



Healthy Aging

**design as a tool supporting prevention of
modern diseases among middle-aged people**

Research Plan

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Topic

Introduction

The Experience of Movement

The experience of movement in architecture can play an important role in how we understand the world, find our place in it and maintain our health and well-being. As Peter Blundell Jones in *Architecture and Movement* describes: *Our walking feet register the changing textures of the ground, and covering it step by step informs us of the effort and distance, as well as employing our senses of smell, sight and hearing in the manner for which they evolved. (...) We encounter along the way the plants and animals and other people with whom we share our world.*¹ At the same time movement is tied to physical activity, which is defined as bodily movement produced by skeletal muscles, that requires energy expenditure². Not only it helps us burn calories, but also, as research from fields of medicine and architecture shows, it contributes to a sense of vitality and enhances the quality of life, as we age.³ By connecting these factors, buildings can create the environment that is composed of spaces, that provoke users to move in order to improve walking experience and hence contribute to health. However, the movement of the user and his activity is rarely a priority or even a secondary concern, when designing the environment and its potential is often not utilized.

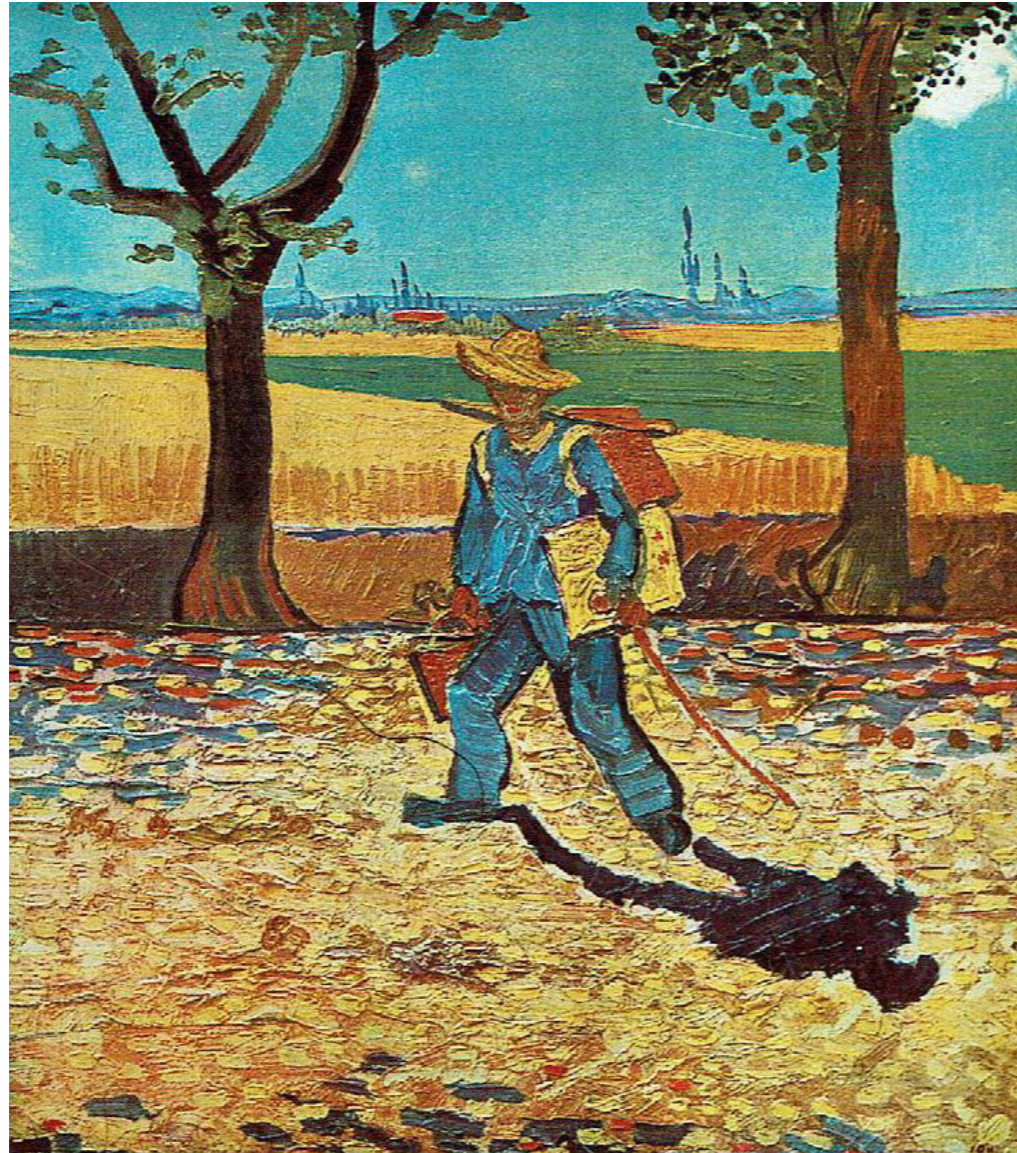


Fig. 1 Vincent van Gogh, 1888,
oil on canvas, *Painter on the
Road to Tarascon*

¹ Peter Blundell Jones, "From foot to vehicle" in *Architecture and Movement: the Dynamic Experience of Buildings and Landscapes*, ed. Peter Blundell Jones, Mark Meagher, (London: Routledge, 2014), p.28

