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Moving Spaces—The Affective Embodied Self in Tram Design and the Autonomous Imaginary

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Introduction

The current climate of technological discussion is geared towards a fully immersive era of cyber, characterised by ambitious initiatives to train self-learning software (machine learning [ML] systems) with big data and developments in sub-fields of information technology (IT). While emphasis is placed on the power of digital algorithms and artificial intelligence (AI), simultaneously the physical world is being re-imagined and re-embodied. This transformation is particularly evident in growing urban areas as the majority of the world's population will live in cities

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in the future (World Bank, 2023). Cities are shaped by various mobilities—social, technological, geographical, cultural, and digital—which create new forms of socio-material and cultural relations, impacting people's daily routines and practices (Freudendal-Pedersen et al., 2019). This emphasis is reflected in major infrastructural upgrades worldwide, such as hospitals, schools, and transportation systems. These infrastructures encompass emerging IT systems including AI, physical robotics, self-driving vehicles, evolving pervasive connectivity, and new, rapidly improving ways of information retrieval and display. While this is a leap into the future, some of its elements are more apparent, such as strategies like ACES (Automated, Connected, Electric, Shared), which represent ongoing developments in transportation (Adler et al., 2019). This suggests transformation in perspectives and engagement in ways people perceive, interact with, and comprehend their everyday environment. The shift in environmental experience occurs through design changes, morphing contextual circumstances, as well as shifts in understanding the relationship between physical and digital realms.

The development of IT-based systems, including sustainable mobility aspects like vehicle design, smart mobility, and infrastructure, is closely intertwined with efforts not only to achieve for example broader ecological stability, but also to enhance greater resilience in system performance encountered at a personal level within people's day-to-day existence (Herweijer & Waughray, 2018). This endeavour comprises considerations of availability, affordability, efficiency, and convenience, constituting a pivotal trend to address efficient transportation solutions in growing cities (Holden et al., 2019). Technological advancements in mobility, such as electric vehicles (EVs) and autonomous vehicles (AVs), ridesharing, and digital connectivity offer cities opportunities to create cleaner, more convenient solutions (Hannon et al., 2019). One prime example of this integration is in the public transport sector. Here, sustainability, within a broader scope, is an integral part of the value-based fabric of mass transportation, seamlessly incorporating aspects like safety, integrity, reliance, resilience, and customer service, among others (Abdallah, 2017). Despite ongoing discussions on the technological benefits of, for example, AVs, innovation diffusion and public acceptance is not always seamless; non-technological concerns often pose more significant obstacles to technology adoption (Othman, 2021). This can be seen in, e.g., safety concerns, ethical dilemmas, liability issues, and regulatory challenges.

In line with contemporary trends in infrastructure renewal and the evolution of systemic change contributing to urban revitalisation, *tramways*, and other forms of light railways, have experienced a global regeneration. Being popular internationally from the early 1800s through to the mid-1900s, tramways slowly began to be decommissioned during the 1950s, continuing until the early 1980s (Petkov, 2020). These vehicles began their history as horse-drawn carriages, gradually evolving into gas-powered machines, and finally becoming electrically powered cars. The reduction of tramway systems stemmed from the ideology of the "car society" of the era, advocating the idea of urban transformation that profoundly altered people's lifestyles. Car ownership became a symbol of modernity, individualism, and personal expression (Hård & Misa, 2008). Despite this, some cities such as Melbourne (Australia), Athens (Greece), Basel (Switzerland), and Helsinki (Finland) managed to keep their tramway systems intact. Over time, these have become beloved cultural icons that not only embody a distinct era in urban history but have also gained significant cultural recognition, serving as "prototypes"[1] for integration into smart city concepts (Rousi & Alanen, 2021).

The re-emergence of trams, labelled as the Tramway Renaissance, began in the mid-1990s and remains ongoing. This resurgence has brought a significant socio-technological upgrade that extends beyond the physical infrastructure (Petkov, 2020). This trend has also delineated a shift in the ways that people perceive mobility and conceptualise the urban environment (Moraglio, 2011; Souter, 2001). Trams serve as more than mere technical developments. Moreover, they also embody and convey a socio-cultural atmosphere within a specific temporal landscape.

This intrinsic connection is closely intertwined with the seminal nature and dynamics of *fashion*—as a universal concept that unfolds as a multi-faceted event (Entwistle, 2000). For this reason, in this context, the authors aim to present fashion as a lens (tool) and a cultural marker that captures the interaction of micro-level and macro-level socio-dynamic forces in times of change within the technological landscape (Cholachat-pinyo et al., 2002). The re-introduction of trams into urban spaces demarks engagement with global trends ingrained within the *technology-fashion* change that is also implicated with the re-definition of embodied

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[1] Prototype, or 'prototypicality,' in accordance with Leder et al. (2004), refers to the amount to which an object is representative of a class of objects, built through experience (learned knowledge).

space sharing, social cohesion, preferable urbanity, and updating the public images of the cities themselves (Mackett & Edwards, 1998; Moraglio, 2011). From the perspective of re-thinking *space,* this has meant a reconfiguration of the travel pathways and surfaces in cities, promoting shared experiences and socially sustainable movement (Coles et al., 2023).

Motivations behind the new tramways represent a direct intersection with ideological ecological discourse. This stands particularly in relation to personal vehicle usage. Given that ethics may be considered to have affective qualities that engage specific emotional experiences (see e.g., Saariluoma & Rousi, 2020), it is worth assessing how the frame of fashion contributes to the evaluation and utilisation of the multidimensionality of the tramway and its systemic existence in users' interactive experiences. Specifically, focus is placed on how the embodied affective conceptualisation of *self* (identity and being) translates within the experience of a new tramway.

This chapter presents a study of the tram experience in Tampere, Finland, which marks the beginning of a new era in the city's history. The tram system has been implemented as part of a transformation towards sustainable and IT-based transportation systems, which is expected to significantly disrupt the way people experience and interact with urban transportation in the next decade (Baltic et al., 2019). Moreover, the technology of tramways has long been associated with the fantasy of automation and autonomisation (Petkov, 2020). The key goals of the tramway system are to improve easier and cleaner everyday life and transportation in the municipality, support urban growth and development, and enhance the city's appeal (Tampereen Ratikka, 2023).

EMBODIMENT IN SOCIO-TECHNOLOGICAL FASHION AND SYMBOLIC INTERACTIONISM

Maurice Merleau-Ponty et al. (2014) notes, "History, then is neither a perpetual novelty nor a perpetual repetition, but rather the *unique* movement that both creates stable forms and shatters them" (p. 90). As seen in the precarious history of trams, technology is tightly intertwined with social, cultural, and economic trends (Petkov, 2020). This means that in order to understand the relationship between humans and trams, or any vehicle for that matter, one must look beyond the technical and towards the dimensions that both frame and are framed by technical choices. The

purpose of the fashion frame (SoTEM) we are launching, is to introduce the approach as a lens for understanding and structuring the complex connections between the different dimensions. Fashion weaves the experience of newness and meaningfulness, both as a social construct and as a socio-material phenomenon in physical objects, surpassing mere functionality (Petersen et al., 2016). Fashion, as a collective event, ultimately mirrors people's willingness to adapt to ideas and ideologies shared within society. This implies an embodied and situated social practice (Entwistle, 2000).

The cocoon of this section is characterised by the understanding that all technology, none-the-least transport-related technology, operates within social dimensions. Socio-technology, or the intersection between society and technology (Bunge, 1998), is thus referred to in order to express trams as both technical (material) and social-cultural (immaterial) technology. This means that technology operates within social plains both as a direct connector and mediator, as well as a symbolic vehicle (Nadin, 2007; Rousi, 2013a). The authors take a symbolic interactionist (Blumer, 1998; Mead, 1934) approach to illustrate and investigate a dialogical process of embodied experience of the *self* (see e.g., Rousi & Alanen, 2021). In symbolic interactionism (SI), there is an ecological understanding of the experience of self in light of and in relation to others. Through the lens of social psychology, this means that the *self* is both expressed and constructed through existence with and engagement in others (Bourdieu, 1990; Dunn, 1997; Sterne, 2003)—human and non-human.[2] When choosing to consume, engage, or participate in technologies and technology-enabled actions, humans enact their ideologically driven values (Cockton, 2017, 2020; Leikas, 2009). Technological experience is never simply an isolated engagement. Rather, it is confounded by the past, present, and what is anticipated and imagined for the future (Roto et al., 2011; Rousi, 2020; Wurhofer, 2015). This imagining of the future involves a decision on behalf of the individual to form an allegiance that once more goes beyond the material and logistic, towards the immaterial and transformational (Dunn, 1997).

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[2] This additionally implicates the traditions of Actor Network Theory (ANT, see e.g., Latour, 2007) that views actors (human and non-human) as existing in networks in which mutual effect occurs.

