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Exploring the dynamics of architecture with the concept of affordance
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Exploring the dynamics of architecture with the concept of affordance

From an architectural perspective, the purpose of this paper is to explore the dynamic relations between individuals and the environments using the concept of affordance. In three different cases of architectural research the concept of affordance is used as an analytical tool – yet demonstrating different scopes and outcomes. A post-occupancy evaluation of an office space in transformation; a lighting assessment and intervention in low vision rehabilitation situated in private home environments; and an urban event at an architecture festival involving the intervention of a sound- and scentscape. The three cases show that the concept of affordance can embrace and operationalize the human perception of the environment, pointing at descriptive, prescriptive, and exploratory possibilities in relation to architectural design and research. The concept of affordance enables rich descriptions and explorations of qualities of architecture, related to multisensorial, emotional, and social interactional aspects of humans and their environments.

Keywords: affordances, human-environment relation, architectural research, environmental psychology, multisensory design

Introduction

The concept of affordance has evolved in different directions since Gibson introduced it as part of an ecological approach to perception, as the possibilities for action that the environment offer the animal (Gibson, 1979). New categories have been introduced, within psychology: mental affordances (McClelland, 2020), emotional affordances (Broberg et al., 2013) and social affordances (Neel & Lassetter, 2019; Kiverstein, 2015), or related to specific aspects of the environment, as nature (Araújo, 2019), music (Krueger, 2014; Tanaka, 2010), social media (Merolli et al., 2013), ICT (Gössling, 2021), technology (Shin, 2017) and product design (Norman 1988, 1998). The contributions have developed hypotheses, measures, evaluations, design methodologies and designs, cultivating the concept within the specific fields of interest.

Gibson suggested the ecological approach as a way to overcome an unsatisfactory theoretical basis in architecture and design (Reed & Jones, 1982). Even though several branches of design have adopted the approach, especially impacted by the work of Don Norman in product design (Norman 1988, 1998), the use of affordances within architectural research has been somewhat limited. In a recent discourse analysis and structured review of affordances within architecture, Young and Cleveland (2022) argue in line with Gibson (Reed & Jones, 1982) that the lack of interest relates to the tendency in architectural design to focus on aesthetics: The descriptive visual language of the modern architect is hard to combine with utility or function. Thus, existing contributions in the field of architecture either focus on the personal, the social or the cultural aspects of the human environment relation and often in ways that do not encompass the dynamics between the personal, social, and material: leaving out the human in artefact-artefact affordances (Maier et al., 2009) or focusing on the function-task relation (Galvao & Sato, 2005).

However, as a field situated between practice and academia, architectural research is multifaceted, Vitruvius' triad of *firmitas*, *utilitas*, and *venustas* (Rowland & Howe, 2001), which has been a core of the architectural practices since the antique, already unites form and function: *Utilitas* relates quality of a design to its use, and *venustas* relates to the experience of this design. Two millenniums later, the ideology of Bauhaus embraced the sensory perception in the architectural process, a "constructive" architecture where perception constitutes the first act (Argan, 1962, p. 104). This sensory perception has largely been embedded as tacit knowledge in the hands-on creative educations, while architectural scholars' descriptions of the perception of space and architecture have by large been supported by philosophy. From early and mid-20th century and as a reaction towards the contemporary modernism, especially

phenomenology has cultivated the understanding of the human-environment relation. E.g. in Merleau-Ponty's concept of human-world enmeshment, where the sensing and what is being sensed are intertwined in a pre-cognitive intelligence manifesting through action in the world at hand (Seamon, 2014). Or in Lefebvre (1991), challenging the epistemological representations of space in philosophy by bridging them with real spaces: perceived-conceived-lived and practiced socially in the daily reality. Furthermore, where Heidegger's (1952) work on dwelling and Norberg-Schultz' (1979) take on the urban and landscape scale have been part of establishing an *architectural phenomenology*, Gropius introduced architecture as a "phenomenology of planning" to the students of Bauhaus (Argan, 1962, p.101), Norberg-Schultz translated the phenomenological approach to both architectural education and practice (1979), and later the approach has been operationalized in the writings and work of the practicing architect Zumthor: Describing architectural quality as its ability to move, by the "immediate appreciation, of a spontaneous emotional response" in the meeting with a building (Zumthor, 2006, p. 13). Similarly, Hale (2016) describes design, perception and use as inseparable entities comprising our understanding of our physical surroundings as based on the possibilities it offers.