² "Physical Activity", World Health Organization, Accessed March 25, 2021: https://www.who.int/health-topics/physical-activity#tab=tab_1

³ Daniel Lieberman, *The Story of the Human Body, Evolution, Health and Disease* (London: Penguin Group, 2013), p.29

Obesity and Chronic Diseases

During the last 30 years the life expectancy in the Netherlands has increased from 77 years in 1990 to 81,6 years in 2014.⁴ Unfortunately, even though people live longer than ever, it does not equal longer than ever healthy life and the quality of the extended lifetime often leaves much to desire. In the same time span the number of healthy years Dutch people live has decreased from 50 to 43,82.⁵ On average, a Dutch citizen nowadays lives with a chronic disease for almost 38 years and in 2016 chronic diseases were the leading cause of death in the Netherlands.⁶ The situation is only bound to get worse, as according to the *Primos-prognose* by ABF Report from 2020, the population above 75 years in Netherlands is predicted to double by 2050.⁷ This means, that in the future, the declining number of workforce and the rising costs of healthcare will cause an undesirable situation from both, the human and economic perspectives. Currently the world is facing the epidemic of obesity, which is proved to be strongly related to the development of chronic diseases.⁸ People with obesity are five and half times more likely to suffer from type 2 diabetes than people, who are not overweight and three times more likely to suffer from arthrosis and cardiovascular disease.⁹ Physical inactivity along with smoking and poor diet are among the leading causes.

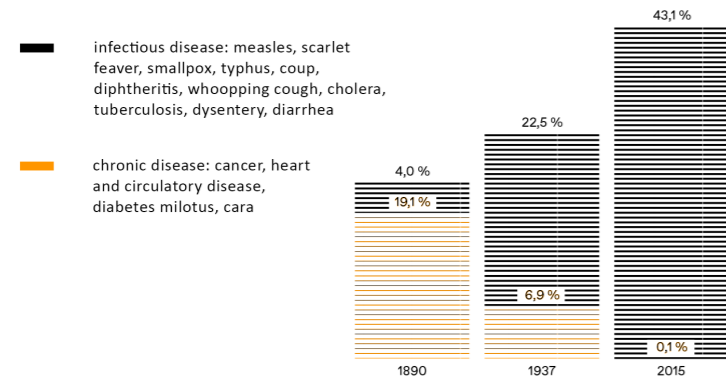


Fig.2
Comparison of morbidity rate to infectious and chronic diseases in Amsterdam in last 30 years

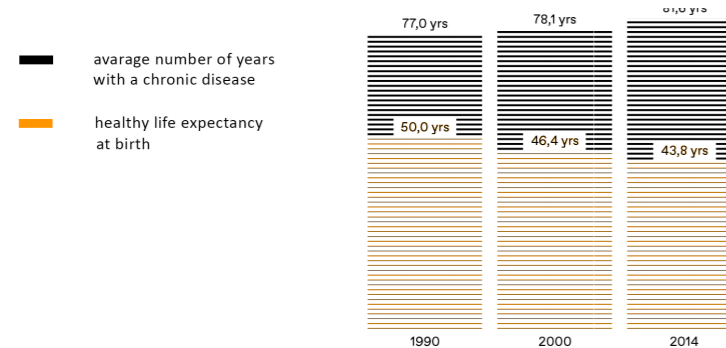


Fig.3
Change in life expectancy and healthy life expectancy in Netherlands over the last 30 years