Fashion, and the Socio-Technological Embodiment Model

Building upon Matteucci and Marino's (2016) view of fashion as a universal concept, part of a larger debate on its nature, fashion is extended to different cultures and societies. This perspective is influenced by classical sociologists such as Simmel (1957; 2012), who emphasised the way in which social dynamics within spatial contexts, especially in urban environments, shape human interactions, closely relating to the phenomenon of fashion (Pyyhtinen, 2020). Fashion is shaped within social meaning structures (semiotic systems, see, Peirce, 1905) as a cultural marker. It indicates the presence of certain traits or changes in a society or environment, manifesting itself temporally through places, products, systems, and experiences (König, 1973). Merleau-Ponty et al. (2014), sheds light on the adaptability of historical stereotypes (e.g., norms) within the cultural landscape, when people create a mental and practical framework as a basis for interpreting and engaging with their environment. This also characterises universal fashion as a practice. According to Merleau-Ponty, stereotypes "are not for that matter destiny, and just as clothing, jewelry and love transform the biological needs from which they are born, so too, within the cultural world, the historical *a priori* is only consistent for a given phase" (p. 90) requiring flexible responses to ever-changing cultural circumstances. However, the academic perspective on fashion is most evident in the realm of "dress,"[3] encouraging a closer examination of this field.

Mary Lynn Damhorst (2005) focuses on the psychological and communicative aspects of dress and the body. She has developed a *clothing-in-context model* as a sign system in the form of a radial chart, where each layer illustrates relationships among tangible and intangible elements, some of which may have multiple subcomponents. It begins with the basic perceptual features of clothing, such as shape, colour, lines, weight, patterns, and so on, continuing to the conditioning and treatment of materials. These are followed by layers related to the body (e.g., haptics), including its movements and situational surroundings. The model then extends outward to personal characteristics and social relationships, all governed by "grammar" and shared aesthetic rules within

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[3] In fashion studies, the term 'dress' is used to encompass a wider spectrum than clothing, emphasising the comprehensive nature of appearance (see e.g., Kawamura, 2005; 2011).

the cultural context, contributing to the interpretations of meanings. Thus, in accordance with Damhorst, the relationship between the body and its ecological dimensions extends from the contextual and situational to the environmental and higher-level dimensions, which shape and interweave the connections between materiality (i.e., formal design features) and the human sense of self. The advantage of this contextual framework is that it illustrates the connections between individuals, society, and culture, where social-psychological processes play a role in shaping cultural change within the cultural context (Kaiser, 1997).

We demonstrate that the Damhorst's model can be adapted to encompass any socio-technological embodiment (Fig. 5.1), further reinforcing the conceptualisation of fashion as a socio-cultural manifestation that reflects and shapes social meanings and practices. This understanding of fashion enables a better comprehension of the relationships between temporality, sociality, culture, and the embodied self in any given socio-technological context. As a result, the adapted socio-technological embodiment model provides a multilayered framework for understanding the complex interactions among technology-fashion change, culture, self, and everyday contextual experiences. It further illustrates how these layers are embedded in relation to one another through dynamic and ongoing mutual processes.

As shown in *Fig. 5.1*, culture provides a broader spatio-temporal field (Bourdieu, 1996) for the interpretation of meanings (layer: *culture*), while multilayered social processes and the construction of shared meanings are created and enacted within this field (layer: *social dynamics*). In the context of our study, the tram case as an example, the city serves as a commonplace, providing scaffolding for social interactions and facilitating the cultivation of shared awareness, a sense of group belonging, and shared emotions (layer: *group association*). This framework acknowledges that the immediate embodied context and relatedness on a tram (layer: *social situation*), as well as multisensory experience of the tram environment as a dynamic and affective moving space (layer: *embodied perception*), are where the human-technology interactions occur.

The concept of embodied perception, influenced by technical (material) design entities, comprises various sublayers. In the context of a tram, these sublayers include the immediate body space, kinetic interaction, layout and accessibility, scenic perception, information communication, everyday surface aesthetics, and interior aesthetics. All of these sublayers collectively contribute to shaping the embodied experience of the self and
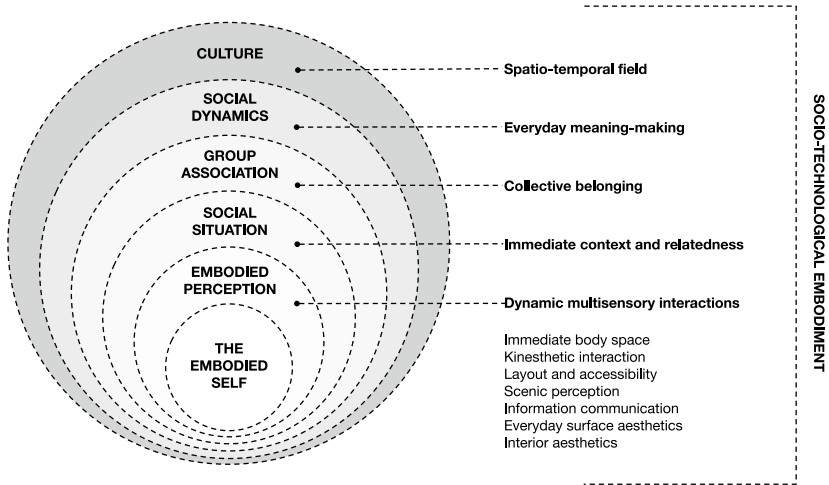
CULTURE — — — — — Spatio-temporal field

SOCIAL DYNAMICS — — — — — Everyday meaning-making

GROUP ASSOCIATION — — — — — Collective belonging

SOCIAL SITUATION — — — — — Immediate context and relatedness

EMBODIED PERCEPTION — — — — — Dynamic multisensory interactions

THE EMBODIED SELF

Immediate body space
Kinesthetic interaction
Layout and accessibility
Scenic perception
Information communication
Everyday surface aesthetics
Interior aesthetics

SOCIO-TECHNOLOGICAL EMBODIMENT

Fig. 5.1 Adaptation of a *clothing-in-context model* by Damhorst (2005) and conversion to a general *socio-technological embodiment* sign system format informing SoTEM

being. In this regard, there is a *relatedness* that is noticed in Merleau-Ponty's et al. (2014) theorisation of embodiment that sets the positioning of the body and its actions into a system of events that cause and affect the ways in which people both experience and are experienced by others (see also, Shusterman, 2005). In this sense, the adapted socio-technological embodiment model also has a connection to Merleau-Ponty's "phenomenal field," which refers to the holistic realm of sensory experiences. Embodied perception is not a passive process, but rather involves integrating various sensory inputs and contextual factors into a unified whole.

As the authors, we see the self in both its material and immaterial form—the "*me self*" (ecological self[4] positioned within the system of systems) and the "*I self*" (the reflective or internal self, somewhat abstract to the environs) (see, James, 1890). Thus, the logical progression of

[4] According to Neisser (1988), the ecological self is the self as directly perceived in the immediate physical environment. Today, it manifests within both natural and digitally constructed environments as part of a larger system of systems.

Damhorst's model places the self at the centre, highlighting the interplay between the embodied self in a tram and multidimensional technological experience, affecting the immediate body space. This understanding is relevant to studying how mobility systems are transformed in everyday life conditions as it sheds light on how personal values (ideology) and preferences, as well as smart technologies, influence people's response to different aspects of the tram vehicle and its related systems.

The social situation of the tram can be divided into two main domains. Firstly, interactions that occur during tram travel with others (e.g., mobile devices). Secondly, the broader social situation, extending from micro-level (family and personal circumstances) to macro-level situations (societal paradigms, social-political, environmental climate, etc.). Group association occurs with strains, communication, representations, and ideologies within the social situation as an act, or acts, of identification that actively situate the self—the *I self* and literally the *me self*—in relation to others (Blumer, 1980). *Particular others* (those who hold significance in relation to the self) and *general others* (those who are not identified as possessing significance) in turn are defined by group association. Culture frames the experience, its reading (interpretation), and how these socio-technological characteristics manifest in the first place (McCarthy & Wright, 2004; Shilling, 2004).

Embodied Semiotics—Multisensory Perception and Relatedness

The tram, and public transportation experience, are integral parts of the evolving urban landscape that go beyond the design of the tram vehicle and its infrastructure. The aesthetics of the tram connect with elements that supersede landscaping, tram stops, tram routes, street designs, movement, and other technical factors. Rather, the embodied aesthetic experience contributes to the experience of *being*—socially and culturally. It is this holistic experience of being, particularly the essence of relationality, that requires a deeper semiotic understanding that includes a rationality of its past, present, and unfolding future (Merleau-Ponty et al., 2014; Reynolds, 2020). This temporal aspect possesses an awareness (learned knowledge) of what has been, that is confounded by the identification and positioning of the individual in relation to this history. This manifests in present interactions, which are also influenced by an anticipated future (Michalco et al., 2015; Rousi, 2020). Merleau-Ponty draws parallels to this kind of temporal horizon and the way objects are

perceived from different spatial perspectives, which is not limited to a single isolated moment. He further argues that the body takes herein possession of time and enables temporal horizons to exist for a present moment, thus actively "constituting time". This refers to the way people actively shape and experience time through embodied perception—rather than merely being passive recipients of "constituted time."

