

Exploring meaningful user experience in the domain of mobility
Navigating meaningful experiences with the 13 fundamental psychological needs

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Publication date

2021

Document Version

Final published version

Citation (APA)

Geiser, F., & Kim, E. Y. (2021). *Exploring meaningful user experience in the domain of mobility: Navigating meaningful experiences with the 13 fundamental psychological needs*. Delft University of Technology, Faculteit Industrieel Ontwerpen.

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Exploring meaningful user experience in the domain of mobility

Navigating meaningful experiences with the
13 fundamental psychological needs

Introduction

What is meaningful mobility? Understanding meaning and what is meaningful for yourself or other people is no easy feat. Yet as designers, we all hope that our creations will be meaningful for people, society at large and the planet. In this document we present an approach that can help you to get a better grasp of meaning in the domain of mobility: the mobility edition of the 13 fundamental psychological needs typology developed by Desmet and Fokkinga (2020).

Needs and meaning

Fundamental needs are defined as the universal needs shared by all humans, across cultures and demographics. They are the basic drivers in our lives as fulfilling them directly contributes to our psychological and physical wellbeing and quality of life. Because of their relevance to our wellbeing, events and activities that help fulfil our needs are meaningful to us (Desmet & Fokkinga, 2020).

“If you take a moment to reflect on the activities that you find personally most enjoyable and meaningful, you will probably find these activities fulfil at least one of your basic needs - most probably multiple needs”

(Desmet & Fokkinga, 2020)

Needs and our daily lives

The fundamental needs shape our behaviours and motivations as we move through life (Tay & Diener, 2011). Yet, most of us don't consciously feel the drive to fulfil a specific fundamental need. In other words, one does not wake up in the morning thinking: “I have to fulfil my need for stimulation.”

Instead, we operationalize the fundamental needs in our daily lives in a multitude of sub-needs. These sub-needs take shape as goals and desires which are specific to an individual and/or a situation (Desmet, 2021).

For example, the fundamental need for “Stimulation” might manifest itself for a two-year-old as the sub-need “Exploration” and elicit a desire to let go of their parents' hand and to follow their curiosity. Whereas for a young adult, the same sub-need might lead them to plan a trip to an exotic destination. Everyone fulfils their sub-needs in different ways, but all these activities are meaningful as they help us to fulfil our fundamental needs.

Applying the theory

The fundamental needs and sub-needs can be used in many ways. You might want to apply the needs theory directly to a design you are working on, use the needs as factors in your Vision in Product design (ViP) process or as a start for a speculative design project. In any case, we believe it is most valuable if you engage with this theory by getting some hands-on experience yourself. Setting up your own exploration in form of an introspection of what meaningful mobility is to you is surprisingly easy.

Research Introspection

For this exercise we will focus on the *Researcher Introspection* approach (Wallendorf & Brucks, 1993). In this type of introspection, you step out of your role as a designer and introspect on your own experiences as a human being (Xue & Desmet, 2019). The data that we will work with in this process stems exclusively from your own memories, thoughts, emotions, and experiences (Wallendorf & Brucks, 1993).

A research introspection can be done in three different ways relating to the time frames that form the scope of the investigation: retrospective, concurrent and imaginary (Wallendorf & Brucks, 1993). This exercise will provide you with tips on how to carry out a *Retrospective Introspection* and *Concurrent Introspection* to investigate what aspects of mobility you experience as meaningful.

Retrospective Researcher Introspection

For the *Retrospective Introspection*, you can start by looking through your own picture collection. Take your time and pick out the pictures that you feel are related to the domain of mobility. The picture does not need to show a mean of transportation and it does not need to be a great picture either, it is about what the picture represents for you (ACT in actie, 2014). It can be a selfie on a night out with friends, as long as there is some form of mobility involved. Consider each picture separately and put down some notes (Figure 1 shows an example). You can ask yourself “what makes this moment meaningful to me?” or simply reflect on the moment captured in the picture.

A *Retrospective Introspection* is an easy and quick way to learn about meaningful experiences, but it also holds some important limitations you should be aware of. The first limitation is that the data tends to be biased towards exceptional events and particularly salient experiences (Wallendorf & Brucks, 1993). As we tend to only take pictures of special events, your data might lack ordinary, but potentially meaningful, aspects of your life. Another important limitation is that memory degrades over time (Wallendorf & Brucks, 1993). This means that when doing a *Retrospective Introspection*, it should not be your aim to accurately understand past experiences. But it can be a great tool to understand what makes experiences, facilitated by design, memorable and how these experiences and their emotional residue influence your experiences in the present (Xue & Desmet, 2019).

Concurrent Researcher Introspection

Given the limitations of a *Retrospective Introspection*, you may consider investing some more time and doing a *Concurrent Introspection* (Xue & Desmet, 2019). For this type of introspection, instead of going through your picture folders, observe and document events in your daily life as they unfold. Over a certain time period, let's say a week, take pictures of your activities. Take as many pictures as you like and make sure to include ordinary aspects of life that might seem ordinary such as doing groceries or going to work. At the end of each day, pick between one and five pictures that seem most interesting (make sure to not disregard pictures of ordinary events).



Figure 1: Example of the outcome of an introspection combining the Retrospective and Concurrent approach. For more tips and tricks, have a look at the example on the [“mobility X needs” miro board](#).

Identifying sub-needs

When you have a collection of pictures and notes, try to relate your insights from the introspection to the 13 fundamental needs (see Figure 2). Carefully read the description of each fundamental need and look over your pictures and notes. Ask yourself “what need(s) are associated with this moment?” or “What need(s) is/are being fulfilled or violated in this situation?”

