offered its residents life in private apartments with the luxury and comfort of a hotel, similar to the rooming houses in the United States (Klinenberg, 2012a; Oorthuys & Muller, 2014). Between 1921 and 1932 ten so called ‘woonhotels’ or apartment houses were built in the Netherlands, mostly in the Hague. Apartment hotels contained, besides the individual apartments equipped with heating, a small kitchen and a bathroom, also a collective kitchen and washing facilities (Huisman, 2000). Boschzicht, built in between 1918 and 1920, was the first apartment house in the Netherlands and was popular among families of embassy and governmental employees based in the Hague (Oorthuys & Muller, 2014). The apartment house first mostly focused on housing families but later on formed the basis for ‘Het Nieuwe Huis’ in Amsterdam, a flat for solo dwellers. The
initiative was started in 1913 by Anna Kruys, who was done living in guesthouses and with landladies. The building finally opened in 1928 and contained 89 studios, 76 two-room apartments and 4 three-room apartments, which could be rented by unmarried men and women. The floorplans of this building are shown in image 2. The apartments had a small kitchen, heating and a bathroom except of the studios which shared a bathroom. The tenants could dine in the restaurant on the ground floor and the building even contained a library (Oorthuys & Muller, 2014). In the late 1920s, independent housing for singles was revolutionary and the apartments were filled quickly. ‘Het Nieuwe Huis’ is still in use today as an apartment complex for solo dwellers.

Image 2: Floorplans of the apartments in ‘Het Nieuwe Huis’ (Oorthuys & Muller, 2014, p. 70)

Image 3: Interior of a studio in the Westereindflat (Huisman, 2000, p. 34)

Development from 1970

Social context

From the 1970s on, the standard life cycle changed. Whereas before young adults moved out to get married and start their own family, at the end of the twentieth century it was common to live on your own for a while (Gadet, 1999; Hamsen, 2008). Students, for instance, moved into student houses instead of moving in with a landlady. Furthermore, the Dutch government started subsidizing housing for one and two person households (Huisman, 2000). In the 1970s, living alone was stimulated by the rise of emancipation and individualism. At the same time the growth of wealth through economic development and the social security by the welfare state, made living alone affordable (Hamsen, 2008; Klinenberg, 2012a). Solo dwellers, and especially women, benefited from the expansion of the service economy in the 1970s. By turning the domestic tasks of women into paid jobs, both jobs as well as possibilities to join the work force were created. Especially having a job was important, because by having a job you were able to support yourself, which improved your independence and ability to live on your own (Klinenberg, 2012a). Furthermore, relationships and marriage were often postponed or avoided and relationships were
broken up more easily (Gadet, 1999; Hamsen, 2008). The amount of divorces in Europe went up during the 1970s since the well-being of the self and individual needs became more important than the more traditional measures as income and status (Klinenberg, 2012a). As a result, people started to live more and longer alone. By the end of 1971, only 5 percent of the Dutch lived alone, in 2006 this was already 15 percent (Hamsen, 2008).

**Housing typologies**
The growing amount of solo dwellers and their specific housing needs, were recognised too late by the Dutch government. Only from 1970 on policies for small households emerged, whereas at the beginning of the twentieth century already, private initiatives for single housing developed housing types like ‘Het Nieuwe Huis’ in Amsterdam. In 1974 the state secretary of Volkshuisvesting, public housing, in the Netherlands introduced the nota ‘Huisvesting alleenstaanden en tweepersoonshuishoudens’, which had to create housing for singles and two person households. This nota resulted in the built of HAT-units, which were specifically for one and two person households (Dam, 1975). The HAT-nota made the development of housing for solo dwellers affordable by subsidy. With these HAT-units the problems were not solved while solo dwellers still faced a big housing shortage. Small houses were often demolished or sold and as a result there were less houses available (Groetelaers et al., 1980). Still in 1981, sixty to eighty percent of the registered people seeking for social housing were one or two person households (Stelder, 1981). Since small houses, containing 2 to 3 rooms, were popular among solo dwellers, also small houses other than the HAT-units were built (Eijkeren & Peters, 1979; Groetelaers et al., 1980). These houses were often meant for small families but turned out to be suitable for solo dwellers as well (Huisman, 2000).