Design semiotics, or the study of sign systems in relation to design (Vihma, 2007; Warell, 2003), has deep roots in pragmatic philosophical traditions such as those represented by Charles Peirce (1905) and John Dewey (1908). Yet, design itself poses challenges towards understanding basic sign models such as Peirce's object, signifying element (sign or symbol), and interpretant. For, a design can be understood as both object and signifying element (Rousi, 2013a). It is on the one hand (whether artefact, system, or service) an object. Yet, on the other hand, it is a signifying element, that represents affordances and what can be achieved via the design (see e.g., Gibson, 1979). Design constitutes immaterial qualities such as symbolic values and references to other times and paradigms, as seen in activities related to sustainability and autonomous technology.

When individuals engage with trams as design objects, they undergo a transitional metamorphosis process that sees the interaction of mentally-bound information (mental content, Rousi et al., 2010) with multisensory information (Silvennoinen et al., 2015), and, in the cases of past and future, sense data (remembered sensory information, Rousi & Silvennoinen, 2018). This can be considered as *multisensory design semiosis* (Rousi, 2013b). In encounters with design objects, the multisensory experience can be broken down into three distinct yet related dimensions: (1) the formal, physical, or structural properties of the object (syntactic material dimension); (2) the expressive or semantic properties of the object (semantic dimension); and (3) the pragmatic dimension that encompasses the object's immaterial semantic qualities (pragmatic dimension) (see e.g., Vihma, 2007; Warell, 2003). These semantic properties may imbue the object with symbolic meaning and emotional significance (Fiore, 2010), and thus, also respond to concerns related to the object's experiential benefits beyond interaction (Krippendorf & Butter, 2008).

Method

Participants, Recruitment, and Research Ethics

The current study was conducted in collaboration with the Tramway Alliance, which includes partners such as the City of Tampere, Tampere Regional Transport (Nysse), and VR Group Plc, a Finnish state-owned company known for its passenger and logistics services. Participants were selected from a pool of about 2,000 registered candidates who had expressed interest in tram user testing during trial runs. Our research partner, Nysse, coordinated participant selection. Together with VR Group, they managed the trial run schedules and facilitated the researcher's data collection during these sessions, all of which took place during the COVID-19 pandemic.

A total of 30 participants (14 women, 15 men, and one participant identifying as "other") were recruited to participate in a two-part sequential one-to-one interview session. Participants represented five different age segments based on Nysse's classification: 17–25 years old, 26–40 years old, 41–55 years old, 56–70 years old, and over 71 years old. They were selected based on three pre-defined user groups: public transport users, public transport and car users, and car users. Nysse further categorised these groups based on different passenger (user) personalities, with group 1 comprising "saver" and "responsible" users, group 2 comprising "optimiser" and "enhancer" users, and group 3 comprising "cruiser" and "forced motorist" users. Participant representatives were chosen for each group to ensure a diversity of views and reasons for using public transportation, in alignment with Nysse's brand strategy.

As the data were collected during the test runs of the Tampere Tram in May 2021, when the tram was not yet in public use, most of the interviewees had no prior experience of travelling by the Tampere Tram. There were, however, some exceptions. Some participants had been involved in the test drives, typically taking just one trip. While participants' deeper attitudes towards the tram were unknown, their willingness to engage in these trial runs indicated a certain level of curiosity and interest in the tram project.

In alignment with ethical guidelines, participants were supplied with a Research Notification and Privacy Notice, explaining the study's broader context, procedures, fully anonymised data collection, usage and storage, and the participant's right to withdraw. Participants were also asked to sign an informed consent form in compliance with the University's ethical

guidelines, Finnish National Board on Research Integrity, and General Data Protection Regulation (GDPR).

Interview Procedure

The research was conducted in Tampere over a two-and-a-half-week period. Data collection involved in-person thematic interviews, which comprised two consecutive parts. These interviews aimed to explore three key aspects: (1) socio-cultural dynamics (cultural processes); (2) tangible and intangible systems of signification (expressions); and (3) the holistic nature of the experience (social, emotional). Guided by a universal fashion perspective and in addition to the SoTEM model, the exploration was influenced by Kaiser's (1997, p. 59) contextual framework, which integrates such dimensions to enable the examination of shifts in meaning. The first part was a semi-structured interview held at a library, served to gain pre-travel insight regarding initial thoughts, expectations, and prior experiences. The second part, which forms the data and *results presented in this chapter*, occurred during the tram journey. This interview operated as a thinking aloud procedure, in which participants directly presented their experiences and thoughts as they interacted with their surroundings while moving through the city. Participants were given the opportunity to share their perceptions of the tram's design, appearance, usability, and related environmental changes. The interviewer asked open-ended questions about the participant's first impressions and their holistic experience inside the tram as a moving space. While the second interview primarily explored participants' real-time tram journey experiences, it also allowed them to supplement their responses from the first interview, though not actively encouraged. The entire journey took approximately one hour. Interviews were conducted while travelling from one end of the central city line to a suburban district. After reaching the final stop, participants changed to a returning tram. All comments were audio-recorded for verbatim transcription.

Analyses

All interviews were transcribed and analysed using ATLAS.ti software, which included coding of the data and content analysis (Carley, 1993; Hsieh & Shannon, 2005) based on three initial interview themes that encompassed the content of part 1 and part 2. From the analysis of

the second part, focused on the tram journey, three key topics emerged: (1) scenic perception (through window); (2) kinesthetics (seamless movement and mobility); and (3) visual and spatial aesthetics (interior atmosphere). Results are based on a synthesised "assembly" derived from these emergent topics, which includes semiotic logic and its accompanying syntactic, semantic, pragmatic qualities, and affective dimensions. We adopt a discursive approach to report and explain themes pertaining to these topics adhering to our refined Socio-Technological Embodiment Model (SoTEM) of embodied perception. The model emphasises the multi-layered and multi-sensory nature of the tram on users' affective responses. Themes are: smooth and carefree motion (ride *comfort*); interconnected seamless mobility (*utility, convenience, and* autonomous *imaginary*); effortless, safe and inclusive transportation (*usability* and *accessibility*); speed and experience of time (*temporality*); embodied spatial aesthetics (spatial *awareness* and *being*); experiencing *urbanity* (the self, the tram and the whole in the city); appearance of a tram form (visual design and *expression*); colour co-design and shared decision-making (*inclusiveness* and *belonging*); tram as mediator in cultural significance and the city's identity (shared *values* and *memories*); socio-cultural ambivalence in colour perception (aesthetic preferences and *individuality*); and the unsettling of status quo via unsettling in colour disruption (shared *practices*, *norms,* and *values*). The themes are discussed in detail in the Results section (Sect. 5.4). Findings are presented as explanations that are accompanied by key examples extracted from the data illustrating the combined sentiments of participants.

Results

This study shows the rich multisensory interactions and socio-technological role of the tram as conveying meaning. The tram system's human interactive characteristics extend beyond its design and usability, encompassing its social and cultural presence in a specific context at a given time. Spatial aesthetic atmosphere played a crucial role in shaping participants' experiences and influencing their affective responses and embodied perception of the environment. This resonates with Merleau-Ponty's et al. (2014) notion that sensory qualities emerge in "indeterminacy," where sensory experiences lack full clarity but create an "atmosphere" through which formal design qualities gain significance. The qualities thus have an expressive value. Likewise, Spence (2020)

emphasises that our interactions with the environment are influenced by all our senses, even when we are not consciously aware of their effects. This highlights the significant impact of embodied perception and atmospheric interaction on our well-being.

Tram Kinesthetics: Motion, Fluency, Stability, and Speed

The *Tram Kinesthetics* section explores the participants' embodied perceptions of the tram's unique aesthetic features, including its: (1) smooth and carefree motion; (2) fluency in seamless and interconnected mobility; (3) effortless, safe, and inclusive stability; and (4) rapid, accelerating, fleeting speed. These themes are closely tied to aspects of the tram experience such as ride comfort, utility, convenience, usability, accessibility, and the temporal dimension of the journey. This section sheds light on how these features contribute to the overall quality of the experience in relation to the embodied self.