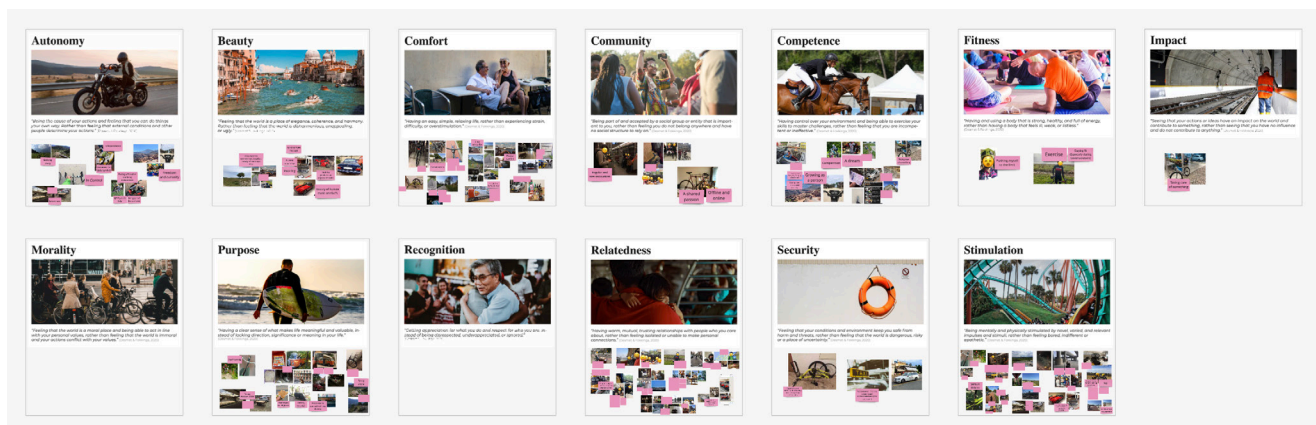


Figure 2: Pictures and notes from the introspection mapped onto the 13 fundamental needs.

Compare your pictures and notes to the sub-needs of each fundamental need presented in this overview (see Figure 3). Does it fit with one of the sub-needs presented, or can you identify a new sub-need from your insights? If you feel like you have come across a new sub-need, pick a title and picture that best represents it and write a short description.

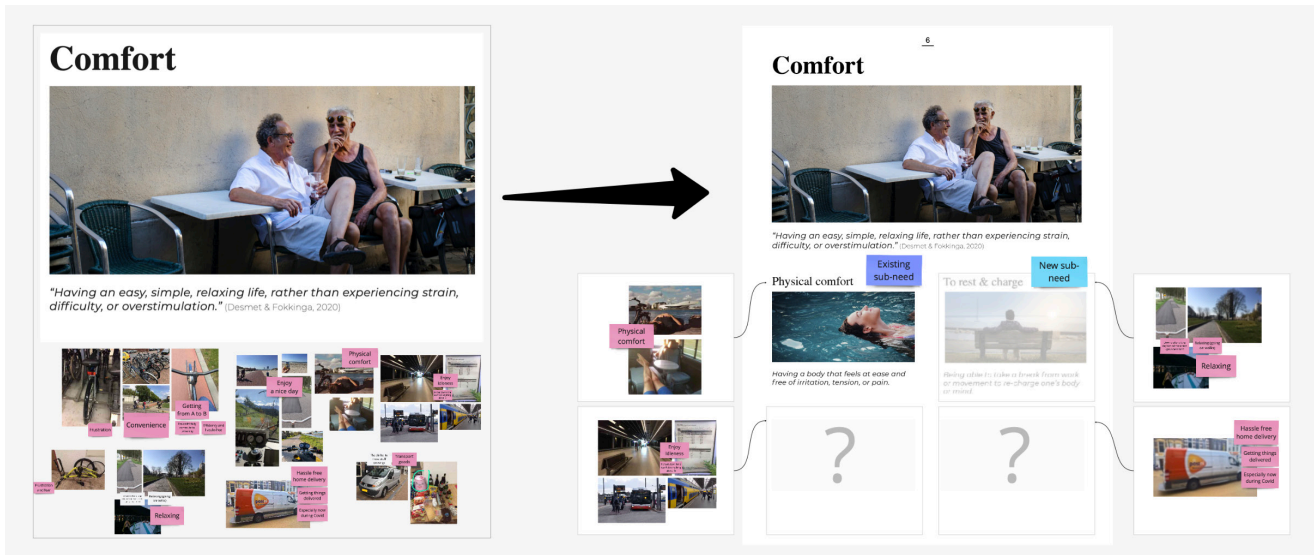


Figure 3: Identifying sub-needs from the introspection insights.

For more information have a look at the “core literature” section in the [“mobility X needs” miro board](#). Using this document as a print-out? The QR-Code on the right will take you to the miro board.



Instructions for Teamwork

If you are working in a team, we advise each team member to go through the introspection process separately (from selecting the pictures to putting down notes) at least one time before sharing your thoughts with your teammates. Remember, as the researcher carrying out this introspection, you are the expert of the experiences that make up the data. When you discuss your insights with the group, try to respect each other’s interpretations, but don’t be afraid to ask critical questions that allow you to dig deeper together. Once everyone’s insights have been discussed, you can continue with the process towards identifying sub-needs together. It is important that you leave room for different interpretations instead of opposing them. Creatively embracing each other’s perspectives will ultimately contribute to a better understanding of meaningful user experiences in the domain of mobility.

As you gain experience with process, feel free to experiment and see what works best for you and your team. For example, let’s say you want to design a mobility experience for a group of friends on a night out. Then you might want to carry out a concurrent introspection by going out together, documenting your experiences and ultimately going through the entire process together.

Needs and design

Once you have concluded your introspection and related your insights to the theory of needs, it is time to think about designing. Research at the faculty of Industrial Design Engineering of TU Delft shows that the theory of the 13 fundamental psychological needs can contribute to a diverse set of design projects in the domain of mobility (Van der Gulk, 2021; Goettsch, 2021). We hope this toolkit inspires you to create meaningful designs that help people fulfil their fundamental psychological needs and contribute to wellbeing and happiness. Remember that this typology was created as a tool to explore and understand human experience and the creation of meaning. Any design in the domain of mobility involves different stakeholders and holds potential benefits, unintended consequences, and externalities for a variety of entities and systems. We therefore invite designers who use this typology to look beyond the needs of human individuals and to invite alternative perspectives into the design process.

To help you get a grasp of what all this could look like in practice, we present two design case studies in the domain of mobility. To our knowledge, these designs were not created with the approach presented in this document in mind. But looking at them from the perspective of the fundamental needs theory will provide you with some concrete examples of how needs are reflected in designed artefacts and why people (considering only end users in this case) might consider them meaningful. For more examples, have a look at the poster “Thirteen bikes, for thirteen fundamental needs” in the Appendix. Additional tools, resources and explanations on the fundamental needs theory can be found on the website of the [Delft Institute of Positive Design](#).

Case study 1: BlaBlaCar

BlaBlaCar is an online platform that connects people travelling by car and people looking for a ride. On the platform, drivers planning a trip can share their itinerary and offer a paid seat in their vehicle. Passengers interested to join contact the driver and book a ride. They travel together and the passengers contribute to the travel costs by paying the driver, offsetting parts of their travel costs. By sharing a ride, users save money while contributing to transport efficiency and reducing environmental impact of driving.

