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Operationalizing affordances for public space: artefacts and their various uses

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Abstract

The demands on public space are manifold, and are likely to increase due to the densification of cities and diversification of societies. How can we better understand public space, and plan spaces that accommodate a wider range of users and activities? This paper discusses the concept of affordances and operationalizes it for public space research. Affordances are possibilities for action that users can engage in when in an environment or using an artefact. Studying public space through the lens of affordances is a relational approach that can serve as a planning and design tool or as a means of evaluating public space in post-occupancy studies. We address three questions regarding affordances in public space: who produces them, what and how do they afford, and to whom? We then present a typology of five affordances, empirically grounded by interviews and observations in three public squares in Zurich, Switzerland: expected, extended, secondary, intentionally shaped and unintentionally shaped affordances. By examining representative artefacts, we show that affordances may be created intentionally by different actors but also emerge unintentionally from relations between human beings, artefacts and the environment. They all shape the way in which public space is used, and by whom.

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1. Introduction

Public space is situated and lived; it is an arrangement of human and non-human beings, materiality and meanings, and as such, is constantly produced and reproduced in practices of public space use (Qian 2020). Public space is contested: debates about the commodification or privatization of public space highlight the numerous expectations placed on public space (Carmona 2010a). Diversifying societies, growing inequality and the need to densify cities intensify the demands placed on public space. It becomes imperative that public space be of high quality and serve as a place of encounter that promotes social cohesion across ethnic and economic differences (Aelbrecht, Stevens, and Nisha 2019).

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Public space has the capacity to accommodate a wide range of people – differing in their cultural backgrounds, but also in terms of socio-economic status, lifestyle, age and their practices in public space (Madanipour 2019). In public space, countless bodies, practices, material and symbolic objects, and the environment interact with each other, producing dynamics, possibilities and relations that are largely unpredictable (Qian 2020). Public space can therefore not be reduced to what planners and designers conceive. Moreover, since planning concerns the (unpredictable) future, the conception of public space needs to be open for unplanned uses and unknown users (Sendra and Sennett 2020).

In this paper we put forward the concept of affordances as a way of including unpredictability into our thinking about public space. Affordances can be defined as relations between the environment and an actor, and are expressed in behaviours or activities made possible (or impossible) for an individual by the environment, a natural object or an artefact[1] (Chemero 2003). The concept originated in ecological psychology (Gibson 1979/1986), and was thus initially concerned with interactions between animals – human beings in particular – and their environment, but gained traction in design and later in communication and technology studies (Davis 2020). A seminal publication on the affordances of children's play areas (Heft 1988) has inspired applications of the concept in public space (e.g. Daly 2020; Gu 2021; Lanng and Jensen 2022).

A recent publication by Stevens, Daly, and Dovey (2024) has made advancements in theorizing the concept of affordances for public space. The authors show, from a theoretical perspective, that adopting a relational understanding of affordances through assemblage thinking and actor–network theory (ANT) can help framing affordances in public space beyond the intentions of designers and users. However, there is still scope for further theorizing, and for operationalizing the concept of affordances for public space and apply it to empirical material.

In its long history of application in various disciplines, different authors have defined affordances in various ways, sometimes diverging from Gibson's original definition. It is therefore not surprising that the concept is repeatedly criticized for conceptual vagueness and inaccuracy in its application (Chemero 2003; Davis 2020). Yet the concept's many merits justify its further use, and in an attempt to move forward and overcome these ambiguities and uncertainties, Davis (2020) provides a framework for affordances. Even though not tailored to it, her approach is particularly apposite for the analysis of affordances in public space. It enriches literature in this field, because in public space research, there is a lack of exploration into how affordances can explain the fact that what an environment offers to users might not be equally attractive to everyone (Hadavi, Kaplan, and Hunter 2015; Heft 2010). We therefore refrain from taking a definitve stance on the evolution of the concept, but propose to adapt Davis's (2020) framework for affordances to public space to better understand the spaces' affordances and account for users' plurality.

The second objective of this paper is to shed light on who or what produces affordances in public space (Designers? The intermingling of humans, non-humans and materialities?) and by whom they can be actualized. Despite a similar aim, we chose a different approach from Stevens, Daly, and Dovey (2024) in addressing this question empirically. In an iterative back-and-forth between theory and our empirical material on affordances (obtained through interviews and observations) in public squares in Zurich, Switzerland, we developed a typology of affordances. We identify five types of affordance: expected, extended, secondary, intentionally shaped and unintentionally

shaped affordances. We argue that this typology can be useful in designing and redeveloping public space, and in research on public space, e.g. in post-occupancy studies.

In Section 2, we first clarify what it means to look at public space through a lens of affordance, and then present our typology of affordances found in public squares. Section 3 introduces the case study and the methodology, and in Section 4 we apply our typology to several representative artefacts and examine their type(s) of affordance. Finally, we discuss the wider implications of this typology for planning and designing public space, and propose a set of questions to ask when applying the typology of affordances in further research.