The participants' initial impressions and perceptions of the tram journey were significantly influenced by their prior experiences of moving around the city, primarily with the public bus system. Many participants had embodied memories of their previous bus journeys, often characterised as "shaky" and "bouncy" due to the city's cobblestone streets. This comparison with previous modes of transportation revealed unique aesthetic features of the new tram system, providing valuable insights into the participants' experiences. One key aspect that was revealed was the smooth movement of the tram. This caught the attention of virtually all passengers from the start and was a recurring theme in their appraisals of the tram's competence during the journey. Compared to previous bus experiences, many participants highlighted the enhanced physical comfort and stress-free opportunities created by the smooth movement. This comfort contributed to a sense of safety, inclusiveness, and pure joy, as the effortless and seamless, yet efficient, movement of the tram provided a carefree and enjoyable experience:

> It's easy to fall asleep here because it's so steady and I don't have to worry about staying on the bench.
>   (Female, 56-70 years old, public transportation user: saver)
>   [...] this is soft, soft motion [...].
>   (Female, 56-70 years old, public transportation and car user: optimiser)

The responses reflected sensations influenced by participants' prior embodied experiences, aligning with Merleau-Ponty et al. (2014), who posits that the body and bodily memories are integral parts of real-time lived experience. Consciousness extends throughout the body, oscillating between the present and the past. The tram was said to reduce feelings of stress, creating a space for relaxation. This was particularly true for private car drivers, who felt a positive sense of relief in being able to focus on other things besides traffic. These kinds of notions were also revealed when participants were asked about their perception of themselves travelling by tram while seeing cars driving on the road beside them. Some participants considered the tram a viable alternative option to a car, especially during their free time, offering an opportunity to rest while someone else takes care of the driving. Many perceived the tram as a convenient and easy mode of transport, especially in busy city centres where parking is a challenge:

> It feels so carefree somehow. I don't have to pay attention to anything else except staying on the bench. With this, one can have such a smooth ride […]. I can focus on other things besides traffic. When driving a car, I have to be so careful regardless of the weather […] the weather does not really affect this.
> (Male, over 71 years old, car user: cruiser)

Other participants expressed that the tram would provide convenience to families with two or more commuters, particularly in light of inner-city traffic. From the traffic perspective the efficiency and safety (carefree character) were emphasised. Stress and its relief via tram use was a reason for car drivers to seriously consider future tram use. The experience tended to highlight a rare moment in the everyday when one could potentially relax and enjoy. Car driving was pronounced as a risk with uncertainties about supportive infrastructure (parking) and scheduling (timetables). The tram was seen as the solution to these car-bound issues. These experiences align with Merleau-Ponty's et al. (2014) philosophical perspective on relatedness, in which the body, through its sensory experiences and spatial awareness, enables individuals to perceive the world in a holistic manner. Thus, participants' emphasis on convenience highlights the body's innate capacity to engage with the immediate environment, emphasising the significance of "here" and "now," with a focus on immediate sensory experiences and present-moment awareness.

Additionally, the notions expressed by participants expose a shift in attitudes towards the use of private cars, and the lack of any stigma associated with the use of trams. These perceptions signal a transformation and the imaginary crossroad in the realm of seamless mobility, where the boundaries between private, shared, and public transport are becoming increasingly blurred, disrupting the transportation status quo (Baltic et al., 2019). While a fully integrated IT-run mobility system is not yet widespread, participants' responses indicated the early stages of a diffusion process. This process offers a glimpse into the evolving landscape of daily mobility practices, as perceived by participants within specific contextual circumstances.

Further, many participants expressed enthusiasm about the prospect of bringing their personal bicycles or scooters onto the tram. This integration of the tram system into their daily lives represented a shift in their mobility habits, incorporating the affordances provided by the tram system. However, one participant, a male aged 26–40, particularly stood out due to his early adopter disposition towards electric vehicles (EVs). He owned an electric car, electric bike, and electric scooter, and he also expressed a keen interest in using the upcoming electric tram system in Tampere. His choice to embrace EVs was driven by ecological concerns, cost-effectiveness, and comfort. He eagerly anticipated the potential benefits that new innovations could bring to the evolving mobility landscape:

> I'm just interested in new things in general. I'm not the type of person who clings to the old, but rather looks forward to those innovations that can improve the quality of life. […]. In the same way, I see that the tram does that.
> (Male, 26-40 years old, car user: cruiser)

He mentioned that he enjoys the convenience of being able to choose the best mode of transportation for each specific journey, and that he has used his electric bike for commuting to work. He also discussed the potential benefits of shared mobility options, such as short-term rental services for cars, and expressed a belief that car ownership will become less important in the future:

[…] car ownership will decrease for sure, if it becomes easy to rent a car for a short period. There are already those […] Teslas and LEAFs that can be rented for short periods of time […]
    (Male, 26-40 years old, car user: cruiser)

This participant's responses suggest that a more versatile transportation system can be available for adoption, aimed at reducing people's stress in everyday life and improving overall convenience:

[…] one must be able to move around. It's just like a basic human right.
    (Male, 26-40 years old, car user: cruiser)

This insight sheds light on the systemic optimism that will potentially be brought about by the trams as an interconnected facet of the larger urban mobility and lifestyle system. There is both relief and address of the changing circumstances faced by urban commuters who view the trams as an opportunity to improve overall life quality. However, as the city's tram system covers only a portion of the journey, requiring efficient feeder traffic, such as buses and cars, are also needed to ensure seamless mobility. Many participants expressed concerns about the availability and convenience of feeder traffic and the disruption to their established bus routes. Public debates had already raised questions about the future of autonomous mobility adaptation, which some participants believed to be just around the corner:

That tram is quite limited […]. In my opinion, there is good transportation in Hervanta. However, the buses […] will stop due to the tram. Now, they need to arrange cross-traffic […]. People are a bit puzzled and hesitant about it, wondering how it will work and if it is a good idea. Moreover, the shuttle bus is a robot car. […] there is a robot car coming there now…
    (Female, over 71 years old, public transportation user: responsible)

The integration of autonomous mobility into the transportation system can also raise growing concerns about rapidly changing everyday practices. Moreover, interviews revealed that the appreciation of including various modes of transportation within the tram system, as part of a seamless mobility experience, applies to all users, including those with mobility aids such as rollators, wheelchairs, and strollers. This highlights the importance of accessibility and inclusivity, as these devices are essential for individuals with mobility impairments and for parents and caregivers

travelling with young children. Participants praised the tram's accommodating design, which was particularly favourable for elderly passengers and those who had to stand during the journey. The tram's accessibility and inclusivity contribute not only to its functionality but also to its aesthetic appreciation. Perceived accessibility in mobility facilitates a satisfying life, increasing overall comfort and well-being (Friman et al., 2020), and plays a crucial role in how individuals encounter and experience the transportation system. With an aging population, there is a growing emphasis on inclusiveness in public transportation, especially for older individuals, who also oftentimes rely on their "cognitive age" rather than "chronological age" (Sudbury & Simcock, 2009), promoting self-fulfillment for all (Wolfe, 1997):

> It feels good, it feels like a soft ride. There are no sudden stops. This is quite important, especially if you're standing. It's not dangerous for the elderly.
> (Male, 41-55 years old, public transportation user: responsible)
> […] it makes the transportation easier and of course elderly people, like my father who has slowed down a lot over these eighty-seven years […] so I see it as a safety issue for these elderly people.
> (Female, 56-70 years old, public transportation user: responsible)

Participants also emphasised the low-floor design of the tram as a key feature for convenience and comfort, providing a smooth and effortless transition between the platform and tram, and the opportunity to just "walk in." The absence of stairs allowed passengers with mobility issues to access the tram with minimal to no assistance:

> When you look at it, it's easier to use with all kinds of means, wheelchairs and stuff, when there is almost no threshold…
> (Male, 26-40 years old, public transportation user: responsible)

The tram's wide doors and spacious interior were noted for their contribution to making it easier for passengers with mobility aids to move around and find a comfortable position. The designated area inside the tram, marked with a large yellow wheelchair infographic on the grey floor, provided a safe and secure place for these aids during the journey and was highly appreciated by participants:

> It's a lot more spacious. Indeed, the wheelchair spot is near that [door],
> so you can leave easily […] even if you have strollers at the same time.
>   (Male, over 71 years old, car user: cruiser)

The inclusion of various modes of transportation as part of the seamless mobility experience can be seen as an extension of users' physical capabilities. This creates a sense of extended embodiment and integration into their overall sense of self. In accordance with Merleau-Ponty et al. (2014), individuals using objects like a rollator or bicycle do not perceive these as isolated entities with specific dimensions. Instead, they consider how these items interact with the available space to function effectively, enabling them to expand their being-in-the-world, appropriate new instruments, and extend their capabilities.

Finally, the majority of participants experienced a rush of excitement from the speed and convenience during their initial ride. They enjoyed the acceleration from the city centre to 70 km/h towards a suburban district, known for its large student population and high-tech companies. The reasonable half-hour commute time from the inner city to the end of the line changed participants' perception of distance between the two places. Many noted the effectiveness of the tram's priority traffic signals and the resulting uninterrupted ride. Participants reported that "time flies" during the journey. The sense of speed seemed to affect participants' flow experiences, characterised by full attention and immersion in the activity (Csikszentmihalyi & Halton, 1981). The ride became enjoyable and absorbing:

> I used to laugh about a five-minute difference, but it's not just about that, it's more of a whole feeling that it's not too cramped here, it's not too hot here, it doesn't smell bad here, and then, when it comes so briskly, the journey somehow seems to go faster, even though it's only a difference of 3-5 minutes, or even less, I don't know how much it really is […]
>   (Male, 41-51 years old, public transportation and car user: optimiser)

The tram's rapid acceleration exceeded participants' current adaptation level, resulting in an intense positive response. For example, Frijda's (1988) law of change in emotions describes that emotions are not solely triggered by the presence of favourable or unfavourable conditions but by changes in these conditions, whether real or anticipated. The other design attributes of the tram also enhanced the sense of speed and satisfaction.

This reinforces the interpretation of the tram experience connecting to flow theory, as the multisensory features in themselves serve an immersive function in the experience.