**HAT-unit**
HAT-units were created by refurbishment of buildings, development in and outside the city centre as well as dividing apartments in smaller individual units (Stelder, 1981). Refurbishments often happened in monumental buildings whereas new developments often took place at empty plots. Like the project shown in image 4, 5 and 6, located at the Pannekoekstraat in Rotterdam, which formed a connection between two building blocks. The building contains 42 units in total of which 30 have a separate bedroom and 12 are studio apartments. On the ground floor two stores and some communal facilities, like a living room, were created (Stelder, 1981).

![Image 4: Location (Stelder, 1981, pp. 36 - 41)](image-url)
Current trends

Social context

Currently, the amount of solo dwellers grows further due to growing importance of the individual, longer life expectancy, the rising status of women, and the development of communication technologies and social media. This growth is a worldwide phenomenon which not only takes place in the western world but also in upcoming countries like India. In Sweden, already 48% of the households consists of one person and in its capital Stockholm even 60% of all houses are occupied by one person (Klinenberg, 2012a). In the future this growth will continue. In 2060, 44 percent of Dutch households will consist of one person whereas in 2011 this was only 36 percent (Centraal bureau voor de statistiek, 2011). At the moment “living alone is an individual choice that’s as valid as the choice to get married or live with a domestic-partner” according to Eric Klinenberg (Klinenberg, 2012a, p. 212). As a result, solo dwelling is not seen as a social failure anymore. Solo dwellers often live alone to invest time in professional and personal growth since relationship and jobs are fragile, which turned solo dwelling into an urban lifestyle and not a phase in between two relationships (Klinenberg, 2012a). Living alone is even celebrated in mainstream media with series like ‘Sex and the City’ and the sitcom ‘Bridget Jones’ (Schmidt et al., 2015). In contrast to what social scientist expected at the start of the twentieth century, the increase of living alone did not cause fragmentation or loneliness (Klinenberg, 2012b). Solo dwellers often live in the city and have helped to revitalize public spaces since “Singles and people who live alone are twice as likely to go to bars and dance clubs. They eat out in restaurants more often, are more likely to take art and music classes, [and] attend public events” (Klinenberg, 2012a, p. 64). Despite this positive view on solo dwelling, there still is the expectation of society to find a partner (Duin, 2015; Klinenberg, 2012a). This is not only reflected in the amount of advertisements for dating sites as well as shown in the organisation of the Dutch tax system. When living together, you are able to share the rent and at the same time you often get tax reduction benefits when you have a registered relationship (Duin, 2015). As a solo dweller you are not able to benefit from this, and this asks for the emancipation of solo dwelling as addressed by the ‘Single Issue Partij’.
Housing

In order to accommodate the growing amount of households, which is caused by the growing amount of solo dwellers, more houses are needed in the future (Centraal bureau voor de statistiek, 2011). Unfortunately, our current cities and metropolitan areas are not designed for solo dwellers and at the same time we fail to redesign them to meet the needs of solo dwellers (Klinenberg, 2012a). The housing market still is not based on the demands of people and developers continue to build single family homes (Duin, 2015). Furthermore, one person households have difficulties to find affordable housing since buying or renting a house on your own can be expensive and out of reach when you do not earn enough (Duin, 2015; Klinenberg, 2012a). At the same time, solo dwellers need compact housing in densely populated and walkable neighbourhoods close to a variety amenities, attractive public spaces, bars, restaurants and other places where there are possibilities to meet friends. Also a good connection of public transport is essential. These facilities are important for every type of resident, which makes housing in these places even more expensive and scarce, but are especially of importance for solo dwellers since they are more likely to visit social places (Huisman, 2000; Klinenberg, 2012a; Stelder, 1981). Since the city plays an important role in the daily life of solo dwellers, they are more likely to live in smaller apartments and share facilities with others if that means they can live in or at the edge of the city centre (Duin, 2015; Klinenberg, 2012a; Stelder, 1981). Developers in Amsterdam are developing these specific types of housing for singletons. These houses are small and affordable when you only have one salary to pay your mortgage or rent with and contain individual apartments and some shared facilities. Examples of these types of housing are the apartments in Villa Mokum and De studio by AM (Duin, 2015). On a global scale, the tiny house movement is growing. Tiny houses have a limited amount of square meters but still contain a kitchen, bathroom and an often combined sleep and living room. Tiny houses are already seen as a lifestyle in the United States and in the Netherlands this way of housing is slowly getting known (van der Wal & van der Wal, 2015). But like the initiatives at the beginning of the twentieth century, the developments happen on a small scale and it does not serve the demand yet.