2. Theoretical framework

We share Davis's (2020, 8) concern that the concept of affordances be applied with precision to make use of its analytical contribution. Let us therefore first clarify some terms. An affordance is a relational structure that 'enables or constrains potential behavioural outcomes', or put simply, affordances are 'possibilities for action' (S. K. Evans et al. 2017, 36). The use of, or activity performed within, that space or artefact is called an 'actualized affordance' (Raymond, Kyttä, and Stedman 2017; Stevens, Daly, and Dovey 2024). Instances where the environment is modified by its users to open up new potential activities are called 'shaped affordances' (Raymond, Kyttä, and Stedman 2017).

In the literature, the concept of affordances has been applied to public space for various purposes and in different contexts. For example, it has been used to analyse the social–material interactions offered by an urban slope (Lanng and Jensen 2022), a cycle lane (Rérat and Schmassmann 2024) or by landscaped water management solutions aimed at reducing flood risks (Mottaghi, Kärrholm, and Sternudd 2020). Other studies have addressed the fit between the design objectives of a square and its actual uses (Daly 2020), or the practice of eating and how it relates to affordances and expectations in public space (Kim 2019). Popovski and Young (2023), for example, investigate how physical elements of the cityscape sustain or hinder urban protests and the activities of individuals experiencing homelessness, and Jensen (2023) explores the affordances of benches and looks at how they either 'gather publics' or create an 'atmosphere of rejection'.

Given this broad range of applications of the concept of affordances, we see scope for further theorizing it and providing a framework that can be used in a variety of contexts and at different stages of the planning, design and evaluation of public space. Returning to our main questions (Who or what produces affordances? How can we account for users' plurality in affordance thinking?), we need two theoretical 'tools': relational thinking (Section 2.1), and Davis's (2020) framework for affordances consisting of mechanisms and conditions (Sections 2.2 and 2.3).

2.1. Relational thinking: who produces affordances?

Literature on affordances is often concerned with their ontological nature, i.e. whether they exist in the physical world or only in the perception of subjects (Chemero 2003; Stevens, Daly, and Dovey 2024). We do not delve into this philosophical question here as we take a more practical perspective. For our purposes, it is sufficient to say that

affordances are relational (Davis 2020; Heft 2010), i.e. they lie in the 'relations between the abilities of organisms and features of the environment' (Chemero 2003, 189), where 'abilities' include both physical abilities and skills that are learnt in sociocultural practices (Rietveld and Kiverstein 2014).

Stating that affordances are relational puts them in proximity of relational approaches like assemblage thinking and ANT (Daly 2020; Kim 2019).[2] Both have in common that they consider relations or arrangements of human and non-human entities as having agency and as producing new actors (Müller 2015). In the case of affordances, it is the relations between the environment and a user that enable or constrain behaviour and therefore have agency in their own right.

For our purposes, we draw on the relational approach of Löw (2016). In her sociology of space, she conceives of two ways in which space is constituted (spacing and the operation of synthesis), which has important consequences for affordances. In Löw's (2016, 131) definition, space is 'a relational arrangement of living beings and social goods' that is constantly (re-)produced by practice. The constitution of space occurs, on the one hand, through 'spacing'. This entails the positioning of social goods, living beings or symbolic markings in space (Löw 2016, 134). Designing a space involves the placing of elements such as benches, trees or waste bins, creating affordances. Likewise, bringing a foldable chair is an act of spacing that generates affordances. Also human beings themselves may temporarily alter the affordances of a space for others; by occupying a bench, for example, we temporarily change its affordances for others.

Synthesis, on the other hand, has to do with the way space is perceived by individuals, in which the positioning of social goods and living beings is 'blended' into one. This 'operation of synthesis' happens through 'perception, imagination, and memory' (Löw 2016, 135), within pre-existing spatial structures and social arrangements. Löw argues that, even though these structures may not be visible, they are materially perceptible because living beings and social goods have an 'external effectuality' that can be perceived by individuals and 'which can influence feelings' (Löw 2016, 171–172). Löw calls this affective dimension of space 'atmosphere'. There is a clear link here to Anderson's (2009, 80) concept of 'affective atmospheres', i.e. the idea that atmospheres influence people's moods and collective feelings (Griffero 2020, 107–108).

Griffero (2020, 101) suggests that affordances are not only instructive to actions, but may also impact sentiments or emotions. Like others (e.g. Lanng and Jensen 2022), we share this view and contend that it is not only artefacts that have affordances, as a space's atmosphere may also play a role in shaping what actions – and what feelings – are possible, and thus spaces in themselves may have affordances.[3]

Atmospheric affordances in public space can be produced intentionally, either by professional producers such as (landscape) architects and designers (Anderson 2009, 80), e.g. by creating a pleasant soundscape through burbling water, or by users, e.g. by hanging up a garland to decorate the site for a birthday party. They can also be created unintentionally, simply in the way that atmospheres are synthesized by users and created by their behaviour in space.

Affordances differ from person to person: while the way atmospheres are synthesized is usually intersubjective, it is not universal, and also intentionally designed affordances afford to varying degrees, as we will outline below.

2.2. Mechanisms: what and how?

An environment or artefact does not 'either' afford 'or' not afford. It affords different things to varying degrees (S. K. Evans et al. 2017, 40) and in varying ways to different people (Heft 2010). Davis (2020) provides a way to conceptualize both the what and the how of affordances, suggesting the existence of multiple 'mechanisms of affordance', which include requesting, demanding, encouraging, discouraging, refusing or allowing certain activities (Davis and Chouinard 2016).