Tram Perspectives on the City: Spatiality, Relatedness, and Expression

The *Tram Perspectives on the City* section explores the participants' perceptions of the tram's unique spatial perspectives and their relationality to the city's surroundings. These themes are explored through the lens of the tram's: (1) spatiality and windows as social interfaces; (2) immersive and transforming scenic views in relatedness; and (3) expression and aesthetic appreciation of the tram's form. The section sheds light on how these themes enhance the sense of being through spatial awareness, visual design, and expression. Additionally, this sense of *being* through the embodied self plays out in relation to the tram itself and the city and its urbanity.

The design of the windows in the tram aligned with Arnheim's (1977) notion of windows as interfaces and shelters, which "connected and separated creatures in their environment and related them to it" (p. 144), akin to digital user interfaces. The placement of windows also contributed to the modern and stylish appearance of the tram. Moreover, the tram's windows functioned as spatial elements that significantly impacted the overall atmosphere and illumination inside the vehicle. Many participants expressed aesthetic appreciation for how the ribbon-shaped design and infusion of natural light created a unique sense of spaciousness and openness within the tram.

Participants conveyed a sense of freedom, increased awareness, and connection to the city. For many participants, the panoramic view and amp visibility outside were significant dimensions that positively influenced aesthetic and interaction experiences. They provided a constantly changing story of the city that passengers could immerse themselves in without worrying about the journey. This was facilitated by active tram movement, which supports Arnheim's (1977) idea that spatial knowledge is best acquired through "purposeful locomotion" (p. 153) rather than stationary observation:

> […] I get to observe the city […]. I have time to observe the city differently than if I were driving myself, but also in comparison to walking,

because when walking you have to be careful of other pedestrians and follow traffic rules and traffic lights […].
    (Female, 41-55 years old, public transportation and car user: optimiser)

A flaneur-like experience was expressed by the participants who, while being one with the cityscape, were also removed in their "airy" mobile observation towers. Many participants were able to witness the rapidly changing landscape, offering a unique perspective on their familiar and commonplace urban environment and its transformation over time. Some expressed nostalgia for areas that were once familiar, and their tram ride prompted memories of certain buildings, places, and events. Others demonstrated excitement for the city's future and direct interest and curiosity towards it. Ironically, many gas stations were in the process of being demolished at the time of the test rides. The once indeterminate and even romantic spaces (Wilson, 2003) were now filled with buildings designed to follow the track as the tram entered the city. The journey inspired mixed feelings of a growing city. The tram was not just transportation as a means of travel through participants' commonplace, rather it provided a unique opportunity for them to connect with the transforming urban landscape:

Well, it's just nice to have something new, but I don't know if this [city] is really ready for it.
    (Male, 26-40 years old, public transportation user: responsible)
    These landscapes probably live in such a way that I would imagine every field will inevitably be filled with apartment buildings, but probably for places like this [where we are now], nobody can really do anything anymore.
    (Female, 56-70 years old, car user: forced-motorist)

Another feature from the window was that of the green tram track. This captured the attention of almost all participants, many of whom had been following the landscape architecture in the surrounding area for some time. It was noted as a positive environmental change that improved the appearance of the street, enhancing the quality of everyday urban life. Phrases such as "boulevard", "esplanade", "park-like", or "big-city-like", reflected the transformation from an ugly road to a more elegant city boulevard, which historically has been a hallmark of sophisticated metropolitan areas (Searns, 1995). The greenery and its softening effect

were described as contributing to the wellbeing of the urban environment, suggesting a level of environmental sophistication that residents were proud of. This is in line with contemporary values for liveable areas and sustainable design:

> This has become really nice now, with so much greenery, like an esplanade or boulevard. In the middle, there's a green area […] It's definitely pleasing to the eye.
>   (Female, 26-40 years old, public transportation user: responsible)

The impressions of the tram are caressed by the green-casing (grass-lined passages) of its tracks. The effects of the grassy strips ripple into the internal–external sentiments of the ride. Sustainability of the design takes on a direct reference to nature as the greenery is seen as breaking the asphalt-ridden characteristics of the old roadways. Furthermore, the participants' scenic perceptions were not confined to the external environment viewed through the windows. Rather, it also encompassed the appearance of the tram exterior. Despite being familiar with the tram after seeing it around the city for six months before the test rides, participants still perceived its appearance and design as an integral part of the surrounding urban landscape, shaping their perception of their hometown. This emphasizes the importance of understanding the tram's role in the broader perceptual field.

Almost all participants were impressed by the bow-shaped design of the tram, which features a curved front and large windshield that many found aesthetically pleasing. Comparing the form to traditional box-like trams or to the city's previous bus system, many associated it with modern and up-to-date qualifications. The tram's design was perceived as dynamic, efficient, and sleek, with participants using terms like "bullet-train-like", "shuttle-like", "fast-looking", "smooth-looking", and "streamlined". This suggests that form qualifications signified progress and forward-thinking, indicating that the tram contributed to the sense of being part of a contemporary commonplace. Their excitement and positive experience over the tram's form implies that its sleek design and modern features hold significant meaning for the participants beyond its practical function as a mode of transportation, as well as its positioning towards the systemic autonomous future:

> The design of the tram is very modern. It looks fast, so to speak, with a fast design, with round shapes and angular shapes, so that it's a bit like a bullet train, even though it isn't […].
>
> (Male, 26-40 years old, car user: cruiser)
>
> This is more like a spaceship model. Like a shuttle […] the front, it's aerodynamic. […] it looks different from Helsinki's rickety square trams, aren't they just some straight […]. It's like a spaceship is actually going, like a future means of transport.
>
> (Female, over 71 years old, public transportation user: responsible)

Statements of the modern aesthetics of the tram were connected to the curved nature of the front of its body. One participant emphasised the futuristic shuttle-like nature of the vehicle, comparing it to the outdated nature of other cities' trams. Another participant emphasised the temporal newness of the design which was stated to be a positive characteristic. This indicates that participants focused on the specific aesthetic qualities of the tram. Merleau-Ponty describes this as the "power of suspension," the ability to suspend or restrict one's attention within the field of perception to examine certain details.

Yet, reflections on the form were not all optimistic. Visual aesthetics are influenced by a range of factors, including previous experiences, personality factors, cultural background, and personal preferences (see e.g., Arnheim, 1974). As such, a few participants had different reactions to the same design based on these factors. One participant described the tram's bow shape as unimaginative, unaesthetic, unappealing, and unsatisfying, likening it to a "blunt-nosed caterpillar" and expressing disappointment in its impact on the surroundings and experience of the city environment. Another participant saw the tram as an "ugly grub-like creature" and was critical of its lack of aerodynamic design. They believed that a more streamlined design would have been more efficient and more pleasing:

> I was looking at it from my own balcony, our balcony, when it passes here, and I think it's an ugly caterpillar, a "flat-faced caterpillar" […] it's not streamlined at all, so it consumes more electricity when it runs flat-faced, instead of being a little bit inclined […]

(Female, spouse of a man aged 56–70 years old in the same age group, car user: forced-motorist).

The aesthetics of the tram form allow it to serve as a means of self-realization. Positive reactions to the tram's design suggested that it

fulfilled an aspect of participants' self-expression, while negative reactions indicated a sense of dissonance in their relationship to the surrounding urban environment. These perceptions can be associated with stylistic preferences. Merleau-Ponty et al. (2014) uses the concept of "style" to characterise the unity of the world. He compares it to recognising an individual based on their unique style of behavior or expression. This recognition of the world's unity occurs through experiences, even if a precise definition of that unity remains elusive. Merleau-Ponty acknowledges that knowledge, including our understanding of the world's style, is dynamic, evolving with time, perception, and new experiences, perspectives, and insights. He states that this evolving knowledge does not undermine the world's unity but rather reflects dynamic engagement with it.

Tram Colour and Aesthetic Preferences: Inclusiveness, Heritage, Individuality, Astonishment, and Disruption

The *Tram Colour and Aesthetic Preferences* section explores the participants' perceptions of the tram's colour. It strongly resonates with a process of citizen engagement that asked Tampere residents in earlier stages of the design process for their input into choosing the final colour of the vehicles. Several themes emerged that seemed to impact the experience of the colour. These were: (1) the colour red—as voted by the people of Tampere; (2) the industrial heritage of Tampere and its continuous historical role as an icon of modern technology; (3) personal colour perceptions and individual assertion; (4) surprise and astonishment in relation to the colour and overall visual impression of the tram system; and (5) symbol of commercialisation, contemporary brand value, and breach of cultural norms. The colour of the tram proved to be a prominent topic among the participants in the study, with many expressing strong feelings and attitudes towards its unique shade. According to Arnheim (1974), colours carry strong expression, as participants associated the colour with cultural, historical, and practical significance.

Those responsible for the tram design had previously engaged the citizens in the participation process by holding a colour vote, allowing them to have a word in the tram appearance. The participants could choose from three predetermined colours, two of which were different shades of blue and one was red. There had been a discussion about colours on social media and there were supporters for the colour pink as well, but it had

not been approved as an option for the vote. Eventually, the colour red was chosen to be the colour of the tram. Many participants found the vote to be an exciting and important event, as it allowed them to feel included in the shared decision-making among the community members. Other votes were also organised during the tram's design path. One participant, who had also been involved in a special 13-person user testing group, whose members had been involved in testing the tram prototype at the beginning of its design process, described the shared intention of many participants towards the colour vote:

> I'm probably saying it for the fifth time now. This was designed by people from Tampere.
> (Female, 56–70 years old, public transportation user: saver).