These ideologies and philosophies all point to an understanding of perception where use and environment are inseparable entities. Heft (2010) argues that possibilities for action and use should be fundamental and included in the early phases of architectural design rather than a subsequent afterthought, as is often the case in design practices. Paradoxically, and despite the existing theoretical understanding in philosophy e.g., conflicting suppositions of perception hinders researchers and designers to cultivate the qualities of perceptual experience (ibid.).

The concept of affordance, with its wide application, holds potential to address this problem: As a key tool to investigate and understand the mechanisms and relationships between humans and their built environment (Bell, 1999), a framework for thinking of and understanding function, meaning and attraction of the environment, that can sensitize architectural design to user needs; and help identify constraints and possibilities for action (Heft, 2010). The purpose of this paper is to explore the possibilities and limitations of the concept of affordances to, in empirical architectural research, emphasize the interplay between the subject and its environment.

Materials and methods

Theory

Revisiting Gibson's (1979) environmental psychology, the perception of affordances concerns the functional properties of the environment and what it offers the individual. Affordances situate perception in multisensory interactions with the environment, not perceived as mere objects in space but as possibilities for action. Merleau-Ponty's notion of "synesthetic perception" describes how the senses intermingle and resonate mutually in a synergy of experience, this pre-conscious perception of the lived body highlights that this link between sensing and action is almost always out of sight from conscious awareness (Seamon, 2014). This pre-conscious perception is especially present in the effect of smell because of its direct link to our limbic system involved in emotional processing (Haug et al., 2000). It can be difficult to be conscious about the effect of smell, as: "Our storage of olfactory experience ... is not readily accessible to the perceptual consciousness ... which is another way of saying that smells are good at eluding mental censorship" (Eliasson, 2005, p. 50). Multisensory interaction requires, being active as a fundamental part of perception - being in motion, feeling, smelling,

listening (Heft, 2010). Evidently different qualities of a setting are related to different activities: A low bench may afford a child to sit, while it is far too low for an elderly, for whom it holds a negative affordance. In this way, perception links the environment and our emotions - the environment affects our emotional state and our emotional state affects our perception of the surroundings (Engberg-Pedersen & Meyhoff, 2004). Moreover, a feeling can itself be seen as an affordance that expresses positive or negative opportunities, which can motivate different actions (Proust, 2015). The qualities in an environment can provoke new emotions, constituting a dynamic interplay between the perceiver and the environment, where affordances are “meaningful, value-rich features of experiences that in the course of action and in the context of an individual’s history are often alluring, and sometimes repelling” (Heft, 2010, p.26). Departing from the corporal sensations, Gibson notes that the process of perception, also hold a self-perception, specified by the field of view: “Each person gets information about his or her body that differs from that obtained by any other person” (Gibson, 1979, p.107). Information of the body and the environment is specified in the same interaction – both subjective and objective. Consequently, the affordances form properties, relative and unique to the individual, at the same time a fact of the environment and a fact of behavior.

The self-perception also includes sociocultural aspects (Heft, 2010). Social aspects of perception have been unfolded by Goodley (1971) in geography and urban studies by introducing group perceptions in addition to individual perceptions. Where the individual concerns a complex and less susceptible micro-scale and personal space, the group perceptions include shared and generalized world views - of assumed "sane, healthy, 'rational' adults" (p.4). As the socio-cultural context inform what the individual perceives as affordances, the actualization of a potential affordance also depends on the

dynamic relation between the processes of the immediate perception and the social and cultural construct at the given time (Heft, 2003). However, meanings are not added on top of the lived, bodily experience, but woven together with it in the actual practice (Ingold 2000, p. 286). Affordance is therefore a dynamic perceptual process of interactions between the individual and their environment, which develops over time. Socio-spatial affordances, including both the social (the effect) and the spatial (the features), was the focus of a recent study of affordances of the home environment during lock down, and showed that communality, individuality, adaptability, and connectivity were key affordances in this new setting (Marco et al., 2022).