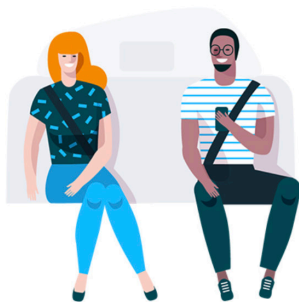
Another core aspect of the concept is the social side of carpooling, implied already by the name BlaBlaCar. In 2018, the company conducted a study on the social impacts of carpooling collecting responses from almost 5000 users. The results showed that 80% of BlaBlaCar members carpool to see their family and friends and 60% declared that they see their loved ones more often thanks to the platform. According to the study, people have meaningful conversations during the ride with 87% recognizing that they had enriching exchanges while carpooling and 47% declaring

that carpooling has made them more open to other cultures and opinions (Dell’Era et al., 2018; BlaBlaCar, 2018).

The survey suggests that the meaning of BlaBlaCar is likely more than just the cost saving and positive environmental impact of carpooling which relate to the fulfilment of the need for **Competence** (being able to master challenges) and **Morality** (being able to act in line with your moral values). For many users, the meaning of BlaBlaCar appears to be strongly tied to the fulfilment of the need for **Relatedness** (fostering good relationships), and **Stimulation** (being stimulated by novel experiences)

But it is not just the overall concept that supports to the fulfilment of fundamental needs. When booking a ride on the platform, users get to see each other’s profiles, reviews and have the possibility to talk to each other before deciding to ride together. These design characteristics of the platform help to build a basic level of trust which contributes to the satisfaction of the need for **Security** (feeling safe from harm and threats).

Meaningful conversations



- 84% | Gain knowledge on a topic
- 76% | Feel useful by listening or exchanging
- 69% | Talk about personal topics or themselves
- 61% | Receive good life advice
- 56% | Get perspective on their situation
- 51% | Change their mind on a topic
- 21% | Reveal things about themselves that they have never talked about!

Figure 2: Illustration showing some of the results of the study on the social impacts of carpooling (BlaBlaCar, 2018) with a clear nod towards the fundamental needs Relatedness and Stimulation.

Case study 2: Copenhagen Wheel

The Copenhagen Wheel is an e-bike conversion kit that transforms an ordinary bicycle into a hybrid e-bike. It was designed by the MIT Senseable City Lab for the City of Copenhagen and consists of a bicycle wheel, including the electric drivetrain and a sensing unit, and a smartphone app. The assistance from the electrified wheel can be controlled via the app and the system is able to recapture energy similar to a KERS (Kinetic Energy Recovers System) system.

Besides boosting your ride with electric assistance, the Copenhagen Wheel collects data on the physical effort made by the user and the surroundings, such as road conditions, pollution levels and traffic. This data is accessible to the user via the app and can be used to plan healthier rides, achieve exercise goals or to meet with friends on the go. The user can also decide to share the data with friends to the city contributing to a database of environmental information (Dell’Era et al., 2018; Senseable City Laboratory, 2009).

As a wheel that turns your ordinary bicycle into an e-bike, the Copenhagen Wheel supports you by delivering some extra power during your bike commute.

This can support you in fulfilling your fundamental need for **Competence** (being able to master challenges) by augmenting your physical abilities, **Autonomy** (being able to do things your own way) by enhancing your mobility freedom, and **Comfort** (having relaxing moments) by keeping you relaxed during your ride.

By making it possible to plan healthier rides, achieve exercise goals and meet friends, the design can help fulfil the need for **Relatedness** (fostering good relationships) and **Fitness** (having a healthy body).

The part of the solution that allows you to share environmental data with the city and friends, creates an opportunity for improving the quality of life for the people close to you and to participate in the maintenance and improvement of public spaces. This relates to the fundamental need for **Impact** (feeling that you contribute), and **Morality** (being able to act in line with your moral values).

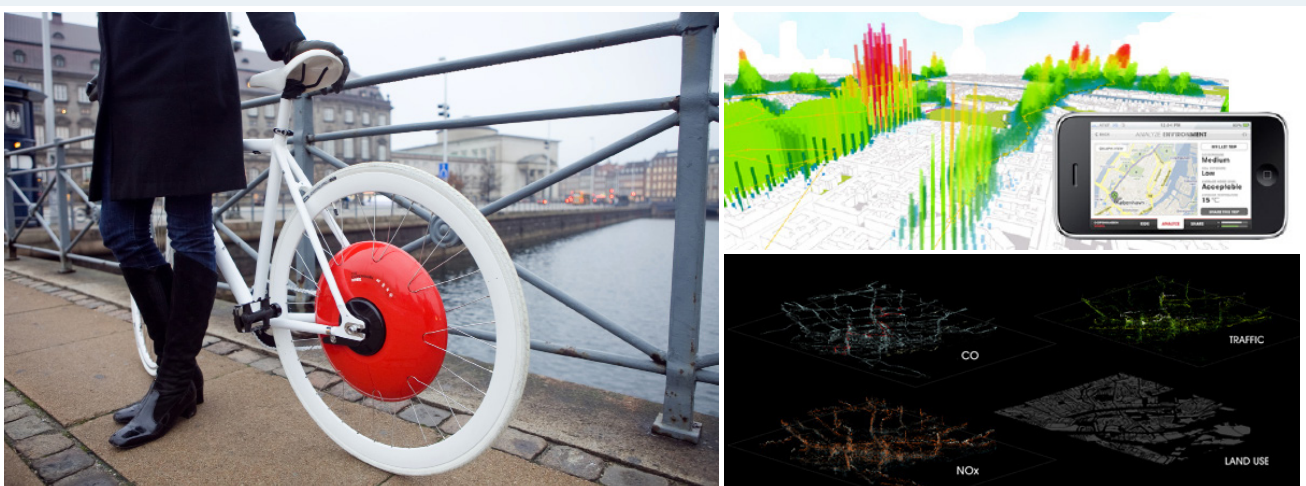


Figure 2: Pictures illustrating the Copenhagen Wheel and some of the maps that can be created from the data it collects.

A project by the MIT Senseable City Lab senseable.mit.edu/copenhagenwheel/
Photo (left) by Max Tomasinelli www.maxtomasinelli.com

The fundamental needs

The following pages contain an overview of the 13 fundamental psychological needs taken over from the original typology by Desmet, P.M.A. & Fokkinga, S.F. (2020) and adjusted for the mobility domain. **This document is a preliminary version.** For now, the overview contains only a few sub-needs for each fundamental need. This leaves space for your own exploration!

Autonomy



“Being the cause of your actions and feeling that you can do things your own way. Rather than feeling that external conditions and other people determine your actions.” (Desmet & Fokkinga, 2020).

To take opportunities



Feeling ready to take on opportunities and act spontaneously.