Moreover, the colour red, despite varying opinions on the exact shade, was consistently associated with positive emotions and perceived as aesthetically pleasing and familiar. For most participants, the colour resembled that of old factory buildings, a nod to the city's industrial heritage. While some participants also associated the colour with the city's political and ideological roots as a working-class city which was not the primary focus for the majority. Instead, participants were more concerned with how the colour complemented the city's historically significant old factory buildings with chimneys, which have undergone adaptive reuse to new purposes. As such, the colour was seen as having cultural and historical significance and representing the city's identity. In addition to its symbolic importance, participants also noted that the colour served a practical purpose in making the tram easily recognisable and distinct from the blue buses:

> Maybe it's just because Tampere has such a red culture, that in the history of some red cities, it's still a working-class city, more of a working-class colour. [...] This is an old industrial city so I thought [brick-coloured] would be a reminder that it used to be an industrial city [...].
> (Male, 26-40 years old, public transportation user: responsible)

According to Arnheim (1974), colour perception is influenced by a range of psychological and perceptual factors in addition to physical stimuli, such as context, contrast, and the interaction of colours with each other. The Tampere Tram's colour was perceived differently

by different people, with some finding it unappealing or disappointing, which highlights the subjectivity of colour perception:

> It's not a bright colour. It's a dull colour. It was a bit disappointing […].
> (Male, 56–70 years old, car user: forced-motorist)
> It's not even a brick colour [...] we compared it to the red of bricks since Tampere is a city with a lot of brick buildings, so it would have been better. I am an aesthete […] I am disgusted.
> (Female, spouse of a man aged 56–70 years old in the same age group, car user: forced-motorist).
> We talked about that brick red colour. I haven't seen any brick that colour […].
> (Male, 41–55 years old, public transportation user: saver)

Furthermore, during the test drives that took place at the same time as the interviews, many participants were surprised to find that the trams in the entire system were not all the same colour. Some of the trams were a different colour than the original red that was voted on, and these trams were covered in advertisements. Some participants mentioned that there was a voting process for the original colour and expressed discomfort and confusion about the different colours of some trams, regarding the advertisements covering entire trams. Some suggested that the initial colour should still be visible which emphasised the emotional attachment to the original colour. Participants described that the primary aesthetics should be preserved and that advertisements should be well-placed, non-intrusive, and artistic. The presence of advertisements on some trams disrupted the original aesthetics and was even described as "messy" and "cheap looking." Overall, the presence of advertisements on some trams was seen as compromising the brand value and reputation of the tram system:

> In general, it has a negative appearance, [...] it does bring buses to mind if they are completely covered with some ads, but just when all trams are red or one or two are those red-black ones and then there's that LähiTapiola blue tram […].
> (Male, 26–40 years old, public transportation user: responsible)
> To me, it's about being somehow uniform, that they are like the same, that's the feeling, but then if you start wrapping them with ads, then they're all different, and for some reason, it depends on who is advertising

and what kind of ad it is, but it does lower the value or make it feel cheaper[…].
   (Male, 41–55 years old, public transportation and car user: enhancer)

This suggests that some participants perceived trams as a symbol of commercialisation and undervaluation of public space due to the changes in appearance that detract from the overall experience of a new public transportation system. This sentiment was also reflected in the tram's interior environment, which may indicate shifting values in terms of overload stimuli in people's daily lives:

I don't remember if it was certain, but I think that these were not supposed to be wrapped [...], so of course it kind of takes it in a way that they become big advertisements […].
   (Male, 41–55 years old, public transportation and car user: enhancer)

However, one male participant expressed an opposing view to the majority in terms of the aesthetics of the advertising trams. Despite his earlier aesthetic preference for the red colour, his initial preference changed due to the appearance of the advertising trams. He enthusiastically described,

Well, as soon as it got some colour, some sort of color life, it changes the whole look [better] [...] this colour thing, when we voted for it. I voted for the red one. Now that I have seen those taped blue ones […] they are much nicer!
   (Male, 26–40 years old, public transportation user: responsible)

Some participants expressed confusion about the different coloured trams in operation, which suggests that the breach of the cultural norm of community engagement created confusion. Citizens had come together with a shared intention to choose the colour of the tram, an act that also reflects collective acceptance and a shared emotional connection to the tram. Colour preferences revealed participants' varied collective and individual perceptions and emotions, largely stemming from many participants' involvement in the design process. These emotions were intertwined with the city's identity, its industrial past, shared memories, and personal preferences. Additionally, the presence of advertisements on

some trams challenged cultural norms and practices. From the perspective of co-design, this also raises questions about the responsibility of considering participants' opinions.

Conclusion

The cultural context and dynamics of Tampere City, characterised by a unique history of academic and industrial heritage, were evident in the participants' perceptions and associations. This revealed a shared cultural perspective on their social world, urban environment, and its placement in technological discourse. According to Zerubavel (1999), cities have a tendency for creating thought communities to which individuals belong (p. 9). Simmel (1912) argues that the development of contemporary culture, seen through universal fashion, is characterised by the dominance of the objective spirit in shaping the individual's self-knowledge and personal identity. The objective spirit (or better known as objective culture) can be described as collections of tools, products, symbols, and rules that are created by humans and exist externally to any one person. Objective culture and fashion are integrated into individual identity and practices to form "subjective culture" (Nisbet, 1980).

The findings of this study are visualised in Fig. 5.2, which illustrates the atmospheric and environmental cues as described by Merleau-Ponty et al. (2014) and Spence (2020). These cues consist of three main elements: (1) scenic perception (observed through windows); (2) kinesthetics (seamless movement and mobility); and (3) visual and spatial aesthetics (interior atmosphere). The interwoven nature of the interior, along with its window-enabled connection to the surrounding urban spaces, opens a gateway to aesthetic appreciation through embodied and multisensory design semiotics, temporality (nostalgia and projection), and sustainable ideological engagement. The affective experiences of participants' embodied selves in their dynamic interactions with technology are closely connected to contextualization, allowing to examine how meanings of technology change as situations evolve within a specific spatio-temporal field.

While tramways, their design and infrastructure may be carefully documented, the systems within the systems feature a complex network of the material and immaterial that can never be fully accounted for. Some qualities came to the fore in the study when referring to the aesthetic and symbolic dimensions of the trams such as form or usage (car ownership),
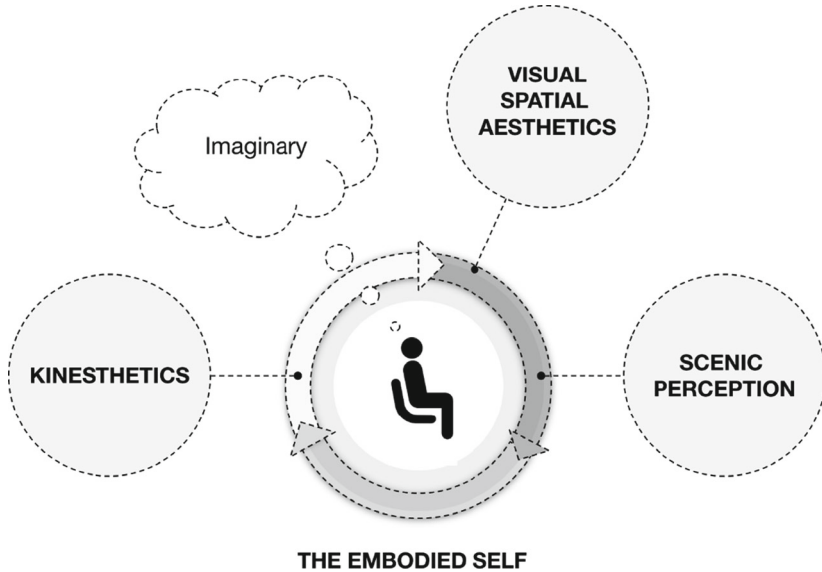
Fig. 5.2 The self in embodied multisensory tram experience

particularly in light of *self*, *identification* and *future*. The participants' perceptions and experiences of the tram journey in Tampere city were shaped by their cultural context, social and cultural presence, and prior experiences of public transportation.

Imaginings of a smart future were alluded to through the form of the chassis. Conflict arose in the responses of the participants, whereby some perceived the nose of the vehicle to be shuttle-like and aerodynamic, while others felt more tilt would have accentuated its futuristic ambitions. Sustainability and its connections to smart cities were accentuated through the greenery of the grassy track casing. Ideological dimensions included social democracy (accessibility and fairness) and decrease in car traffic. Yet, the main imaginary crossroad of the future appeared to be in people's mental image. Participants' reactions to the integration of autonomous mobility varied, with some already recognizing the need to adapt to changing habits for seamless mobility, while others expressed concerns and confusion about the future of transportation. This reveals a delicate balancing act between opposing forces such as group affiliation

and individual assertion, conformity and independence, as well as dependence and freedom, which are typical of fashion changes (Shusterman, 2016).