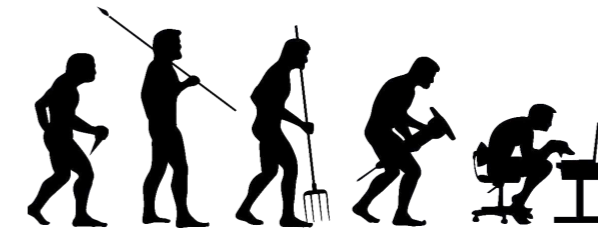


Fig. 4 Evolution of Human Working Posture

Evolution of a Lifestyle

As we look into presented diagrams, we can notice, that situation worsened significantly in the last 30 years.¹⁰ In fact, the research shows, that the further we go into the past, the smaller percentage of people suffered from chronic diseases and some were very rare hundreds of generations ago. One of the explanations of this development comes from the field of evolutionary medicine, which finds the origins of the problem in Stone Age. According to the mismatch theory from the field, the human's body features were adaptive in the environments for which we evolved, but have become maladaptive in the modern environments, that we have now created; thus, humans fall sick to previously rare illnesses.¹¹ As hunters and gatherers, we had to move in a variety of ways and at different intensities on a daily basis. Even after farming had been invented, most people would move many hours a day working, squatting, carrying and lifting. According to Lieberman in *The Story of the Human Body, Evolution, Health and Disease*, for the last few hundred generations two cultural transformations have been of vital importance to the human body: the agricultural revolution and the industrial revolution.¹² The latter marked the point in time, when machines began to replace human work. Scientific inventions started to have effects on the life of an average person and progressing mechanization in many areas of life would increase level of inactivity.¹³ People were no longer required to possess a wide range of skills requiring diverse actions in their jobs, but every worker specialized in doing just few things, using small energy expenditure. Reorganization of economies and social institutions caused need for more professions like bankers, lawyers, secretaries, accountants.¹⁴ Appearance of cars and their higher availability with time stopped walking from being principal means of getting around for purposes of daily life. Better sanitation, better work conditions caused fewer people contracting infectious diseases and suffer from insufficient food.¹⁵ Lieberman states that the industrial era was a point in history that caused a trade-off between lower mortality and an extension of morbidity.¹⁶

¹⁰ Auguste can Oppen, Evert Klinkenberg, Eldrich Pique, *Active Design for Buildings*, (Amsterdam: Pantheon Drukkers, 2016), p.15

¹¹ Daniel Lieberman, *The Story of the Human Body, Evolution, Health and Disease* (London: Penguin Group, 2013), p.29

¹² Ibidem, p.33

¹³ Ibidem, p.262

¹⁴ Ibidem, p.264

¹⁵ Ibidem, p.296

¹⁶ Ibidem, p.296

⁴ Auguste can Oppen, Evert Klinkenberg, Eldrich Pique, *Active Design for Buildings* (Amsterdam: Pantheon Drukkers, 2016), p. 14

⁵ Ibidem, p.15

⁶ Ibidem, p.14

⁷ *Primos-prognose*, ABF Research, Accessed March 17, 2021: <https://primos.abfresearch.nl/dashboard/dashboard/>

⁸ Auguste can Oppen, Evert Klinkenberg, Eldrich Pique, *Active Design for Buildings*, (Amsterdam: Pantheon Drukkers, 2016), p. 17

⁹ Ibidem, p. 17

Many of the trends set by the industrial revolution continues until this day. After the World War II, gigantic industrial corporations have taken over business of making and producing calorie-dense food as cheaply and efficiently as possible.¹⁷ Many inventions that appear today aim to reduce the amount of energy we expend to exist. Inventions of computer, phones and internet and their availability moved a large chunk of our lives to the digital space, where we work or meet people. The year of the coronavirus outbreak elevated to new levels the sedentary lifestyle. Currently people are consuming more calories than ever, while being less active than ever.