While this way of thinking of affordances is useful in the context of technological tools, with regard to public space we think it more apt to place mechanisms of affordance on a continuum ranging from negatively affording (i.e. repelling) certain actions to positively affording (i.e. inviting) other actions (Figure 1). For example, an environment or an artefact can have 'motivating qualities' (Heft 2010, 25), as can be observed at any fountain that is accessible to children and invites them to splash around. Repelling qualities are perhaps less obvious, but we need only think of windowsills with anti-sitting studs, for example, to see that certain behaviours (and consequently certain users) can be designed out of an environment (Townshend and Roberts 2013).

In contrast to the typology of affordances by Stevens, Daly, and Dovey (2024), in our typology (see below), types of affordance are not defined by their mechanism of affordance, i.e. all types of affordance can, in principle, be anything between repelling and inviting. As we will see in the next section, this is all the more important since affordances do not equally afford to everyone.

2.3. Conditions: for whom?

Previous research has found that 'differences in the individuals' concerns and needs' affect the perception and evaluation of affordances (Hadavi, Kaplan, and Hunter 2015, 26; Heft 2010). Translating this to Davis's (2020) terms, we could say that both what affordances offer to people and how they offer it depend on three conditions: perception, dexterity and cultural and institutional legitimacy. This analytical distinction is geared towards technological affordances, but with some amendments it is also applicable to public space. Depending on how these conditions are present in an individual, affordances in public space are recognized differently. This accounts for differences in behaviour in public space based on such attributes as gender, age, ethnic background, life stage and class. In what follows, we discuss the three conditions and their meaning for affordances in public space.

Firstly, perception is a precondition for the actualization of any affordance. Here, the careful design and planning of public space is key, as this should ideally provide easily recognizable cues regarding intended uses, while keeping the potential set of actions as open as possible (Bentley et al. 1985).[4]

Figure 1. Continuum of mechanisms of affordance in public space.

Secondly, dexterity denotes the cognitive and physical skills needed to make use of affordances. This holds not only for technological affordances but also for basic activities in public space. We would add that dexterity extends to what individuals can and cannot do more generally, with potential behaviours also depending, for example, on their purchasing power or familiarity with the context and its sociocultural practices (Rietveld and Kiverstein 2014). For example, access to a public square might be impossible for wheelchair users if there are curbs, while for someone who does not have the money to buy a coffee, a sidewalk café will not permit them to sit in that space.

This brings us to the third condition: cultural and institutional legitimacy. Behaviour in public space is relatively unregulated in a formal sense but, as shown by Goffman (1971/2017), nevertheless entails intricate navigation of formal and informal social norms. This applies to affordances in a particular way: affordances are not determined only by the design of physical artefacts and the ability of people to use them. Learning which behaviours are physically possible and socially legitimate always happens in a sociocultural context (Heft 2010, 25). In addition to what could be termed 'higher authorities' (such as culture and institutions), the many informal and sometimes weak social norms in public spaces vary considerably in their interpretation, meaning that different people may assess the appropriateness of behaviour differently, resulting in different sets of viable affordances. Legitimacy can thus refer to any kind of influence of social norms, their interpretation and their acceptance. It ranges from formal regulation that shapes affordances for certain groups (e.g. when the police are given the power to expel certain people from public space) to norms regarding behaviour at different times of day or the impression that a certain behaviour (or indeed certain people) would be out of place.

2.4. Five types of affordance in public squares

Based on the above theoretical reflections and our empirical material, we differentiate between five types of affordance. We do not conceive of them as ideal types as they are not mutually exclusive and, for most artefacts, are found in combination. However, they help us understanding affordances in public space that arise spontaneously, sometimes unintentionally, through relations between users and the environment, alongside those affordances that are formally designed. They also draw attention to the fact that affordances afford different things to different people, depending on perception, dexterity and legitimacy.

We briefly present the types and how they were derived here. In Section 4, we look at some representative artefacts and their types of affordance, and consider what this means in terms of 'what' and 'for whom'.

An initial distinction between expected, extended, secondary, intentionally shaped and unintentionally shaped affordances is based on the design process. The first three types (expected, extended, secondary affordances) originate from formal design decisions (Stevens, Daly, and Dovey 2024), usually made by designers (by which we mean any kind of professional 'producer' of environments or artefacts). However, these types of affordance interact with users in different ways (hence the further differentiation), creating unplanned affordances beyond what was intended by designers. The other two types (intentionally and unintentionally shaped affordances) emerge from users participating

in the constitution of space by spacing or synthesizing (Löw 2016) and thus modifying or augmenting the environment and its affordances. All types of affordance require some knowledge about the intentions of designers and users. Here, we approximated users' intention by interviews and observations (see Section 3), but their (mis)match with designer's intentions would be a fruitful area for further research (Stevens, Daly, and Dovey 2024).

Let us turn back to the first three categories, and start with expected affordances. Expected affordances are affordances that are intended by the designers. According to the inscription–prescription perspective (Akrich 1992), designers inscribe into artefacts their assumptions of how actors will or should use them. An artefact then translates the designer's intentions into a prescription for users (Kim 2017). Expected affordances are inscribed, and at the same time the 'preferred affordances' of users. Preferred affordances are those that are culturally selected, i.e. they reflect 'a shared cultural milieu that predisposes the individual to use objects […] in particular ways' (Loveland 1991, 101). By the very nature of expected affordances, the average user (which depends on what groups are targeted in the conception of the environment or the artefact) will not usually need to rely on specific conditions to actualize them.