In the entangled relationship between a specific user and specific elements of their environment, an artifact would afford different behaviors dependent on their cultural background, size, and abilities, yet the artifact can also possess multiple affordances (Heft, 2007; Atmodiwirjo, 2014). Gibson's notion of 'nesting', where smaller units are embedded in larger units, across scales "full of transitions and overlaps" (Gibson, 1979, p.9), situate affordances both spatially and temporally (Chemero, 2003), where both functional and social possibilities within a setting can occur daily, periodically, or only once (Heft, 2007).

Furthermore, the temporal scale of the multi-sensorial, stimulus flux of ecological perception cover processes of change and adaptation; change of perspective or events. Humans have changed the environment and what it affords them, creating habitats of different places and different affordances (Gibson, 1979, p. 136). The processes of complementing environmental opportunities with specific personal abilities is called actualization (Raymond et al., 2017), and for an affordance to be actualized it needs to be identified, recognized, or acknowledged by the individual, and eventually become part of their embodied knowledge (Moore & Cosco, 2007). Consequently, in

addition to the directly *perceived* and *potential* affordances, there are also *shaped* affordances – in new or modified affordances (Raymond et al., 2017).

Transitions and change have been further investigated in the notion of destabilization and re-interpretation of affordances (Rietveld & Rietveld, 2011) and a re-adaptation to the environment (Rietveld, 2016). Embracing the unpredictability and indeterminacy that characterize the work of landscape architects, Rietveld and Rietveld describe how architectural interventions can create new affordances. Providing a new context or meaning to an existing feature in strategic development processes: such as an asphalt dune in the Port of Rotterdam framing and mediating the extraordinary landscape of the city, or cultivation of a drifting sand dune in a nature reserve, to communicate the natural processes threatening to exterminate the area and creating new possibilities for the Wadden Sea area. Both approaches illustrate single physical interventions that enable variable possibilities for action in a way where different user groups are allowed to discover its possibilities, creating social affordances. Strategic interventions that link the “landscape, architecture, public domain, ecology, recreation and the economy” and facilitate change (ibid., p. 41).

The modification can also be caused by changing physical conditions or abilities. The body can hinder perceived and desired affordances (McClelland, 2020). Design for sensory challenges has been explored as *space affordances* in design for sensory integration in autistic children (Atmodiwirjo, 2014) or as *architectural affordances* in universal design of sports facilities (Cassi et al., 2021). Despite the value of these contributions to design, they demonstrate the before mentioned instrumental focus on the function-task relation (Young & Cleveland, 2022) and not the dynamic notion of change in these circumstances. Thus, transitions and change were key aspects of Gibson, change or loss of abilities, such as visual impairment has not been further

developed in his work, but subsequent scholars as Moore and Cosco (2007) and Ingold (2000) have sophisticated this understanding of change. Moore and Cosco (2007) extend the dynamic understanding of affordances and acknowledge that affordances change during a lifespan, both in relation to how specific physical and social contexts are perceived and understood, and in relation to the acquired abilities to act upon the affordances. Ingold (2000) further expands Gibson's "total system of bodily orientation" (Gibson, 1979, p. 245), by posing the question: What if you were blind? (Ingold, 2000, p.285): What happens to the interchangeability, the indistinguishable parts of the actual practice of exploring and engaging with the environment, when losing sight?

Methodology

Where Gibson's theory of affordances by large is descriptive – explaining the relation of man and his surroundings, and Normans take on affordances has been prescriptive – constituting a design method (Maier et al., 2009), our approach to affordances in this analysis is exploratory. Exploratory research involves inquiry of new grounds, development of new hypothesis, new ideas or theories (Elman et al., 2020). We have revisited three empirical cases within the field of architectural research that to different degrees have been analyzed and discussed within the framework of affordance, to explore the role the conceptual framework has played in the in the analyzes. The three samples form an instrumental case for discussing the role of affordances in the field of architectural research.

Office space

The first case is from a fieldwork executed in 2007 in a PhD project about dialogue-oriented mapping of space and activity in office spaces (Grangaard, 2008) as a part of a

post-occupancy evaluation. The PhD student collaborated with a Danish architectural firm in the pre-design phase of their process with a public client; a Human Resource department that had moved to an office space consisting primarily of cell offices for one or two employees, while a few of the employees had a desk in an open office. The field work included both participant observations in the common space and participant observations in relation to four informants: two case officers and two consultants. Using video ethnography (Buur et al., 2000) and dialogue meetings with the users involving them in design games (Brandt & Messeter, 2004) made it possible to uncover a new understanding of the interaction between office space and work activities because a common language and a common picture was created in the organization. A picture that can help to improve the quality of the design proposals and further dialogue between the architect and the client. Theoretically, the analysis of this case was based on the concept of affordances, as developed by Gibson (1979).