Lieberman predicts that future advancements in medical science will continue to improve our ability to treat the symptoms of mismatch diseases, but will not devise many cures.¹⁸ He concludes that the only remaining option to deal with the problem is to change people's environment in ways that promote health through prevention.¹⁹ While architecture may not have too much influence on how much you eat, it can influence your activity.

The Past Contributions of Architecture to Public Health

History shows, that architects can play a leading role in the health improvement of the population. In the nineteenth and early twentieth century many cities possessed unhealthy conditions related to the lack of ventilation and poor means of circulation. Architects and urban reformers helped defeat infectious diseases like cholera and tuberculosis by improving design of buildings, streets, neighbourhoods, clean water systems, and parks.²⁰ New York City improved environmental problems like overcrowding and sanitation by creating Department of Street-Sweeping, and introducing new policies like the Tenement House Act and the first Zoning Ordinance Space.²¹ In the early twentieth century, reforming socialist organizations such as the Garden City movement in England or the Life Reform movement in Germany introduced healthier housing to their strategies.²² The modernist movement coincided with research and treatment of tuberculosis. *This was a cultural movement that in architecture and applied design involved the integration of form with social purpose. It also attempted to create a new classless and hygienic lifestyle with socialist values.*²³ Rejecting the old layouts of cramped, dim tenement buildings, where many city-dwellers lived, new dwellings and sanatoriums of modernism embraced the idea of fresh air, sunshine and greenery.

¹⁷ Auguste can Oppen, Evert Klinkenberg, Eldrich Pique, *Active Design for Buildings*, (Amsterdam: Pantheon Drukkers, 2016), p. 17, p.268

¹⁸ Ibidem, p.433

¹⁹ Ibidem, p.434

²⁰ Irene Cheng, ed., *Active Design Guidelines: Promoting Physical Activity and Health in Design* (New York: Centre for Active Design, 2010), p. 13

²¹ Ibidem, p.13

²² Margaret Campbell, "What Tuberculosis did for Modernism: The Influence of a Curative Environment on Modernist Design and Architecture", *An International Journal for the History of Medicine and Related Sciences*, no. 49(4) (October 2005): 463

²³ Ibidem, p.463

Active Design Strategies

In the last decades architecture focused on developing efficient circulation patterns to enhance productivity, comfort, efficiency, and entertainment supported by passive technologies. The result of that rationalized and mechanized thinking is a sedentary environment and less caloric consumption. The potential rich experience of movement and walking in the built environment is often of secondary concern. Reacting to the negative trends of increasing obesity and inspired by the historic precedents of built environment strategies contributing to general health improvement is the Active Design movement. The name emerged out the *Active Design Guidelines*, which was a manual originally published by the City of New York in 2010 in order to guide the creation of health-promoting buildings, streets, and urban spaces, based on the latest academic research and best practices in the field.²⁴ The Center for Active Design was established out of these origins. Definition of Active design by Centre of Active Design presents it as *evidence-based design, development, and operational strategies to support healthy communities.*²⁵

Various active strategies have been developed around the world with the same goal and it also has become a part of *The Active City (De Bewegende Stad)* programme by the City of Amsterdam.²⁶ The strategy aims to make Amsterdam a city that is a *continually creating and improving opportunities in the built and social environments and expanding community resources to enable those who live and work in Amsterdam, as well as visitors to the city to be physically active in day-to-day life.*²⁷ The strategy introduces elements that influence the physical activity of its residents on all levels of urban planning: the presence of green space and street patterns in neighbourhoods, width of pavements wide enough for children to play, presence of benches at regular intervals to enable elderly to take brief stroll.²⁸ It also offers clues for architects on how to incorporate activity into to the building environment of housing, schools and office buildings.