The study lends reflection on the tram system emergence and appearance in the city, its aesthetics, experience and physical existence in a specific context and place. The study also established connections between universal fashion and embodied perception and introduced an adapted Socio-Technological Embodiment Model (SoTEM) to depict the multifaceted nature of embodied experience. According to Merleau-Ponty et al. (2014), experiences flow continuously, with each experience implicating and explicating others, using Paris as an example. He asserts that Paris is not merely a sum of separate objects or individual perceptions but embodies a certain style or sense grasped through a flow of experiences. Each explicit perception, be it a café, faces, or the bends of the Seine, contributes to the city's overall essence. Thus, objects are not perceived in isolation but as part of the overall sense that pervades a landscape or town, as is the case with the Tampere Tram. Ultimately, Merleau-Ponty emphasises that an initial perception without any background or context is inconceivable. Every perception relies on the subject's past, and the abstract function of perception involves encountering objects and implying a more underlying and implicit act by which individuals continuously shape and elaborate their perceptual milieu within a certain temporal horizon.

To draw on Juhani Pallasmaa (2012), embodied experiences may be observed through architectural sensations, as "[a]n architectural experience silences all external noise; it focuses attention on one's very existence" (p. 31). Attention is thus projected away from the building, or in this case vehicle, towards the individual and their positioning in the world. Architecture generally does not take centre stage within everyday practices. Rather, it provides the structural framework through which other encounters and interactions occur. Trams are both structures that frame other social situations, while also being structured and augmented by the surroundings (environmental, cultural, political, etc.). They present a multisensory integration of environmental and atmospheric cues that within the hussle of the everyday remain unnoticed, unless causing concern or threat. The self, from the *I self* through to the *Me self*, unravels via chains of interactions with objects and others. Pallasmaa describes how "[b]uildings and cities provide the horizon for the understanding and confronting of the human existential condition"

(p. 12). These structures serve as mental cues that trigger the imagination, inspire dreams, and fuel desire. There is no such thing as a technological structure that exists in isolation. Buildings and other structures engage consciousness in reflective states that impact one's sense of self and notions of being that are both embodied and spiritual within collective ethos of the times.

The Tampere Tramway system is not yet autonomous. It can be understood rather as a "Wizard of Oz" forerunner in a metropolitan transportation system that is intended to serve a smart city of the future. As such, this study enabled insight into the symbolic interactions that occur between the individual with the environment, technology, ideologies, past and projected future. Ideas about the future are echoed through sentiments of form, seamless mobility, and relatedness to the broader urban environment. The strongest notions reflected towards the future pertained to the changing urban environment—change the tramway and new mobility habits as a part of.

REFERENCES

Abdallah, T. (2017). *Sustainable mass transit: Challenges and opportunities in urban public transportation*. Elsevier.

Adler, M. W., Peer, S., & Sinozic, T. (2019). Autonomous, connected, electric shared vehicles (ACES) and public finance: An explorative analysis. *Transportation Research Interdisciplinary Perspectives, 2*, 100038. https://doi.org/10.1016/j.trip.2019.100038

Arnheim, R. (1974). *Art and visual perception*. University of California.

Arnheim, R. (1977). *The dynamics of architectural form: Based on the 1975 Mary Duke Biddle lectures at the cooper union* (Vol. 376). University of California.

Baltic, T., Hensley, R., & Salazar, J. (2019). The trends transforming mobility's future. *The McKinsey Quarterly*. Retrieved 20 March 2023 from https://www.mckinsey.com/~/media/mckinsey/industries/automotive%20and%20assembly/our%20insights/the%20trends%20transforming%20mobilitys%20future/the-trends-transforming-mobilitys-future-vf.pdf

Blumer, H. (1980). Mead and Blumer: The convergent methodological perspectives of social behaviorism and symbolic interactionism. *American Sociological Review*, 409–419. https://www.jstor.org/stable/2095174

Blumer, H. (1998). *Symbolic interactionism: Perspective and method*. University of California Press.

Bourdieu, P. (1990). *The logic of practice*. Trans. Richard Nice. Stanford University Press.

Bourdieu, P. (1996). *Distinction: A social critique of the judgement of taste*. (8th printing). Harvard University.

Bunge, M. (1998). Sociotechnology. In M. Bunge (Ed.), *Social science under debate: A philosophical perspective* (p. 297). University of Toronto.

Carley, K. (1993). Coding choices for textual analysis: A comparison of content analysis and map analysis. *Sociological Methodology*, 75–126.

Cholachatpinyo, A., Fletcher, B., Padgett, I., & Crocker, M. (2002). A conceptual model of the fashion process–part 1: The fashion transformation process model. *Journal of Fashion Marketing and Management: An International Journal, 6*(1), 11–23.

Cockton, G. (2020). Worth-focused Design: Approaches, contexts and case studies, Volume 2. *Synthesis lectures on human-centered informatics*, 13(2), i–203. https://link.springer.com/book/10.1007/978-3-031-02230-2

Cockton, G. (2017). New process, new vocabulary: Axiofact= a_tefact+ memoranda. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 747–757). https://doi.org/10.1145/3027063.3052755

Coles, A.-M., Clarke, I., & Piterou, A. (2023). A "poor man's carriage": System building and social interactivity in UK urban tramway development, 1860–1890. *Industrial and Corporate Change*, dtac063. https://doi.org/10.1093/icc/dtac063

Csikszentmihalyi, M., & Halton, E. (1981). *The meaning of things: Domestic symbols and the self*. Cambridge University Press.

Damhorst, M. L. (2005). Dress as nonverbal communication. In M. L. Damhorst, K. A. Miller, & S. Michelman (Eds.), *The meanings of dress* (2nd ed., pp. 78–89). Fairchild Publications.

Dewey, J. (1908). What does pragmatism mean by practical? *The Journal of Philosophy, Psychology and Scientific Mmethods*, *5*(4), 85–99. https://www.jstor.org/stable/2011894

Dunn, R. G. (1997). Self, identity, and difference: Mead and the poststructuralists. *The Sociological Quarterly, 38*(4), 687–705. https://doi.org/10.1111/j.1533-8525.1997.tb00760.x

Entwistle, J. (2000). Fashion and the fleshy body: Dress as embodied practice. *Fashion Theory, 4*(3), 323–347. https://doi.org/10.2752/136270400778995471

Fiore, A.-M. (2010). *Understanding aesthetics for the merchandising and design professional*. A&C Black.

Freudendal-Pedersen, M., Kesselring, S., & Servou, E. (2019). What is smart for the future city? Mobilities and automation. *Sustainability*, *11*(1), 221. https://doi.org/10.3390/su11010221

Frijda, N. H. (1988). *The Laws of Emotion. American Psychologist, 43*(5), 349–358. https://doi.org/10.1037/0003-066X.43.5.349

Friman, M., Lättman, K., & Olsson, L. E. (2020). Public transport quality, safety, and perceived accessibility. *Sustainability, 12*(9), 3563. https://doi.org/10.3390/su12093563

Gibson, J. J. (1979). The theory of affordances. *The ecological approach to visual perception* (pp. 67–82). Houghton Mifflin.

Hannon, E., Knupfer, S., Stern, S., Sumers, B., & Nijssen, J. T. (2019). *An integrated perspective on the future of mobility, part 3: Setting the direction toward seamless mobility demand*. McKinsey Center for Future Mobility. Retrieved 20 March 2023 from https://integral.ms/wp-content/uploads/2019/01/An-integrated-perspective-on-the-future-of-mobility-part-3.pdf

Herweijer, C., & Waughray, D. (2018). *Fourth industrial revolution for the earth harnessing artificial intelligence for the earth*. A report of PricewaterhouseCoopers (PwC). Retrieved 12 September 2023, from https://www.pwc.com/gx/en/sustainability/assets/ai-for-the-earth-jan-2018.pdf

Holden, E., Gilpin, G., & Banister, D. (2019). Sustainable mobility at thirty. *Sustainability*, *11*(7), 1965. https://doi.org/10.3390/su11071965

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288.

Hård, M., & Misa, T. J. (Eds.). (2008). *Urban machinery: inside modern European cities*. MIT Press.

James, W. (1890). *The principles of psychology*. Henry Holt & Co.

Kaiser, S. B. (1997). *The social psychology of clothing: Symbolic appearances in context*. Second Edition. Fairchild.

Kawamura, Y. (2005). *Fashion-ology: An introduction to fashion studies*. Bloomsburg Publishing.

Kawamura, Y. (2011). *Doing research in fashion and dress: An introduction to qualitative methods*. Bloomsbury Publishing.

Krippendorff, K., & Butter, R. (2008). Semantics: Meanings and contexts of artifacts. In H. N. J. Schifferstein & P. Hekkert (Eds.), *Product Experience* (pp. 353–376). Elsevier.

König, R. (1973). *The restless image: A sociology of fashion*. Allen & Unwin.

Latour, B. (2007). *Reassembling the social: An introduction to actor-network-theory*. Oxford University Press.