Home environment

The second case involves a pilot project on lighting assessments in low-vision rehabilitation: A three-stage recovery-based lighting assessment and intervention were tested by low-vision rehabilitation professionals in consultation of 60 visually impaired participants from 2017-2019. The pilot was the main case of a research project exploring the change processes of rehabilitation, actively engaging the interaction of consultants, participants, and their social and physical contexts. The first stage of the pilot, and the focus of this article, was situated in the home environment of the visually impaired participants where the low-vision consultant assessed the lighting conditions and overall settings together with the occupants. Ethnographic fieldwork was conducted by participatory observation of 17 of these home visits, focusing on the participants' understanding of and interactions with their home environment, and the consultants'

facilitation of the rehabilitation process. The concept of affordances enabled analysis of the interaction between the participants and their home environment, including the changing relations within the rehabilitation process.

Urban event

The third case is a scent and sound installation in an urban public environment implemented as part of an architecture festival in 2022 with the overall theme 'Sense of Place' (Lygum, 2022).

Even though the experience of space engages the whole body and all its senses (Pallasmaa, 1996; Bell, 1999) the sight has culturally been dominating in western architecture (Barbara & Perliss, 2004). Thus, the overall goal of the installation was to focus on two disregarded senses: hearing and sense of smell, and its role within the field of architecture, landscape architecture and urban planning.

The event was a collaboration between the group of architectural researchers, a sound designer, a sound director, a scent marketing consultant, and a perfumer, with the overall objective to create awareness about hearing and sense of smell by adding contrasting and surprising sounds and scents to an urban transition area for pedestrians. - an approximately 100-meter-long subterranean tunnel, under a railway line, that connects a main road with an old industrial area in a process of turning into housing, offices and a farmers' market. Nine loudspeakers and in three scent diffusers, composed three different sound and scent sections in the tunnel. To challenge the sense of place within this graffiti-decorated urban setting, the contrasting theme of nature characterized the installation. Moving from the main road the visitors would perceive scents and sounds from the seaside, the meadow, and the forest, creating the illusion of walking through a varied landscape.

On a Saturday, October 8, 2022, between 14.00 and 18.00, approximately 240 festival participants as well as accidental passers-by experienced the installation. 15 people were interviewed, both adults and children, at the exit of the tunnel investigating their spontaneous reaction to the event. The quotes of the participants were translated into English, and together with photos and films, constitutes the empirical material on the participants experience. Employing the concept of affordance, in particular from the field of landscape architecture, enabled discussions and reflections on the role of the multisensory perception within architectural perception.

Results

Affordances of doorways

In this case, the concept of affordances was used as an analytical tool for describing and understanding the role of the physical space in an office environment in relation to the creation of possibilities for informal social interaction.

A lot of the social activities were taking place in relation to the individual seat in the open office or the cell office. Often a colleague was visiting one of the informants or an informant was visiting a colleague in a cell office. That the doors were open to the offices when the employees were at work was another tendency. Several of the informants expressed that they wanted to signal openness towards their colleagues by letting the door open. Looking at the video material from the field work in the common spaces of the office environment it became clear that informal interactions were situated in the doorways of the cell offices. The employees were standing with their back and backside to the common circulation area leaning against the door frame talking to one or two colleagues sitting in a cell office. Walking around in the environment it was

inevitable not to see what we could a phenomenon of “backsides in doorways”. The doorway became a place for the sequences of a conversation.

Individual control over space is a key feature of human territoriality (Altman, 1975). Altman defines three types of territorialities: primary, secondary, and tertiary. In a cell office the inhabitants have the right to control the access of colleagues to their primary territory. As a visitor to a cell office, you are aware that you enter someone’s space and territory.