Control



Having control over your actions and decisions.

Self-sufficient



Being able to support yourself instead of relying on others for help.

Freedom of movement



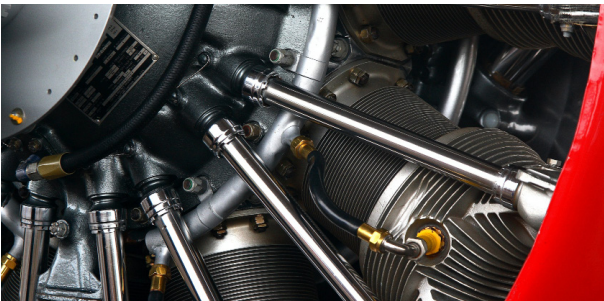
Having the ability to visit places rather than being stuck in one place.

Beauty

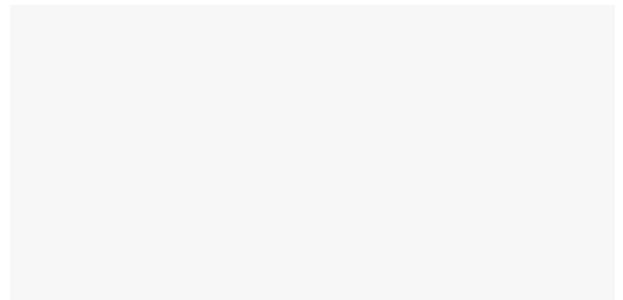
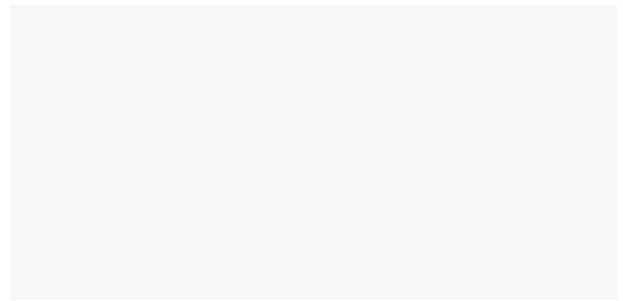
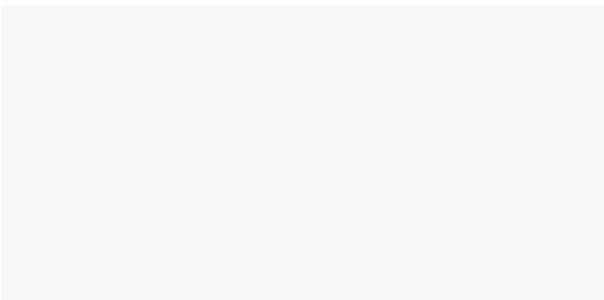


“Feeling that the world is a place of elegance, coherence, and harmony. Rather than feeling that the world is disharmonious, unappealing, or ugly.” (Desmet & Fokkinga, 2020)

Technical ingenuity



Experiencing the visual beauty and underlying thoughtfulness of technical objects.



Comfort

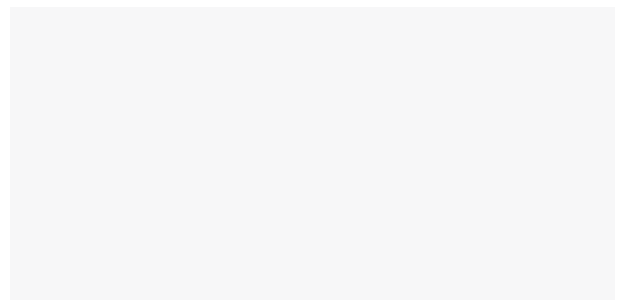
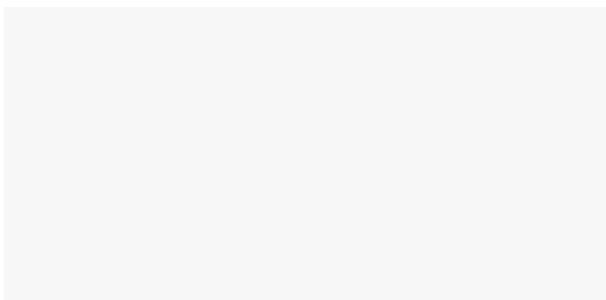
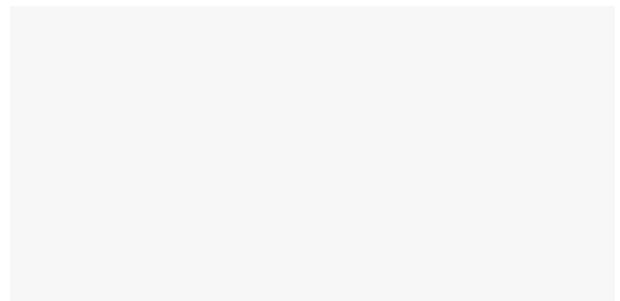


“Having an easy, simple, relaxing life, rather than experiencing strain, difficulty, or overstimulation.” (Desmet & Fokkinga, 2020)

Physical comfort



Having a body that feels at ease and free of irritation, tension, or pain.



Community

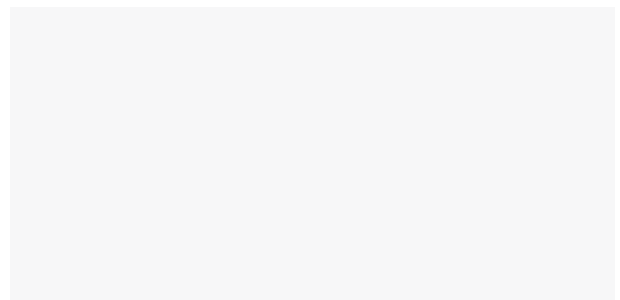
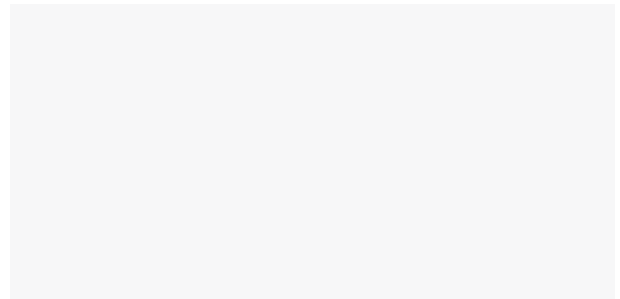
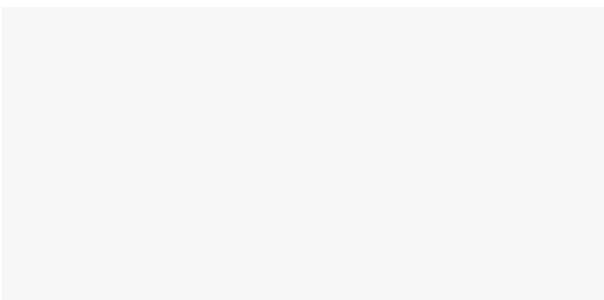


“Being part of and accepted by a social group or entity that is important to you, rather than feeling you do not belong anywhere and have no social structure to rely on.” (Desmet & Fokkinga, 2020)

Identity



Having a sense of identity and being able to engage with people, objects and environments that are part of who you are.