Extended and secondary affordances are also formally designed. In contrast to expected affordances, however, users have a more active role in them and might perceive affordances that transcend conventional expected affordances. Extended and secondary affordances are therefore more demanding on the level of perception as well as in terms of dexterity and legitimacy. While they differ from each other in the conditions that need to be fulfilled to actualize them and in the conventionality of the behaviour afforded, it can be difficult to distinguish between them. The distinction is primarily analytical; empirically, they will be found in different degrees and combinations.

Firstly, extended affordances are provided by the form or the material of an artefact or its environment, but they require some additional dexterity and/or and fewer people will consider this behaviour legitimate. Additional dexterity can mean, for example, further knowledge about the artefact or familiarity with a context, or it may be that extra props or skills are needed in order to actualize the affordance, e.g. a ball to play football on a lawn.

Secondary affordances, then, are even more distant from the conventional behaviour of expected affordances. Cultural predisposition leads individuals to use artefacts in certain ways, i.e. actualizing expected affordances (Loveland 1991). The same affordances might, however, be inherent to other user-artefact-arrangements. There, actualization needs more creativity and is more demanding in terms of the conditions of affordances (notably cultural and institutional legitimacy). For example, some horizontal surfaces not intended as seating may, nevertheless, allow sitting in what is called secondary seating (Bentley et al. 1985). Secondary affordances highlight a lack of expected affordances. If primary seating opportunities are numerous, secondary seating is less likely to be actualized.

Let us now turn to the other two types, the shaped affordances (Raymond, Kyttä, and Stedman 2017). Both intentionally and unintentionally shaped affordances emerge from users' spacing and their operation of synthesis (Löw 2016) through which they modify and augment the environment and thus shape its affordances. In the case of intentionally shaped affordances, these are provided through the placing of additional artefacts in a space in the aim of promoting certain activities or discouraging others. Flowerpots at

a sidewalk café, for example, or a 'No Entrance' sign, intentionally shape affordances, the first by creating a welcoming atmosphere, the second by setting a social norm.

Unintentionally shaped affordances are also created by users, but without being planned as such. Leaving behind a bottle crate, an act of spacing, allows sitting or playing to the next users. The spacing of human beings can unintentionally create an audience for a street artist. Unintentionally shaped affordances may also arise through the operation of synthesis. An arrangement of people and/or objects is perceived as having a certain atmosphere even if none of the actors involved planned it. If a group of people is celebrating a birthday in a public space, the atmosphere is probably more cheerful than usual and may invite people to join in the festive mood. Alternatively, the gathering may be synthesized as noisy and discourage participation, depending on the individual perceiving the event.

Before moving on to the empirical examples that illustrate these five types of affordance, we now present our research approach.

3. Research approach

3.1. Context

This research is part of a larger project on social diversity in public squares in Zurich, Switzerland. We hypothesize that social diversity is closely related to the materiality of squares, the artefacts within them and the affordances they provide. This paper focuses on how affordances, depending on the conditions of affordance, offer different potential activities to different user groups.

The project is based on a case study of three publicly owned neighbourhood squares: Lindenplatz, Hallwylplatz and Idaplatz. They are relatively small (1,500–2,000 m^2), serve a wide range of purposes and uses and are accessible to everyone ('civic spaces' in Carmona's typology, 2010b, 169). They all contain artefacts such as trees, benches, fountains, waste bins and advertising columns.

For many users, the squares are simply a passageway. Other activities conducted in the squares include shopping (mostly for groceries), spending time with friends or family, or spending time alone, e.g. reading a book or watching people. Eating and drinking are also very common activities, whether in one of the cafés or restaurants and their outdoor seating areas, or by consuming self-brought food and drinks.

3.2. Case studies

We briefly present the three case studies here (Figure 2). Elements that are particularly relevant for affordances will be taken up and described in more detail in the following section.

3.2.1. Lindenplatz

Lindenplatz is situated in the heart of Altstetten, a former village incorporated into Zurich in 1934. Lindenplatz is named after the lime trees dotted around the square, which provide shade for the benches placed along the side of a shallow water feature on the ground and for the old village fountain. Three cafés or restaurants with outside

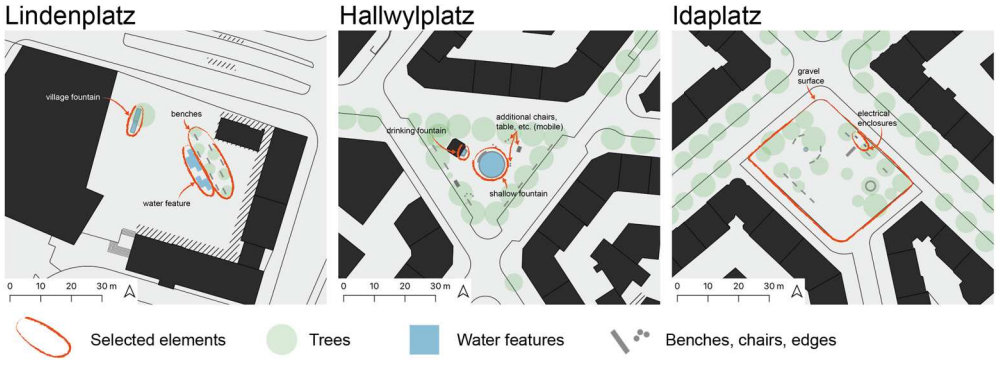

Figure 2. Map of each square. Elements which are reported in Section 4 are circled in orange.

seating areas are on the square's edges, and there are also two supermarkets, five other shops and a newsstand. The centre of the square remains empty most of the time but fills with stalls and a buzzing crowd when the farmers' market is held every two weeks. The square's redevelopment in 2011 involved the addition of the water feature and the restoration of the square's protected historic paving.