The doorway defined a physical edge or shift between the primary territory (the cell office) and the secondary territory (the circulation area and the common space) outside the office in this case. The affordances of the doorway made it possible to lean against the doorway and to hold on to the doorway that created a kind of anchoring in the space defining a temporary place. Thus, the affordances of the doorway became a help for entering this primary territory creating a positive feeling for the one who wants to cross this edge. Because, when an employee positioned oneself in the doorway it could be seen as an indication of an interest in contact with the inhabitant (s) in that particular cell office. At the same time, a possibility was established for the inhabitants of the cell office to refuse or welcome the visiting employee. By standing in the doorway the employee has not invaded the cell office but is keeping oneself at a distance and thereby signaling that the employee is showing regard and is humble toward the inhabitant(s) of the office. Talking of distance, Hall points out that every culture has its specific ‘proxemic pattern’. Based on studies in the US of behavior and experience of distances between people in relation to whether they support or hamper individual activities and group activities, he has developed a taxonomy of interpersonal distance (Hall, 1966). Lawson emphasizes that the experience of distance depends on the senses, personality, the actual situation, and the cultural context (Lawson, 2001).

The taxonomy consists of four types of distance: intimate distance (1 – 46 cm), personal distance (46 – 122 cm), social distance (122 – 370 cm), and public distance (370 cm – or more). Every distance is divided into a close phase and a far phase.

In this case, the affordances of the doorway made it possible to navigate in the social distance and its two phases. Some of the employees left the doorway and the close phase of the social distance coming closer to the inhabitant and withdrew to the doorway when the conversation seemed to fade.

At the end of the conversation, the employee was physically located in a legitimate position in the doorway where it was possible to show that she was on her way to go. However, at the same time the doorway gave an opportunity to stay if the conversation flared and continued. Furthermore, the stay here in the doorway could be seen as a kind of invisible negotiation related to the interaction. The affordances created a situation of a kind of well-being for both the guest in the office and the one having a desk in the office.

Using the concept of affordances together with the interpersonal distances of Hall made it possible to understand how the employees balanced social interaction. The situation was characterized by a kind of openness and therefore it was possible to choose between different actions. Like Gibson pointed out, the affordance of the door was imbedded in the relation between the door and the perceiver also in situations where the perceiver did not attend to it.

In the open office the situation was different because there were not any doorways, and the territory was not as defined as in a cell office. Thus, the distances were not supported by any affordances. A hypothesis could be that the absence of affordances of the door forces the employees in an open office to invent rituals or actions that can support social interaction in a legitimized way.

Dynamic affordances of everyday practices and settings

Lighting assessments have been part of low-vision rehabilitation for decades, but recent developments in rehabilitation practice have expanded the scope from recommendations based on diagnostics and special lighting aids to a broader understanding of the role and use of light as part of people's everyday life. Previous analysis of the case show that the physical environment was both disabling and a key to rehabilitation and recovery,"...facilitating the individual's learning and change processes" (Øien, 2022, p. 12). Where the health professionals had developed a prescriptive alternative to the formerly descriptive practice, inviting the participants' own perception and recovery process to the table, affordance was used as an analytical framework to explore the interaction at stake within this setting: The dynamic processes taking place between consultants, participants, and the physical and social context.

The visual impairments among the 60 participants were related to aging, congenital condition, or as a sequela due to disease or accident, yet common to them all, the preceding affordances of their surroundings had been set-back and their relation to their home environment changed. The intervention focused on activities of own choice and were consequently situated in different settings: From focused seated activities handling tools or household appliances in a more intimate scale, to activities of movement engaging spatial trajectories and the overall framework of the home, and involving social interaction of meals, conversations, or play. Beyond the directed lighting used in focused activities such as reading or handiworks, the assessment could also involve more general lighting in the overall setting, situating objects and things in relation to the surrounding surfaces of walls, floors, and ceiling. In this sense, the assessment engaged both the *medium* and *substances* in the relation of the lighting and what was illuminated. The assessment constituted a mapping of existing and lost affordances, recognizing how the surroundings enabled or disabled them (Øien &

Frandsen, 2022). For some participants, the more distanced surrounding surfaces of walls and ceilings, supported orientation, wayfinding, and the experience of general comfort in their home environment. For others, moving through adjacent rooms was difficult or even painful due to large contrasts between different luminance.

Affordances were rediscovered or reconfigured, by changing or adjusting either the physical environment (including lighting), the position, or the perception of how the light could be used – encompassing the approach and understanding of the role of lighting as part of their everyday life.