²⁴ "What is Active Design?", Center for Active Design, accessed March 20, 2021, <https://centerforactivedesign.org/WhatIsActiveDesign/>

²⁵ Ibidem

²⁶ Auguste can Oppen, Evert Klinkenberg, Eldrich Pique, *Active Design for Buildings* (Amsterdam: Pantheon Drukkers, 2016), p. 7

²⁷ Ibidem, p.7

²⁸ Ibidem, p.8

Prevention among the Middle-Aged People

Implementing changes into the environment, where we spend most of our time: dwellings – changes, that provoke physical activity and healthy living among residents, can contribute to prevention of chronic diseases in the older age. Age 45-60 is a middle-aged phase, when many of the health issues manifest and implementing particular dwelling solutions for this target group could minimize health problems they face in later life. At this transitional phase of life metabolic issues exacerbated by the sedentary lifestyle often appear: the body may slow down, the person may become more sensitive to diet, substance abuse, stress.²⁹ Many middle-aged people at this point of life become empty nesters, which may contribute to the feeling of loneliness. At the same time, they also often feel the need to make the world a better place and contribute to the next generation³⁰, but may also feel useless if there is no opportunity for that. The question of how design can help to ameliorate the quality of their life until the old age and encourage healthy choices, eliminate some of the negative aspects characteristic for that age and capitalize on the will of improving the world is an interesting one to explore and may bring valuable results for the field.

The architecture and urban design can support the prevention of obesity and chronic diseases in older age through active design strategies shaping our daily environment in a way, that the lifestyle adapted by its users, provides them with multiple possibilities of activity and a rich experience of movement.

In particular, architects can help the middle-aged to get through their transition time while maximizing the positive characteristics of their age and help them reach elderly age as healthy physically and mentally as possible. In my research I would like to explore how this can be achieved through active design strategies.

²⁹ "Middle Age", Wikipedia, Accessed April 1, 2021, https://en.wikipedia.org/wiki/Middle_age#cite_note-auto1-9

³⁰ Ibidem

Research question

Main Research Question

Which spatial characteristics of a dwelling can improve the physical and psychological health of middle-aged inhabitants?

Subquestions

- Which events of the past contributed to transformation of the lifestyle into sedentary?
- Which signs (types, elements, policies, models, etc) mark the evolution of health-conscious dwellings across the years?
- Which elements of modern environment, especially dwelling, contribute to a healthy or unhealthy lifestyle?
- What are opportunities to generate more movement and participation in a dwelling space?
- What is active design, who adapts it and what are strategies it incorporates to improve the health of the aging population?
- Who are middle aged people?
- What are movement habits in a typical dwelling of the group age 45-60?
- What forms, relationships, spatial and programmatic opportunities can create social and physical well-being of the target group?

Main Themes

healthy lifestyle
physical activity
active design
aging population
obesity and chronic diseases

Methodology

Structure

In order to successfully explore the topic of healthy aging, I have decided to divide my research into two parts. First part is based on a literature survey from fields of medicine, sociology, and political economy on the topics of evolution of health-conscious dwellings, the change in the lifestyle and the target group of middle-aged people. The second part will use case studies to find active strategies incorporated in housing projects, that are acknowledged in the field.

Literature Study

1. BODY AND A DISEASE

The research will focus on the literature from the area of medicine and environmental psychology in order to understand, how changes in economy and labour culture transformed the lifestyle into sedentary across the generations.

2. EVOLUTION OF HEALTH-CONSCIOUS DWELLINGS

In this part I aim to answer the following sub-research question:

Which signs (types, elements, policies, models, etc) mark the evolution of health-conscious dwellings across the years?

In order to achieve this, I will like to look into literature sources from the field of architecture as well as political economy and theory, in order to see, how policies introduced in the past affected the physicality of the city, public domain and especially the private domain and the dwelling scale.

3. MIDDLE AGED

The goal of this part of the research is to answer the following questions:

Who are middle aged people?

What are movement habits in a typical dwelling of the group age 45-60?

In this part of the research, with help of literature studies from the field of sociology, psychology and medicine I would like to explore, what are the physical and psychological changes that occur in the life of the middle-aged people, how they affect one's lifestyle and lead to chronic diseases and obesity. By studying the change in their lifestyle, interactions with others and daily movement patterns I hope to understand, how some elements of the dwelling design may have negative or positive effect on the level of their physical activity and psychological health.