3.2.2. Hallwylplatz

Hallwylplatz is located in the Werd neighbourhood, close to the city centre. Its triangular shape is surrounded by residential buildings, offices, a hotel, three restaurants, of which two have outdoor seating areas in the square, a hairdresser, and two shops. In the north-eastern corner of the square, there is a small building with a drinking fountain. Benches and trees alternately skirt the square on two sides, and right in the middle, there is a shallow round fountain. In recent decades, several attempts to redevelop the square have failed for financial reasons and because residents resisted them, fearing that a revitalization would be 'too successful' and attract a noisy crowd. However, residents have 'upgraded' the square themselves by placing additional furniture there. The City of Zurich only tolerates this uncommon practice.

3.2.3. Idaplatz

Idaplatz is part of the Sihlfeld neighbourhood. After its redesign in 2006, the square has become a very popular spot for visitors from further afield as well as for locals. The square's main area now consists of a slightly elevated gravel surface, wheelchair accessible via two ramps and two flattened-out corners. There is a relatively high number of benches, some of which are shaded by the trees that are scattered around the square. In the adjacent buildings, there are three cafés and restaurants, all of them serving in the square or on the sidewalk. A small newsstand has two tables beside its entrance, and the commercial offering is rounded off by an organic grocery shop, two other shops and some office spaces.

3.3. Data collection

The data was collected during two periods of fieldwork in summer 2021 and 2022. In summer 2021, extensive fieldwork took place, consisting of an intercept survey (Velu

and Naidu 2009), behavioural mapping (Gehl and Svarre 2013) – both reported elsewhere (Widmer 2023) – and observations (Lüders 2004). The first author spent more than 70 h in each square observing the actualized affordances.

Since we are interested in the conditions and mechanism of affordance, i.e. possibly also in discouraging affordances, or people feeling illegitimate to actualize an affordance, observations alone are insufficient. Therefore, we also rely on data from semi-structured interviews conducted in 2022. They inform us about how affordances are perceived – yet not necessarily actualized – by square users. The interview protocol contained open questions on the activities carried out in the square and the use of the urban furniture, as well as participants' perceptions of other square users and of the general atmosphere. Put together, this information provides a rich database from which the affordances of the squares can be inferred.

Interviews took place between 17th May and 8th November 2022, mostly on site and in dry weather. The fact that they took place in the squares helped, as the environment provided prompts for the participants' answers, as found in walking interviews (J. Evans and Jones 2011). In total, 63 interviews were conducted (Lindenplatz: 20, Hallwylplatz: 21, Idaplatz: 22). Interviews lasted around 45 min on average, but were sometimes shorter with people who had been recruited on the spot.

A purposive sampling strategy with sampling quotas for different population groups was used, in order to ensure a heterogeneous sample (Robinson 2014). There are fewer men than women among the participants (38%), but the sample includes adults from all ages and life stages (students, parents of younger and older children, retired people, etc.). About one third of the participants have a migrant background, corresponding roughly to Zurich's demographics, and the sample is fairly balanced in terms of educational level. It includes some people with a very high socio-economic status, although the quota was not reached in that category. Most importantly, the interviews cover a variety of types of users: people who only pass by, who occasionally sit on a bench or who frequently spend whole afternoons or evenings in the squares.

Participants were recruited by calling upon contacts from previous fieldwork, snowball sampling, asking square users on-site to participate, asking people in nearby public spaces to participate, advertisements in shops, cafés, via neighbourhood organizations, housing cooperatives, noticeboards in big developments, and an article in Zurich's local weekly newspaper.

3.4. Data analysis

Artefacts and elements of the environment are taken as the unit of analysis for a qualitative content analysis (Mayring 2014). We ask how these affordances came about and under which conditions they offer what to whom. As described in Section 2, affordances can be sorted into five different types: expected, extended, secondary, intentionally shaped and unintentionally shaped affordances. For most artefacts, multiple types of affordance are present, and are not always easy to distinguish from each other. In what follows, we describe the five types of affordance using representative elements of the public squares. The artefacts have each been selected in order to showcase one particular type of affordance. The affordances described here are by no means complete – the list of negative affordances alone

would be infinite. We also briefly mention instances of each type of affordance that may be afforded by other elements.

By explaining the conditions and mechanisms of affordance, we demonstrate how our operationalization of affordance for public space is useful in studying who uses public space and for what purposes.