Furthermore, several narratives from the observations and interviews demonstrated the employment of multiple sensations, in a sense where Gibson's "patchwork of the momentary visual" submerges with movement, touch, and sound. First, *movement* was for many at play in ways of operationalizing the residual vision. Impairment of the central vision put the peripheral vision to work and learning to use this specific part of the vision involved engaging with the surroundings in new ways. Beyond observing objects from a fixed point, the peripheral vision or tunnel vision was rather engaged by enacting a "moving point of observation" to scan the space. For others, the sensory adaptation was affected, resulting in either a need for larger contrasts to perceive visual cues, or the quite opposite, that large thresholds caused great pain or discomfort. Consequently, the *temporality of the stimulus* was in both cases crucial for what the relation of light and dark afforded the individual, and the abilities/disabilities related to the conditions were especially present in transitions or movements between spaces of different illumination. Second, *touch* was a recurring sensorial feature. For some of the participants with more severe impairments, the visual sense was already inferior to the sense of touch, and it was difficult for them to tell how much and for what they used their residual vision. One participant described how she knew the eight

steps from her bed to the light switch and the position of her arm to reach it, as a movement embedded in her body, by years of repeating the sequence. Others recalled the spatial arrangement in their visual memory to support their movements and performances across the home environment. For many of the participants, their hearing came to play a new role in their everyday life. Some were still entertained by the dialogue and acoustics scenes of TV shows and series and found appreciation in the sound quality of good productions. Good acoustics and avoiding background noise were crucial for social settings and for the ones using a white cane, the sound of it touching different surfaces is a way of reading the close surroundings. The Charles Bonnet syndrome is a condition causing hallucinations - the brain fills in the blanks from the visual impairment, and participants described these as huge boulders or mushrooms on the sidewalk or as dark spiderwebs. Distorted soundscapes were another related sensation described – in both cases experiences as a misplacement, as they somehow knew it was not there. Yet for participants with both visual and hearing impairments, the perception of their environment was further challenged - particularly affecting their social life. Gibson describes how events and time are nested in one another, within scales, "full of transitions and overlaps" (Gibson, 1979, p.9), here also between the visual, tactile, and acoustic across these events. Similarly, the social holds transitions and overlaps of great importance to the perceived affordances. In fact, everyday practices of the home are by large impacted by cultural significance that can obscure the human-environment interaction. Opposite to the unknown terrain of the animal, the home environment is loaded with customs, tacit knowledge embodied in activities and movement across and within the home. The cultural understanding of the home is seen in the empirical material in narratives of expectations, identity, and household roles.

Supported by the assessment and intervention, and with the help of their family or kin, changes were implemented to the home environment, the use and understanding of their environment, or to both. Translating the specified recommendations to lamps and arrangements triggered new insights, reflections, and problem-solving. Recognizing existing affordances or seeing opportunities in re-configurations, enabled activities of interest and for some, the intervention had facilitated substantial personal change and learning. This process of complementing environmental opportunities with personal abilities, actualization (Rayman et al., 2017), was seen in numerous examples of workarounds and new ways of approaching the everyday.

Affordances of an urban event

“All of a sudden, that tunnel got a totally different life.” (Adult visitor). The event was created to evoke contrasting reactions to the sight of the “repelling” subterranean graffiti tunnel and the “attractive” scents and sounds of natural settings. A man emphasized the scent of seaside and was positively surprised about this unusual smell in a tunnel in an urban setting. It was clear that the participants experienced the sounds and scents differently. One could hear a train while another experienced it as waves. People's immediate reactions to the scent and sound installation illustrated their individual emotional relationship to an environment. Different associations arose. The sounds of the waves gave a woman an association to the North Sea, while a little girl felt an urge to go the beach. A boy explained that when he closed his eyes it was like being in a forest. For a girl the change of sounds and scents created a kind of another universe. Common to the associations were the memories of other places they had a relation to. These places were carried in their memory and were broad back walking through the tunnel.

“The things you sensed felt like the changing of the atmosphere, the smells, and the sounds. It was funny to go back and forth in the tunnel and feeling more relaxed after.” This man was surprised that he felt more relaxed after walking through the tunnel. Similarly, a woman felt her mood had changed to the better. At the same time tunnels the like would normally make her feel unsafe. The installation supported a state of wellbeing.