Competence

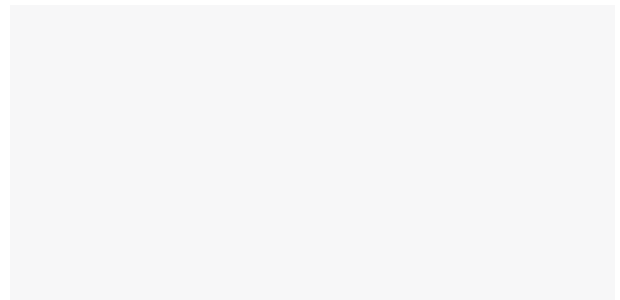
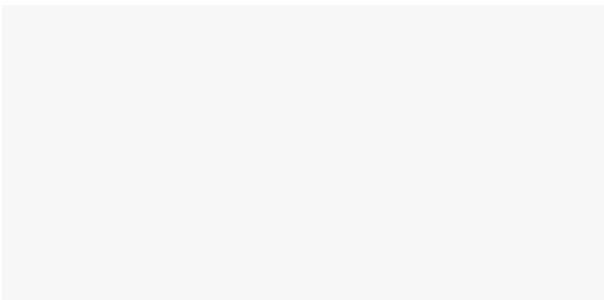
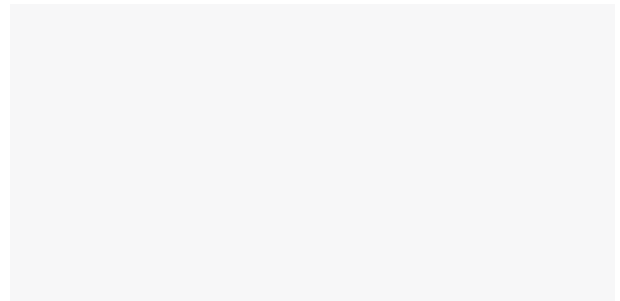


“Having control over your environment and being able to exercise your skills to master challenges, rather than feeling that you are incompetent or ineffective.” (Desmet & Fokkinga, 2020)

Practical experience



Being able to develop your know-how and to gain hands-on experience.



Fitness

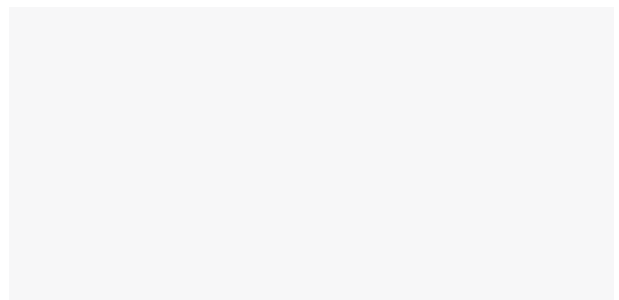
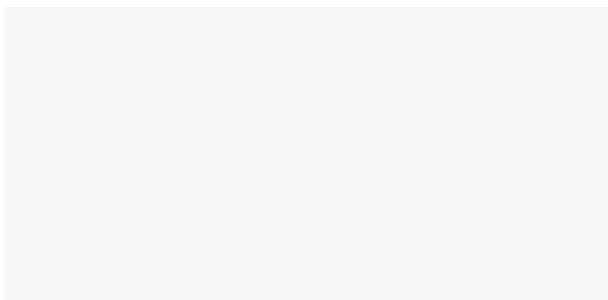
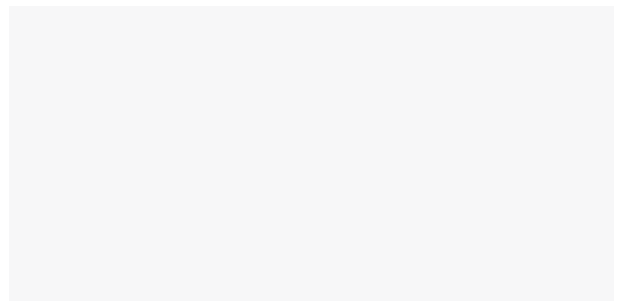


“Having and using a body that is strong, healthy, and full of energy, rather than having a body that feels ill, weak, or listless.”
(Desmet & Fokkinga, 2020)

Physical limits



Being able to push yourself and explore the physical limits of your body.



Impact

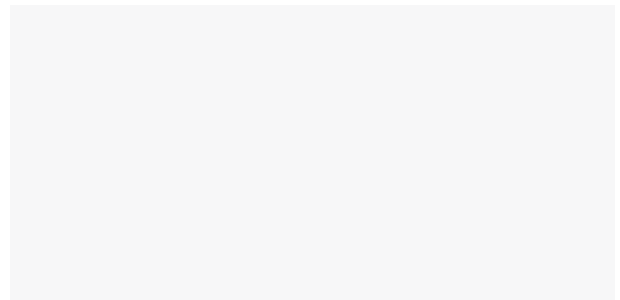
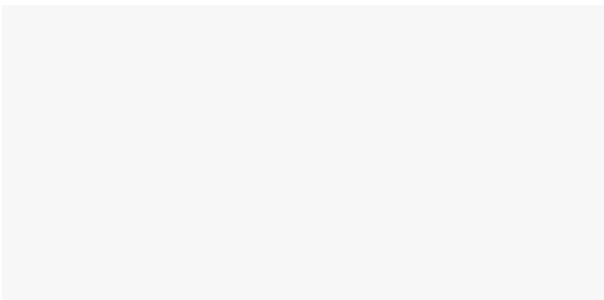
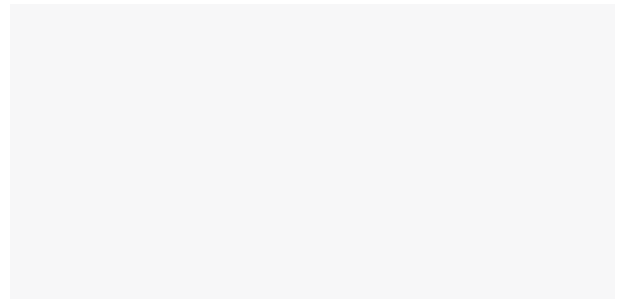


“Seeing that your actions or ideas have an impact on the world and contribute to something, rather than seeing that you have no influence and do not contribute to anything.” (Desmet & Fokkinga, 2020)

Significance



Feeling that you are a meaningful part of society that contributes to humanity and the planet.