4. Types of affordance and where they are located

4.1. Expected affordances: benches and water feature in Lindenplatz

The nine benches, arranged in three rows on one side of the water feature in Lindenplatz, are typical wooden benches (Figure 3). Their affordances can be found in most other benches in an urban setting and allow for a wide range of sitting postures or even lying down. The affordances of these benches are thus as expected: elderly people sit to rest, families eat an ice cream or people sit down to watch others, or to have a short chat with someone. Depending on the weather and the time of day, the mechanisms of affordance may shift from encouraging (sunny spots in spring) to discouraging (blazing hot in summer), but generally the mechanisms and conditions of affordance are very similar for almost everyone.

The water feature just in front of the benches consists of five basins embedded in the ground, each furnished with two water nozzles. As the jets of water are only small, the feature invites children to play with it, while drinking is discouraged because the

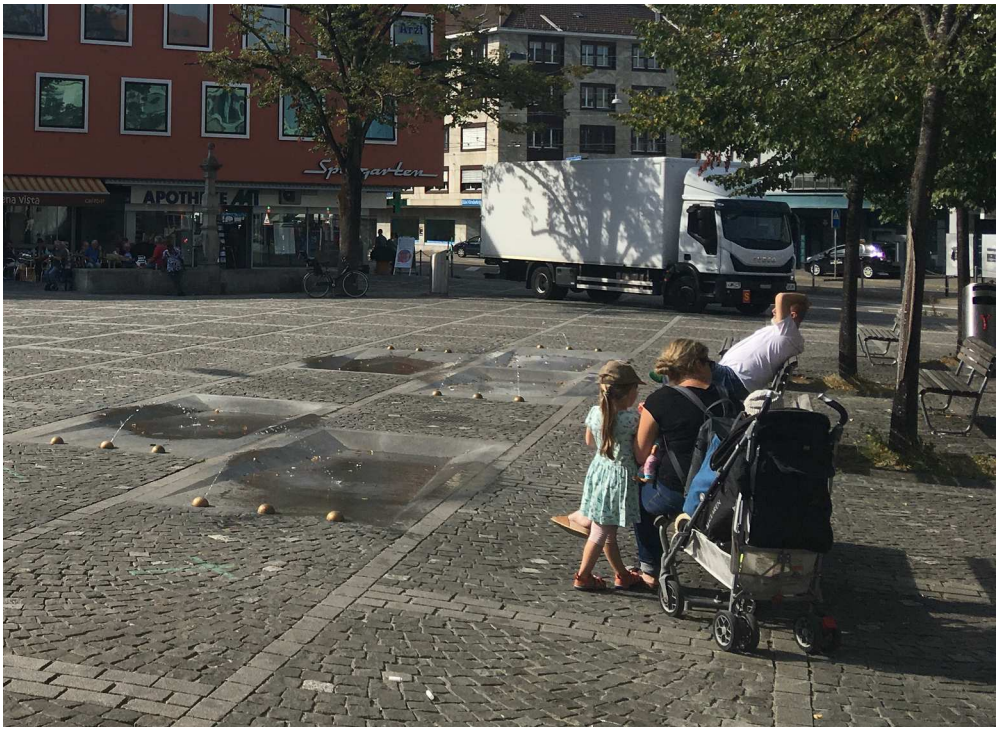

Figure 3. Benches and water feature in Lindenplatz.

nozzles are placed directly on the ground. The expected affordances do not demand any particular dexterity. Splashing around depends on permission from carers, but other than that, there is no particular normative dimension to the affordance. It can thus be actualized by almost anyone.

Being familiar with the water feature, however, alters its affordances, as this father explains:

> We always go to the fountain […]. Also, you can turn the nozzles, most people don't know that. Well, you can show that to the kids, and soon you get into conversation through that. (Daniel, m, 42, family)

Because of Daniel's familiarity with the context, he is not only able to open up a new (and extended) affordance to children, i.e. allowing them to splash in different directions, but the water feature also sparks interactions with other adults.

4.2. Extended affordances: gravel surface in Idaplatz

At Idaplatz, the main part of the square is covered by a gravel surface. Its main (and expected) affordance is that of walking on it. The material was chosen for aesthetic reasons in a participatory process, as the residents wished for a square that was not too asphalted. The area was elevated to discourage cars from driving on it as they had previously been allowed to park in the designated spaces.

The surface also has extended affordances that require certain conditions to be present. The gravel facilitates the playing of pétanque (Figure 4), for example, but only