What the scents and sounds evoked in terms of affordances were related to other types of environments or places – the seaside, meadow, and forest and not the visibly real environment of an urban tunnel. By designing an environment where the different types of sensory stimuli do not match each other, the installation raised awareness on our perception of our environment and how perception depends on not only visual stimuli but also other types of stimuli such as chemical and aural stimuli which is equally detected by our perceptual system. The sounds and scents interacted with the tunnel because of the movement that the tunnel afforded. Walking made it possible to experience a range of multisensory stimulus that afforded emotional affordances linking stimulus with feelings and remembrance.

In line with the concept of affordance, the event pinpointed the fact that we use all our senses when perceiving an environment and that sight is just one among many important sensory impressions. Moreover, it exemplified that each of us has our own unique physical and emotional relation to the environments and that the affordances it offers were bound to us individually. This fact is important to consider when designing or analyzing buildings and landscapes that have a goal of affecting its user's perception, reaction and use in a specific way. Furthermore, it urges us to move away from the visually dominated and detached design processes and research methods into a more

embodied and multisensory approach making it possible to sense a place with all the senses.

Discussion

The key findings of the three case-analyses are presented in Table 1, showing different scopes and out-comes of the use of the concept of affordances across the three cases. By approaching different contexts, the workplace, the urban setting, and the home, we engage different user-roles situated in environments of private and public character. The interactions explored between individuals and their environments engage different degrees of personal and social processes. Involving emotional and cognitive elements in both the instant, more unconscious experience of the misplacement of scent and sound, the change process within recovery where motivation of the participants depended on their emotional engagement, and the tacit knowledge embedded in the use of the doorway in positioning between personal space and common space. All three cases concerned active, yet more or less conscious positioning by the participants studied, within their social and physical context, and demonstrated placemaking from different perspectives: by observing placemaking, as scaffolded in a rehabilitative intervention, or as result of performing a design intervention.

Change is an element in all three cases, yet again from different perspectives. In the office environment, the findings from the study made the organization aware of their culture and use of their physical surroundings and impacted the redesign of the work environment. The lighting assessment made the participants recognize 1) how the changes in their vision affected their relation and use of their home environment, 2) what role the lighting and other environmental aspects played in enabling their residual vision, 3) what light they preferred in different activities and situations, and 4) the role of their position and multisensorial interaction within the physical context. This

knowledge further changed their motivation and understanding of both lighting and their physical abilities. The sensorial event made the participants aware of the foreign scents and sounds, frontloading these senses that otherwise are set aside from the visual. Furthermore, it highlighted the participants emotional connection to the environment and how we as perceivers are constantly affected by our surroundings in a dynamic ping pong process where our emotional and physical state affect the way we perceive our environment, and the environment affects how we feel.

In this way, the cases show different approaches to the perceptual system. Visual perception has by large been the very point of departure for the theory of affordances (Gibson, 1979), yet by embracing invariants of stimulus flux, Gibson also acknowledges the concurrent multiplicity of other sensations than the visual. From an architectural stance, it is interesting that all three cases go beyond the visual and explore its interrelation with smell, sound, touch, and movement. All three cases touch upon qualitative aspects of space and place, testimonies of how they are experienced: Qualitative aspects that can be discussed within measures of wellbeing and quality of life.

Positioning: What our use of affordances affords us

Even though the three cases all represent architectural research they also represent different researcher-positions, located within architectural practice and design of workspaces, addressing public spaces and discussions of aesthetic and sensory experiences, or in interdisciplinary collaboration concerning the role of our physical environments in rehabilitation. The concept has been used to investigate and understand, identify constraints and possibilities for action, generate hypothesis, to inform practice or to invoke perceptions of our everyday. We have employed the concept of affordances in different ways due to our positioning and interaction within

the field we are situated in as researchers. Gibson's original work, itself situated within environmental psychology and with a focus on the biology of animals navigating their terrain, has been subject for reinterpretations and refinement in its successors. The cases show both the prescriptive approach of Norman (Norman, 1988, 1999) and design methodology of the intervention in the event or the lighting assessment. But more important they focus on the effect or outcome of these designs, yet not in a descriptive and generalized manner but exploring the process as it unfolds; as people experience the scents moving through the tunnel, position themselves in relation to each other and the interior in the office, or how the relation between the personal and changing perceptive system and their social and physical context which they are navigating, changes throughout the rehabilitative intervention.