Morality

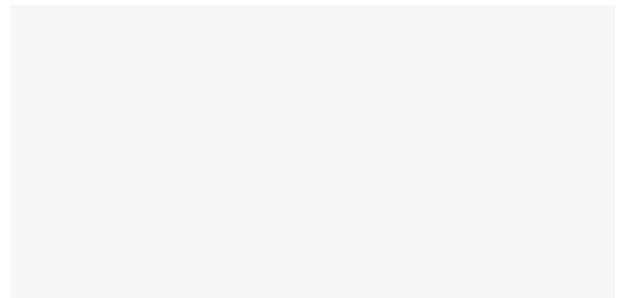
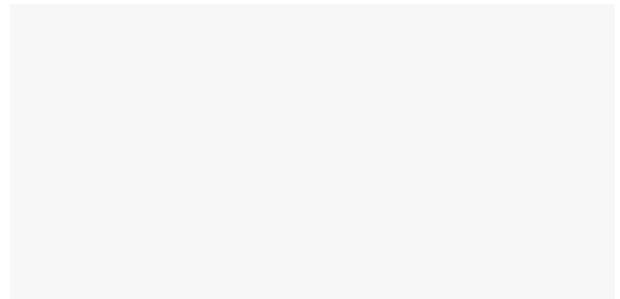
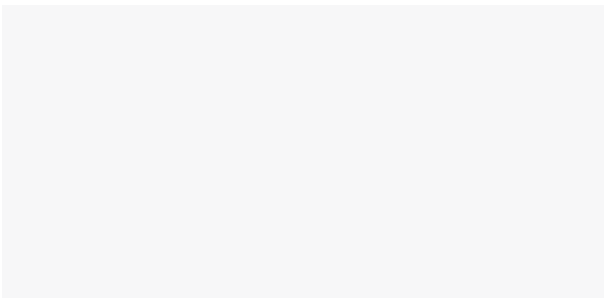


“Feeling that the world is a moral place and being able to act in line with your personal values, rather than feeling that the world is immoral and your actions conflict with your values.” (Desmet & Fokkinga, 2020)

Pursue ideals



Being able to act on what you think is right and to oppose the things you consider immoral.

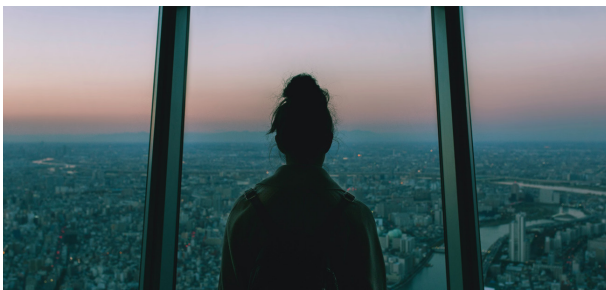


Purpose

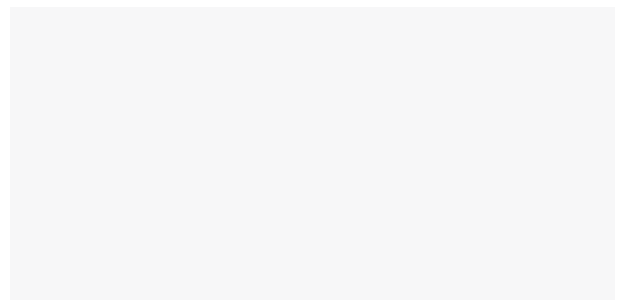
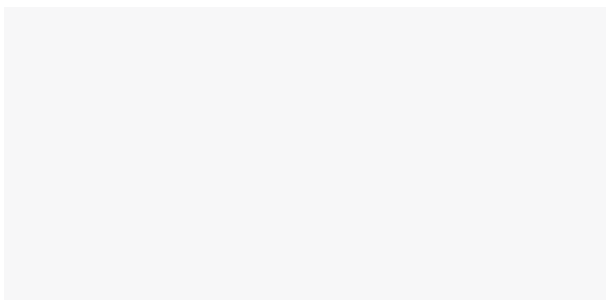
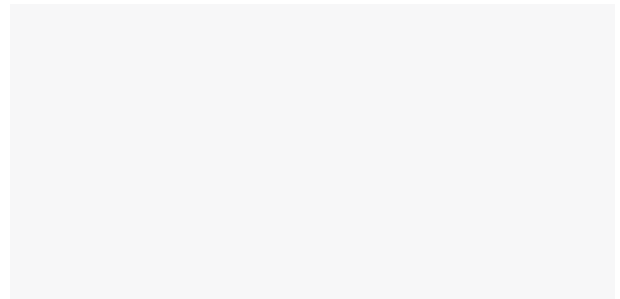


“Having a clear sense of what makes life meaningful and valuable, instead of lacking direction, significance or meaning in your life.”
(Desmet & Fokkinga, 2020)

Self-Knowledge



Experiencing conscious moments of reflection and gaining knowledge about oneself.