Leder, H., Belke, B., Oeberst, A., & Augustin, D. (2004). A model of aesthetic appreciation and aesthetic judgments. *British Journal of Psychology, 95*(4), 489–508. https://doi.org/10.1348/0007126042369811

Leikas, J. (2009). *Life-based design: A holistic approach to designing human-technology interaction*. VTT Technical Research Centre of Finland.

Mackett, R. L., & Edwards, M. (1998). The impact of new urban public transport systems: Will the expectations be met? *Transportation Research Part a: Policy and Practice, 32*(4), 231–245. https://doi.org/10.1016/S0965-8564(97)00041-4

Matteucci, G., & Marino, S. (Eds.). (2016). *Philosophical perspectives on fashion*. Bloomsbury Publishing.

McCarthy, J., & Wright, P. (2004). Technology as experience. *Interactions, 11*(5), 42–43. https://doi.org/10.1145/1015530.1015549

Mead, G. H. (1934). *Mind, self, and society* (Vol. 111). University of Chicago Press.

Merleau-Ponty, M., Landes, D., Carman, T., & Lefort, C. (2014). *Phenomenology of perception*. Routledge.

Michalco, J., Simonsen, J. G., & Hornbæk, K. (2015). An exploration of the relation between expectations and user experience. *International Journal of Human-Computer Interaction, 31*(9), 603–617. https://doi.org/10.1080/10447318.2015.1065696

Moraglio, M. (2011). La bataille de la route [The Battle for the Road]. *The Journal of Transport History*, *32*(2), 224. Retrieved 24 March 2023, from https://www.proquest.com/openview/094d58de8c287a520dec85d9a093ad53/1?pq-origsite=gscholar&cbl=37653

Nadin, M. (2007). Semiotic machine. *The Public Journal of Semiotics, 1*(1), 85–114. https://doi.org/10.37693/pjos.2007.1.8815

Neisser, U. (1988). Five kinds of self-knowledge. *Philosophical Psychology, 1*(1), 35–59.

Nisbet, R. (1980). *History of the idea of progress*. Basic Books.

Othman, K. (2021). Public acceptance and perception of autonomous vehicles: A comprehensive review. *AI and Ethics, 1*(3), 355–387.

Pallasmaa, J. (2012). *The eyes of the skin: Architecture and the senses*. John Wiley & Sons.

Peirce, C. S. (1905). What pragmatism is. *The Monist, 15*(2), 161–181. https://doi.org/10.5840/monist190515230

Petersen, T. B., Mackinney-Valentin, M., & Melchior, M. R. (2016). Fashion thinking. *Fashion Practice, 8*(1), 1–9. https://doi.org/10.1080/17569370.2016.1147699

Petkov, D. (2020). The emergence of the modern French tramway as a socio-technical novelty. *Tramway renaissance in Western Europe: A socio-technical analysis* (pp. 151–228). https://doi.org/10.1007/978-3-658-28879-2

Pyyhtinen, O. (2020). Simmel's resonance with contemporary sociological debates. *The Routledge international handbook of simmel studies* (pp. 33–45). Routledge.

Reynolds, J. (2020). Embodiment and emergence: Navigating an epistemic and metaphysical dilemma. *Journal of Transcendental Philosophy, 1*(1), 135–159. https://doi.org/10.1515/jtph-2019-0008

Roto, V., Law, E., Vermeeren, A. P. O. S., & Hoonhout, J. (2011). User experience white paper. Bringing clarity to the concept of user experience. Result from Dagstuhl seminar on demarcating user experience, September 15–18 (2010). *Disponible en ligne le*, *22*, 06–15. Retrieved March 24, 2023, from https://drops.dagstuhl.de/opus/volltexte/2011/2949/pdf/10373_AbstractsCollection.2949.pdf

Rousi, R. (2020). That Crazy World We'll Live in—Emotions and anticipations of radical future technology design. In R. Rousi, J. Leikas, & P. Saariluoma (Eds.), *Emotions in technology design: From experience to ethics* (pp. 141–153). Springer. https://doi.org/10.1007/978-3-030-53483-7_9

Rousi, R. (2013a). From cute to content: User experience from a cognitive semiotic perspective. *Jyväskylä Studies in Computing*, *171.* University of Jyväskylä.

Rousi, R. (2013b). Formidable bracelet, beautiful lantern: studying multi-sensory user experience from a semiotic perspective. In *Design Science at the Intersection of Physical and Virtual Design: 8th International Conference, DESRIST 2013, Helsinki, Finland, June 11–12, 2013. Proceedings 8* (pp. 181–196). Springer.

Rousi, R., & Alanen, H. K. (2021). Socio-emotional experience in human technology interaction design—a fashion framework proposal. In M. Rauterberg (Ed.), *Culture and Computing. Design Thinking and Cultural Computing: 9th International Conference, C&C 2021, Held as Part of the 23rd HCI International Conference, HCII 2021, Virtual Event, July 24–29, 2021, Proceedings, Part II* (pp. 131–150). Springer International Publishing. https://doi.org/10.1007/978-3-030-77431-8_8

Rousi, R., & Silvennoinen, J. (2018). Simplicity and the art of something more: A cognitive-semiotic approach to simplicity and complexity in human-technology interaction and design experience. *Human Technology*, *14*(1). https://doi.org/10.17011/ht/urn.201805242752

Rousi, R., Saariluoma, P., & Leikas, J. (2010). Mental contents in user experience. *Proceedings of MSE2010, 2*, 204–206.

Saariluoma, P., & Rousi, R. (2020). Emotions and technoethics. In R. Rousi, J. Leikas, & P. Saariluoma (Eds.), *Emotions in technology design: From experience to ethics* (pp. 167–189). Springer Nature.

Searns, R. M. (1995). The evolution of greenways as an adaptive urban landscape form. *Landscape and Urban Planning, 33*(1–3), 65–80.

Shilling, C. (2004). *The body in culture, technology and society*. Sage.

Shusterman, R. (2005). Pragmatism: Dewey. In B. Gout & D. McIver Lopes (Eds.), *The Routledge companion to aesthetics* (pp. 141–152). Routledge.

Shusterman, R. (2016). Fits of fashion: The somaesthetics of style. In G. Matteucci & S. Marino (Eds.), *Philosophical perspectives on fashion* (pp. 91–106). Bloomsbury Publishing.

Simmel, G. (1957). Fashion. *American Journal of Sociology*, *62*(6), 541–558.

Simmel, G. (2012). The metropolis and mental life. In J. Lin & C. Mele (Eds.), *The urban sociology reader* (pp. 37–45). Routledge.

Silvennoinen, J. M., Rousi, R., Jokinen, J. P., & Perälä, P. M. (2015). Apperception as a multisensory process in material experience. In *Proceedings of the 19th International Academic Mindtrek Conference* (pp. 144–151). https://doi.org/10.1145/2818187.2818285

Spence, C. (2020). Senses of place: Architectural design for the multisensory mind. *Cognitive Research/ Principles and Implications, 5*(1), 46. https://doi.org/10.1186/s41235-020-00243-4

Sterne, J. (2003). Bourdieu, technique and technology. *Cultural Studies, 17*(3–4), 367–389. https://doi.org/10.1080/0950238032000083863a

Souter, I. A. (2001). An analysis of the development of the tramway/light rail concept in the British Isles. *Proceedings of the Institution of Mechanical Engineers, Part F: Journal of Rail and Rapid Transit, 215*(3), 157–166. https://doi.org/10.1243/0954409011531486

Sudbury, L., & Simcock, P. (2009). Understanding older consumers through cognitive age and the list of values: A UK-based perspective. *Psychology & Marketing, 26*(1), 22–38. https://doi.org/10.1002/mar.20260

Tampereen Ratikka. (2023). *The Tampere Tramway Story*. Tampereen Ratikka. Retrieved August 24, 2023, from https://www.tampereenratikka.fi/en/the-tramway-story/

Vihma, S. (2007). Design Semiotics—Institutional experiences and an initiative for a semiotic theory of form. In R. Michel (Ed.), *Design research now* (pp. 219–232). Birkhäuser Verlag GmbH.

Wilson, E. (2003). Against Utopia: The romance of indeterminate spaces. In A. Bingaman, L. Sanders, & R. Zorach (Eds.), *Embodied Utopias* (pp. 274–280). Routledge.

Warell, A. V. (2003). *Design syntactics: A functional approach to visual product form. Theory, models, and methods* [PhD Dissertation]. Chalmers University of Technology, Gothenburg.

Wolfe, D. B. (1997). Older markets and the new marketing paradigm. *Journal of Consumer Marketing, 14*, 294–302.

Wurhofer, D. (2015). *Characterizing experiential changes—Temporal transitions of user experience* [PhD Dissertation]. University of Salzburg, Salzburg. Retrieved March 24, 2023, from https://eplus.uni-salzburg.at/obvusbhs/content/titleinfo/5015270/full.pdf

World Bank. (2023). *Urban development*. Retrieved August 24, 2023, from https://www.worldbank.org/en/topic/urbandevelopment/overview

Zerubavel, E. (1999). *Social mindscapes: An invitation to cognitive sociology*. Harvard University Press.