Unlike Gibson's descriptive or Norman's normative use of affordances, the findings from these trajectories are by large enabled by an exploration of our empirical cases. They could not have been predicted in advance, but the openness of the conceptual framework supported these inquiries well. Similarly, our exploration supports a more diverse understanding of the human perceptions. The act of recognizing human diversity, beyond the animal or the "sane, healthy, 'rational adult'" (Goodley, 1971 p. 4) is enabled by exploring nuances and variations. As the case of losing sight reply to Ingold's question "what if you were blind" (2000), it also helps us recognize the sensorial in a way that challenge the static understanding of the 'regular user' and rigid design standards. Furthermore, the human diversity shows that the relation and interactions between the different senses can be re-configured, as well as the relation, interaction, and potential affordances of the environment. Together with the tunnel event that facilitated and mediated experiences of unexpected sound- and scentscapes

familiar to Rietveld and Rietveld's dunes (2011), the cases demonstrate ways to enable variable possibilities.

Guiding architectural research and practice

A slightly more constructive position than blaming the descriptive visual language of architectural practice as the reason for architects not engaging the concept of affordances (Young and Cleveland, 2022), would be to encourage architectural practice to embrace the role of the sensory environments they design. The lack of knowledge concerning the impact and role of these environments in people's everyday lives is a paradox of the profession, however, we believe that qualifying the practice of embracing individual and social perception in planning and design can support values already embedded in the core of architecture.

Aesthetics concern the emotional impact of a design, how it is experienced and valued, and since this experience also affects the use, *utilitas*, and *venustas* are interrelated. Experiencing architecture encompasses an interaction between an individual and their environment, in line with Joel Kruger's (2014) take on musical affordances: the movement and modes that can take place in the perceiver. Architecture shares dynamic qualities with music, with cycles, movement, modality, intensity, tempo, and spatiality, as "temporally extended, spatially and acoustically complex sound event exhibiting its own internal organizational coherence, its own compositional logic" (ibid., p.4). This comparison is not new, as both Gropius (Argan, 1962), Lefebvre (1991), Norberg-Schulz (Andersen, 2022), and Zumthor (2006) draw parallels to music in their descriptions of the experience of architecture. However, we argue that in architecture the experience is further dependent on the individual's movements within the built structure, and in that sense the temporality and spatiality are enacted and cocreated in the very interaction of human and its environment. The event unfolds

dynamically and coherently in space and time. As a piece of music taps into both emotional and social aspects, architecture is similarly shaped by and itself shaping individual and shared experiences. Furthermore, where Kruger position his work on musical affordances within cognitive psychology, we argue that architectural affordances could be a key to understand and operationalize qualitative aspects of our built environment within the field of architectural research and what role the environment has in the very interplay: Embracing the value of affordance not as a property of the physical environment or the constituent structures of the subject, but belonging to the intersection of both. In between the philosophical and the instrumental, the explorative can provide a tool for thinking with, where affordances can help us understand the effects of architecture on human beings, and ideally, inform future design in a way that improve people's wellbeing and quality of life.

Conclusion

The paper explores the role of the concept of affordances in three empirical studies of architectural research. Due to the openness of the concept, it is possible to analyze more than just the physical possibilities for actions. Especially, the notion of placemaking, that acknowledges the individual perception of the environment, engaged by the senses, movements, and the mental process, is a key for understanding the dynamics of architecture.

The paper demonstrates the potential of expanding the qualities of the concept as prescriptive, exploratory, and descriptive, to fit the processes of translation within the field of architecture, where empirical knowledge from architectural research can inform architectural design. Embracing the dynamic relation of people and environments, the concept of affordances can support design and planning to improve the qualitative outcome for their future users.

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Table 1. Theoretical concepts from the framework of affordance used in the three cases, including the focus and outcome of the respective analyzes.

	Gibson	Focus	Experience / outcome
Office space	Territory, placemaking	Placemaking (social and individual)	Recognizing wellbeing – balancing individual and social interaction
Recovery in the home environment	Multisensory Dynamic micro spaces	Placemaking by actualization + re- configuration (individual and guided)	Overcoming/succeeding personal and social, quality of life
Event in urban setting	Multisensory Sound and scentscapes	Placemaking (designed) + sense of place	Comfort/ wellbeing/ stimulus