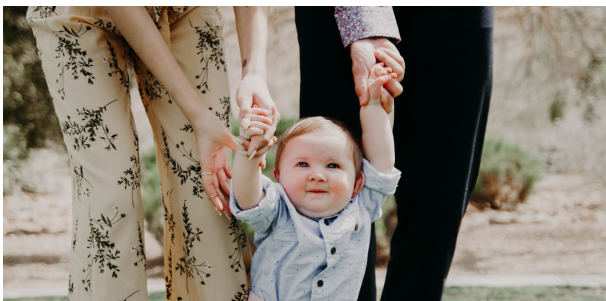


Recognition

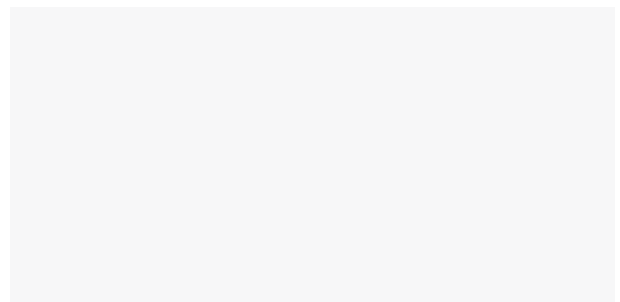
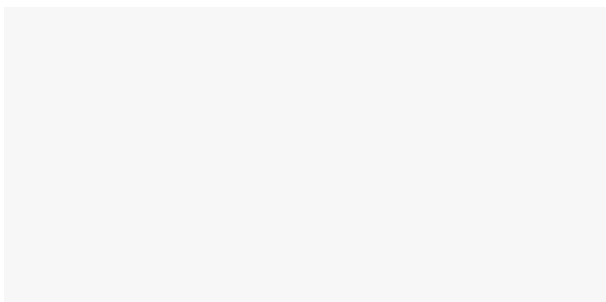
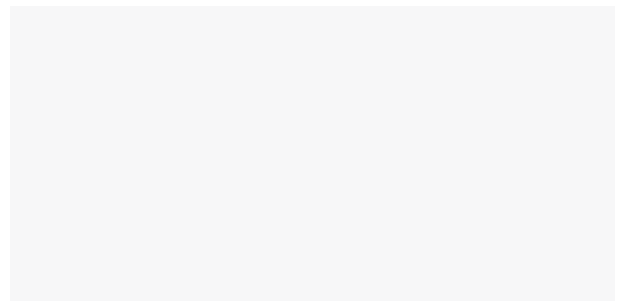


“Getting appreciation for what you do and respect for who you are, instead of being disrespected, underappreciated, or ignored.”
(Desmet & Fokkinga, 2020)

Encouragement



Feeling that others believe in you and root for you.



Relatedness

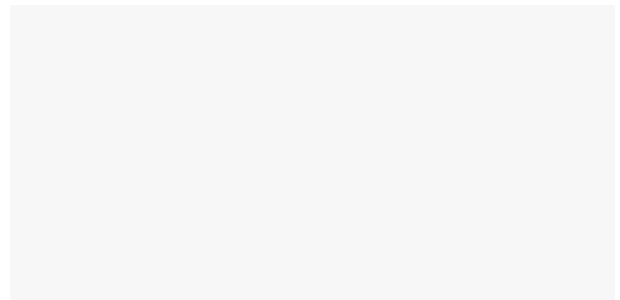
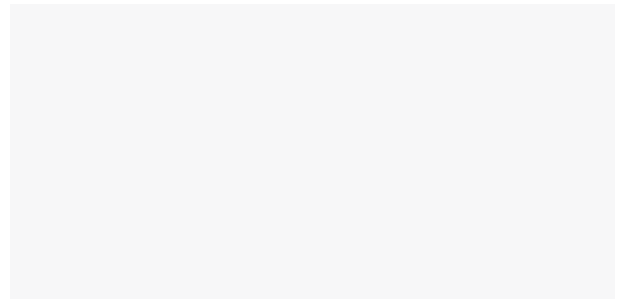
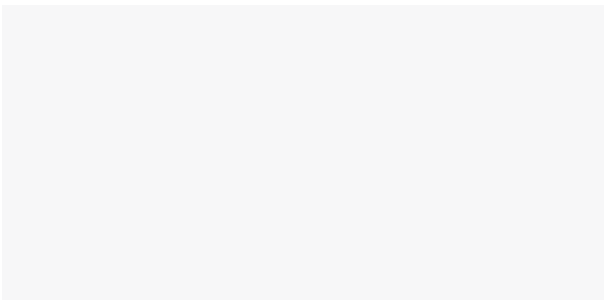


“Having warm, mutual, trusting relationships with people who you care about, rather than feeling isolated or unable to make personal connections.” (Desmet & Fokkinga, 2020)

Foster relationships



Being able to cultivate relationships with people and other beings that are important to you.



Security

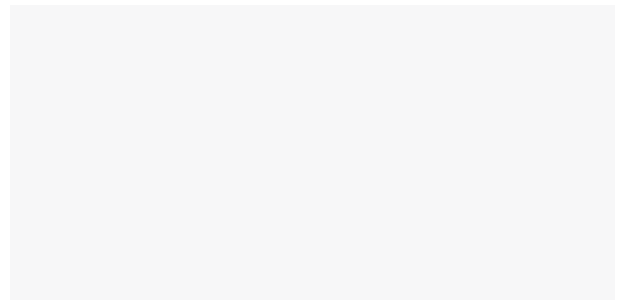
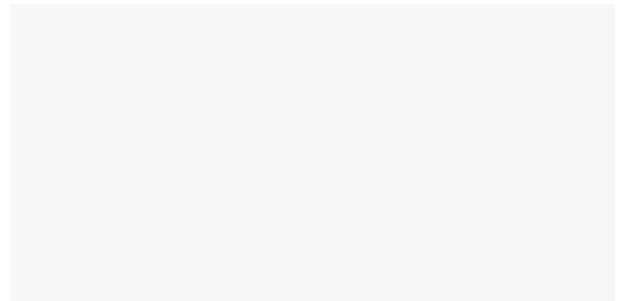
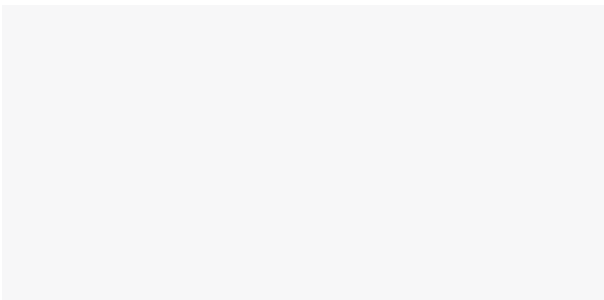


“Feeling that your conditions and environment keep you safe from harm and threats, rather than feeling that the world is dangerous, risky or a place of uncertainty.” (Desmet & Fokkinga, 2020)

Trust & reliability



Feeling that you can rely on people and things.