Case Studies

The goal of the second part is to answer the following research sub-questions:

What are opportunities to generate more movement and participation in a dwelling space for the middle-aged?

What forms, relationships, spatial and programmatic opportunities can create social and health well-being of the target group?

Which elements of a dwelling design contribute to a healthy or unhealthy lifestyle?

What is active design, who adapts it and what are strategies it incorporates to improve the health of the aging population?

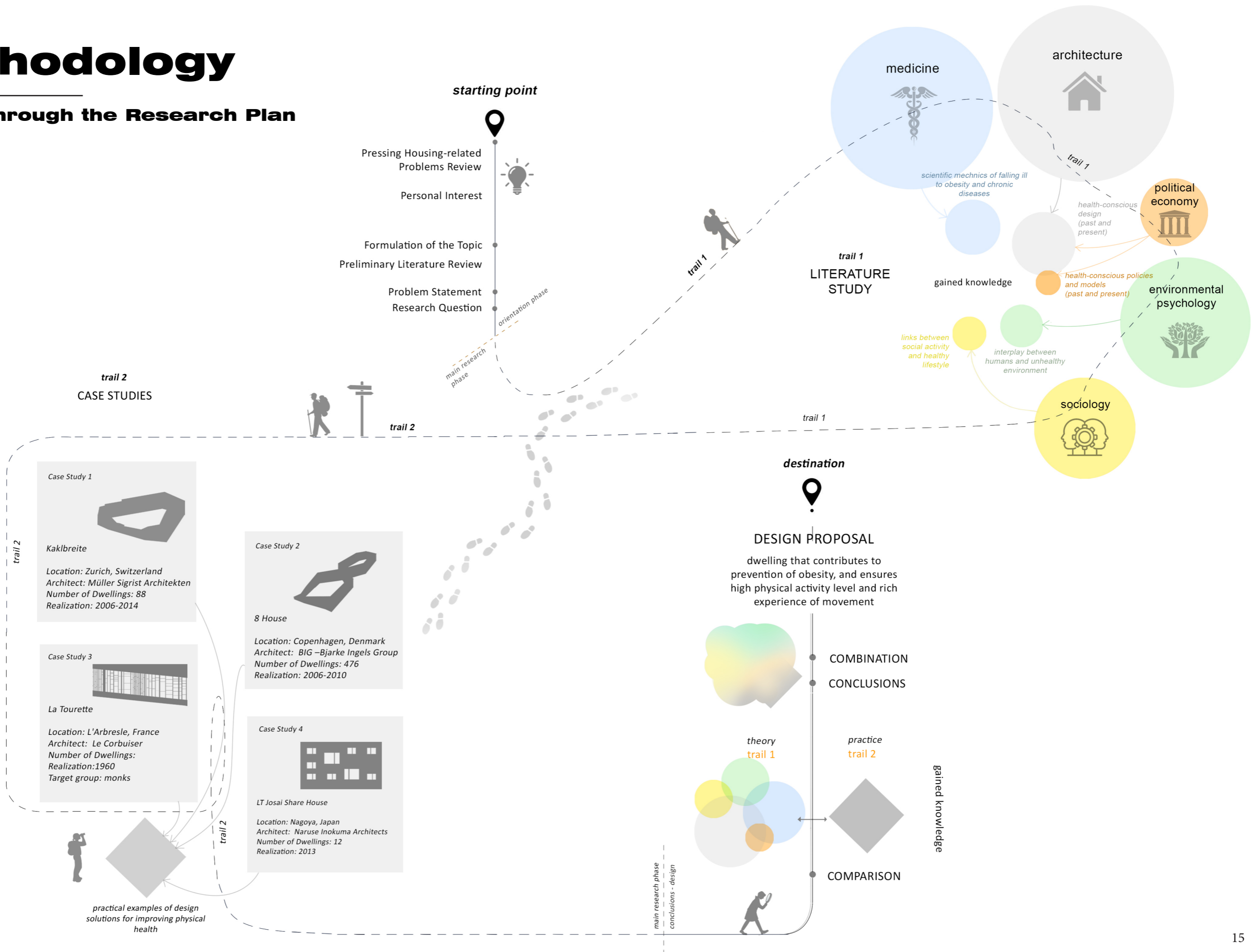
To achieve my goal, I will use the case study analysis accompanied by literature research from the field of architecture and urban design on strategies used to enhance physical activity and psychological health, focusing in particular the Active Design strategy and the Healthy City ideas. I believe, exploring how the chosen projects relate to official guidelines recommended by specialists in the discipline for the architecture design in large and small scale, especially in residential buildings, will be valuable source of knowledge for this research and future design.