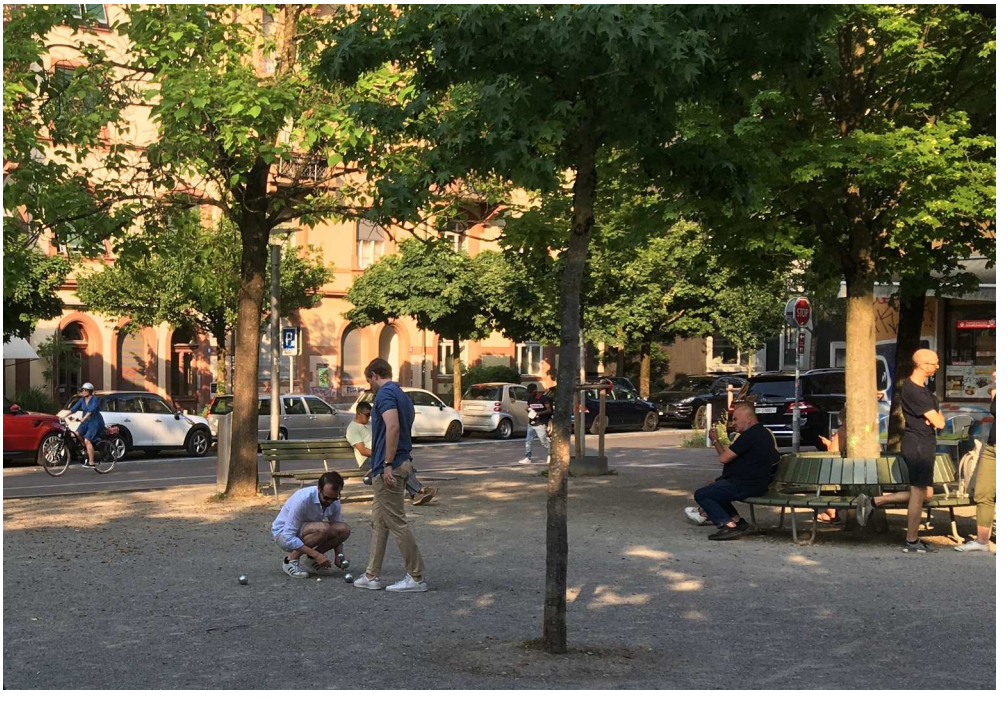

Figure 4. Playing pétanque in Idaplatz.

for those who know how to play (dexterity) and who dare to take up space for their game (legitimacy).

Extended negative affordances also exist: the same material characteristics that make playing pétanque possible discourage people from sitting on the ground, and the gravel 'refuses' to be skateboarded-upon (refusing is a mechanism of affordance identified by Davis (2020)). It can even demand extra effort when walking, depending on one's perception of the surface:

> The only thing I'm not a fan of – but that's completely individual, a personal thing. It's just, the gravel … I don't really think it's a great surface. […] I just don't like having to polish your shoes every time you've been there. And I just find it – it's always so dirty for me. (Peter, m, 63, single-person household)

Another extended affordance is to be observed in Idaplatz: the outdoor seating of one of the bars is not fenced off and is therefore accessible even when the bar is closed, and thus some people take the liberty (legitimacy) of consuming their self-brought food at the bar's tables.

4.3. Secondary affordances: electrical enclosures in Idaplatz

On one side of Idaplatz there are two electrical enclosures. At first glance, they have no use for public square users. Yet here, we encounter secondary affordances. As Idaplatz gets very crowded on summer evenings and the space on the benches and in the bars is limited, people very quickly appropriate the enclosures as an ad hoc bar, placing their drinks on them (Figure 5). In terms of dexterity, this affordance requires little: the enclosures are of a certain height, so it only needs a minimum body height. On the other hand, their height provides another secondary affordance as a play setting for children.

In principle, not much is to be said about the bar affordance from a normative perspective. Some residents, however, are bothered by the noise of the crowds attracted to Idaplatz, and find it disturbing that the enclosures are turned into furniture for partying:

> And that someone puts an electrical enclosure on Google Maps and indicates it's a place where you can enjoy an aperitif and then people come and find it awesome – well, of course I might be a bit old, but I find it ridiculous. (Martin, m, 69, coupled household)

Most users are not aware of this view, and even if they were, they would probably still feel entitled to use the electrical enclosure as a bar. However, locals close by, who might not share this opinion but are conscious of it, may perceive the affordance as not acceptable for them because it might endanger neighbourhood ties.

More examples of secondary affordances are easily found. The same bar affordance is also actualized on very busy evenings in Idaplatz with windowsills and post boxes that have surfaces on which allow putting-things-on-top. In Hallwylplatz, the shallow round fountain in the middle of the square is often used as a pool for young children. The fountains also provide secondary seating in both Hallwylplatz and Lindenplatz, an affordance that is usually actualized as soon as the benches are occupied.

We will see in the next section that in Hallwylplatz, some locals have positioned additional furniture, such as wooden benches.

Figure 5. One of the electrical enclosures in Idaplatz being used as an ad hoc bar.

4.4. Intentionally shaped affordances: toys, chairs and the barbecue grill in Hallwylplatz

In Hallwylplatz, locals have placed additional furniture and equipment in the square: two wooden boxes, filled with children's toys and chess pieces, a slide that is sometimes positioned to end in the shallow fountain, a table and two benches made from logs, a barbecue grill, a table tennis table and thirty or so different individual chairs (Figure 6). By putting them in the square ('spacing'), and by regularly repairing or replacing broken elements, the locals augment the environment and intentionally shape the affordances of Hallwylplatz.

For children, the square now offers many of the affordances of a playground, as it allows them to play with toys, to slide down the slide and to race in circles around the fountain on toy cars. The movable chairs encourage adults to position themselves wherever they want, finding comfortable arrangements in larger groups or a spot that best suits their preferences in terms of sun, shade or view. The grill allows barbecuing and so is often found at the centre of birthday parties, but it refuses to be moved around freely as it is chained to the ground. It also requests that those who want to use it bring a grilling rack.

Some affordances are differentiated depending on dexterity, e.g. familiarity with social practices in the square. Those who are familiar with 'how the square works' know that they can borrow a grilling rack from the person who put the barbecue grill there, and some of those who have been around for years have their own grilling rack, so do not need to borrow one.