Shared housing

Since affording your own place is expensive and thereby unreachable for many solo dwellers, sharing a house is seen as a good solution. Some of the social housing corporations even offer the possibility to rent a house with multiple bedrooms together with your friends (Kleef, 2015). Every tenant has its own room but shares the other facilities with their housemates (Rochdale, 2015). AM, an Amsterdam based developer, is even building apartments according to a ‘friends-concept’ in which two solo dwellers can live and both have their own lease. These houses contain two identical bedrooms and a shared kitchen, bathroom and spacious living room as is shown in image 7 (AM, 2015).

Image 7: Floorplan of the apartments according to the friends-concept of AM (AM, 2015)
Individual housing

For singletons who want their own individual apartment, developers also built small studio apartments, which are mostly located in Amsterdam. These housing types can have a temporary character, like the HeijmansOne, which can be placed on empty plots within the city to house one person households until the plot is developed (Duin, 2015). Other options are concepts like Home4One, which contain individual apartments in a prefab complex. As a result, the rent of the studios is affordable for solo dwellers (Home4One, 2015). ‘De Studio’ as well as ‘Villa Mokum’, of developer AM, can even be bought for 100,000 euro, which is affordable when having only one income (Duin, 2015). Although the apartments are independent, the buildings often contain shared facilities like washing machines, a gym or a café, like ‘De Studio’ has (AM, 2015).

Conclusion

Living alone could lead to different outcomes, from the growth of loneliness to a growth of social life. At the moment this is difficult to predict as was shown by the invalid statement of social scientists at the beginning of the twentieth century that solo dwelling would be harmful. Also, as stated by Eric Klinenberg, we are still in the experimental phase of a new way of living. What we do know is that living alone is becoming an urban lifestyle and that it is getting more permanent. Solo dwelling was long seen as something in between relationships and did not happen often since most youngsters only moved out of their family home when they got married. From the 1970s on, solo dwellers are getting more common and are becoming part of the variety of households in the Netherlands. This is stimulated by the positive image the media shows of singles and forced by the growing amount of one person households. At the same time, solo dwellers are still disadvantaged, while they pay more taxes and have troubles finding a home. This is mostly caused by the lack of suitable housing for one person households. The importance of housing designed for solo dwellers has not been noticed by developers yet, and this still influences the living environments. The ‘Hofjes’, which were created from the middle ages on, focussed on the poor and widowed part of society and did not create a solution for all solo dwellers. As a result, lodging or living with a landlord or a landlady has long been the only option for solo dwellers. At the beginning of the twentieth century, small private initiatives created homes like ‘Amsterdamsch Tehuis voor Arbeiders’ and the apartment house ‘Het Nieuwe Huis’ in Amsterdam. Only in 1974, the Dutch government took responsibility and subsidised the built of HAT-units, which aimed to house both one and two person households. Still, the housing market is not based on the current demographics, social trends and household needs, despite the growing amount of one person households. Still, mostly single family houses are built and if housing for solo dwellers is built it is often located in Amsterdam. In order to create more living possibilities for solo dwellers, which are spread over the Netherlands, policies need to be made and designers need to rethink the
living environments of Dutch cities. By doing so, solo dwellers will no longer occupy homes which were not built for them.

Bibliography


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APPENDIX 2: SOLO DWELLERS IN ROTTERDAM

The amount of one person households per neighbourhood in Rotterdam, map based on information from Gemeente Rotterdam (2015) and CBS (2015)
The percentage of people with the red lifestyle in Rotterdam per neighbourhood, map based on information from Gemeente Rotterdam (2015) and CBS (2015)