JUSTIFICATION OF THE CHOICE OF PROJECTS

In order to find out, how dwelling design can incorporate active design elements and positively affect inhabitants' health I choose to analyse four case studies. The case studies represent different forms of dwelling, where middle aged can live: a co-housing with only individual living (LT Share House), a co-housing with diverse groups: singles as well as families and couples (Kalkbreite), traditional (non-cohousing) housing for individuals as well as families and couples (8House), and individual living for monks in a monastery (La Tourette). All four case studies incorporate the idea of enhancing activity and psychological health. However, the difference in typology, user group and level of collectiveness affects the activity and movement patterns differently in each of these projects. This, I believe, will let me understand better, how the mechanics of encouraging interactions work and examine the conscious and subconscious decisions humans make with regards to physical activity. The case studies will be researched through analysis of project's documentation from the architects f.ex. plans, existing literature studies on the projects, online articles, visual ethnography.

Methodology

A Walk through the Research Plan



Relevance

It is during my lifetime, that the sedentary lifestyle has reached such an intense level and as a young architect I can observe recent effects of the pandemic on physical activity. I believe, it is one of the most important tasks of my generation to help older people stay healthy. Healthy elderlies can give indispensable wisdom and contribute hugely to the future society and economy. The following research topic will help me gain knowledge for this mission.

Ageing population is perhaps one of the most pressing topics of our time. Even though the life expectancy is higher than ever, the quality of the extended lifetime leaves a lot to desire. In the next decades a big pressure to treat the epidemic of chronic diseases will lie on the healthcare. It is important to reduce this pressure through actions on many fields including architecture by focusing on the prevention of the unhealthy lifestyle, rather than fixing its effects. As history has shown, environmental design can play a crucial role in improving public health. Like in the past, nowadays designers have means to play essential role in addressing the rapidly growing epidemics of obesity and related chronic diseases, especially in light of mounting scientific evidence demonstrating the impact of environmental design on physical activity and healthy aging. In the last decades we observed the rise of architecture, that values comfort, efficiency, and entertainment supported by passive technologies. Optimization of the space, that contributed to decreased human energy expenditure, is often seen as progress. The problem of larger population with diseases is dealt by adjusting dwellings to the reality of living with physical limitations and less thought is put into preventing or delaying those. Many architects are not aware of the urgency of the problem and the important role they can play by incorporating active approaches in their work. I believe, that this research can contribute to rising the awareness among architects of importance of activity-oriented spaces, walkability of the space, experience of space and breaking habits.



Fig. 6
Marina Grechanik, 2017, pencil sketch,
Old People Square in Ra'anana -
benches filled with aged people and
their nursemaids

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Image Sources

Fig.1 *Footprint Ground Texture*, Deviantart.com, acc. May 24, 2021: <https://www.deviantart.com/enframed/art/Footprints-ground-texture-19248715>

Fig.2 Van Gogh, Vincent. 1888, oil on canvas, *Painter on the Road to Tarascon*, wikipedia.com, acc. May 20, 2021: https://en.wikipedia.org/wiki/Vincent_van_Gogh

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Fig.4 Van Oppen, Auguste., Klinkenberg, Evert., Pique, Eldrich. 2016, *Healthy Life Expectancy in The Netherlands*, "Active Design for Buildings"

Fig.5 *Evolution of Human Work Silhouettes*, careforthebody.wordpress.com, acc. May 23, 2021: <https://careforthebody.wordpress.com/tag/sedentary-lifestyle/>

Fig. 6 Grechanik, Marina. 2017, pencil sketch, *Old People Square in Ra'anana - benches filled with aged people and their nursemaids*, marinagrechanik.blogspot.com, acc. March 20, 2021: <http://marinagrechanik.blogspot.com/2017/03/>