Stimulation

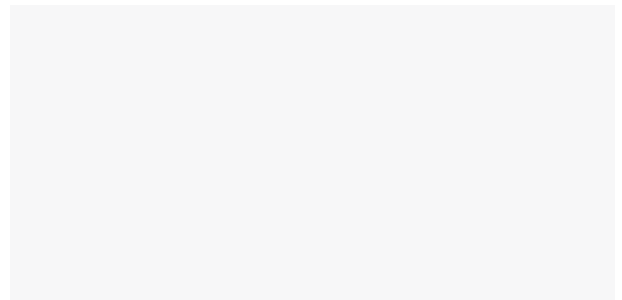
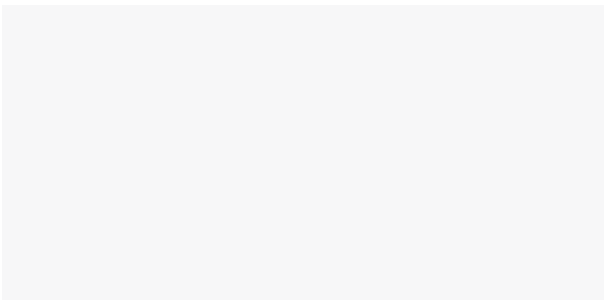
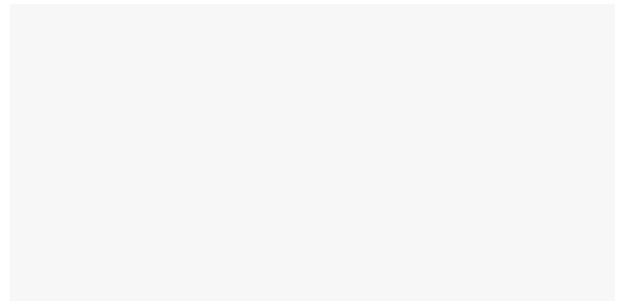


“Being mentally and physically stimulated by novel, varied, and relevant impulses and stimuli, rather than feeling bored, indifferent or apathetic.” (Desmet & Fokkinga, 2020)

Sensual delights



Having enjoyable sensual experiences.



Colophon

Acknowledgements

This typology was created by Fabian Geiser and Euiyoung Kim as a mobility specific derivative of the original typology presented by Desmet, P.M.A., & Fokkinga, S.F in the booklet "[Thirteen Fundamental Psychological Needs](#)". The layout of this original typology by Matthijs de Koning has largely been carried over.

Attribution

This derivative of the booklet "Thirteen Fundamental Psychological Needs" by Desmet, P.M.A., & Fokkinga, S.F. has been authorized by Desmet, P.M.A.

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**Exploring meaningful user
experience in the domain of mobility**

Navigating meaningful experiences with
the 13 fundamental psychological needs

2021

Fabian Geiser & Euiyoung Kim
Delft University of Technology

Appendix



Competence

Some remote destinations are too difficult to reach and some trips too exhausting on a regular bicycle. A pedal assisted electric bike amplifies your endurance and strength, enabling you to cover more distance and climb steeper hills.



Autonomy

Shared bicycles can be found in many cities around the world. You can use these sturdy bikes on demand to get around the city without having to own and maintain a bicycle.



Purpose

Track bikes like this one are uncomfortable and single minded. But their specialised design allows athletes to perform to the best of their abilities and to chase their dreams of records and wins.



Community

Custom bikes are a must for people who are part of a so called "wheelie crew". These bicycles are modified to allow for spectacular manoeuvres which the riders perform while riding together on busy roads.



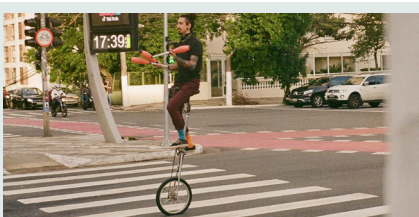
Relatedness

On a tandem you can share the joy of riding bicycle. Riding together on the same bike is a special experience no matter if it is a romantic getaway with a partner or on a day out with friends.



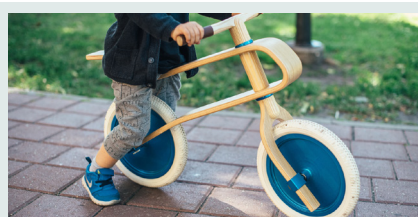
Impact

This bicycle frame is made of bamboo and it is created by skilful craftsmen in Ghana. By choosing for their product, you can feel assured that your purchase contributed to creating economic opportunities for marginalized communities.



Recognition

Unicycles are difficult to ride. Especially when they are as tall as this one. Riders have to practice a lot to safely perform tricks on such a bike, but their courage might earn them some applause from the crowds or in the case of this street performer, some coins.



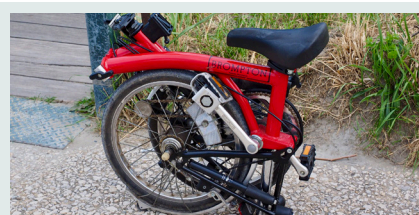
Security

Push bikes are propelled by running instead of pedalling. With their feet always near the ground, kids can get acquainted with some of the skills required to ride a bicycle such as balancing, steering and gaining a sense for speed.



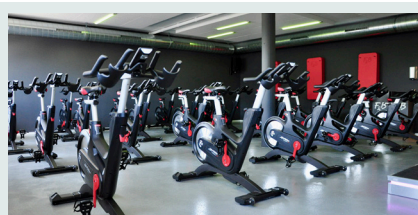
Beauty

Anyone looking to get a new bike is spoiled for choice. A bike like the one in the picture isn't better at getting you from A to B than most other bikes. But with its chrome handlebars, gum-wall tires, and leather seat it surely is a stylish way to move about.



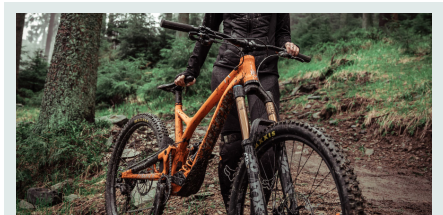
Morality

Folding bicycles are ideal for anyone who is looking for a sustainable alternative to commuting by car. These agile bikes zip through traffic and can be brought on trains and busses, making it easy for you to act according to your environmental ideals.



Fitness

Stationary bikes help you get into shape and stay healthy. No matter the weather outside you can hop on one of these bikes and spin your legs, improving your stamina and building your muscles.



Stimulation

Mountain bikes are purpose build toys for playing in the mud or dust. With their sturdy build, knobby tires, and supple suspension, you can have fun sliding around corners, jumping, and riding down steep trails over rocks and roots.



Comfort

In a bike taxi you can get around a city without breaking a sweat or having to navigate the busy streets. You can sit back and relax while you are being chauffeured to your destination.

Thirteen bikes, for thirteen fundamental needs

Bicycles can be found all over the world. They are one of the most basic means for transportation. Bicycles are generally made up of two wheels, a frame, handlebars, and a drivetrain powered via two pedals. This archetype has barely changed since the bicycle's invention in the 19th. century. Yet, over the years, bicycles have become much more specialised, enabling diverse hobbies, jobs, and ways of living. Today, there are countless bicycles intended for different purposes and derivatives that have broken up the original blueprint. A bicycle for every need.

This overview is a derivative of the poster "Thirteen chairs, thirteen fundamental needs" (Desmet & Fokkinga, 2020).