Figure 6. Barbecue grill, picnic table, additional chairs, and regular benches in Hallwylplatz.

There are other examples of intentionally shaped affordances. In Idaplatz, people may bring a blanket that allows them to sit on the ground without getting dusty from the gravel, while in Hallwylplatz, they may do the same to provide a clean surface that functions as both seating and table when they want to eat pizza from the nearby pizzeria. In addition, some Idaplatz residents intentionally shape the square's affordances through a modification of the environment: they plant flowers around the trees that line the street, thus creating a pleasant atmosphere.

4.5. Unintentionally shaped affordances by the same artefacts

The additional furniture in Hallwylplatz also unintentionally shapes the atmosphere. Participants often describe how the children, the adults playing table tennis or the parties celebrating a birthday or the end of a working week, create a lively, stimulating atmosphere. Their synthesis of the arrangement of bodies and artefacts motivates them to join the buzz or simply watch what is happening in the square.

Others, however, have a different experience. Reflecting on the additional chairs and other amenities, Lina realizes that she would not necessarily dare to use them because she is not one of the locals who has put them there:

> Because to me, it looks like it's just the neighbours who really put out the … [chairs, grill], and you know it's from – well I don't know from whom – and you know that of course it

> must be for everyone, but I don't know whether I'm allowed to use it anyway. I think I know that you could use it, but I don't know if I would do it. (Lina, f, 24, shared flat)

Likewise, Luisa, a woman who lives within a five-minute distance from Hallwylplatz, perceives a certain feeling of non-belonging:

> And I know it's really a square for families, and I would almost not dare to celebrate my birthday here. I feel like the people who use this square, this is their square. That's my idea of it, it's not that it really is this way. (Luisa, f, 35, coupled household)

Interestingly, both are aware that it is their subjective operation of synthesis that makes them feel this way. Like most other participants from Hallwylplatz, they enjoy the relaxed and lively atmosphere of the square, but their perception that the environment has been modified and the furniture put there by others, for others, unintentionally shapes the affordances for them – and, presumably, others like them – who feel that the use of the additional furniture is not legitimate for them.

In principle, taking a toy or a folding chair to a public space and thus intentionally shaping the affordances is quite common for spaces such as lakesides or parks, but is usually only temporary. The example of the additional furniture in Hallwylplatz shows a more durable appropriation and a more intense use of public space that may exclude those who are not familiar with the practices.

For another example of unintentionally shaped affordances, we return to the benches in Lindenplatz. Their affordances are, in the perception of some people, shaped unintentionally by a group of people who misuse alcohol. After conflicts in the past, most people agreed that the situation had become much better by summer 2022 and that this group was no longer actively creating a nuisance. Yet their mere presence was synthesized by some people as creating an atmosphere that discouraged them from using the benches. This view tends to be stronger in elderly people, parents and women. Some are worried about their safety, while others just feel that 'it is not right' for them to sit there. Legitimacy thus conditions shaped affordances. Men and younger people tend to see the atmospheric affordances less negatively, or even find the benches and their occupants entertaining:

> [They are] obviously having some kind of problems in life, mainly alcohol-related, or other drugs. You also see beggars, you can see that. It's mainly these characteristics. […]
> Interviewer: And how does that change how you move around?
> It doesn't at all. I like to sit on the benches in between them, it adds a bit of entertainment ((laughs)). (Lukas, m, 21, shared flat)

Another example of an unintentionally shaped affordance was observed in Hallwylplatz. After a party, some empty beverage crates were inadvertently left behind in the square. The next day, they were soon appropriated by other users who perceived that the crates also allowed sitting on and playing with them.

5. Conclusion

Based on theoretical considerations and empirical data, we have shown that affordances are a powerful tool for studying public space. The concept of affordances draws attention to the fact that being in an environment, or in public squares in this particular case, is never just a passive uptake of visual stimuli, but always involves actively engaging

with the environment (Heft 2010). While this seems almost trivial when considering a playground, it may be less obvious in other activities such as standing to wait for the bus or sitting on a bench. But seemingly passive activities, such as enjoying the sun on a bench, also comprise an active 'operation of synthesis' through which other living beings and artefacts are brought together into one social construction (Löw 2016).

We have argued that affordances offer a way of conceptualizing public space in terms of uses that designers conceived, but also in the unpredictability of unplanned uses (Stevens, Daly, and Dovey 2024). It also provides a pluralistic view of public space's capacity to accommodate a wide range of users. Pluralistic, because affordances have a collectively shared dimension, yet '[a public square] is not the same place for each user group' (Heft 2010, 25). Affordances are shaped by conditions which are not the same for everyone.

In this paper, we have operationalized Davis's (2020) framework of mechanisms and conditions and adapted it to affordances in public space. We have seen that the conditions of perception, dexterity and cultural and institutional legitimacy alter the mechanisms of affordance, causing affordances to move on a continuous scale ranging from repelling to inviting (Heft 2010). In this sense, we have shown how affordances shape the diversity of uses in the three selected public squares. Our theoretical reflections and empirical analysis have led us to the conclusion that asking who or what produces affordances provides valuable insights into what public space can offer to different people and how this transcends formal design.

We have identified five types of affordance: expected, extended, secondary, intentionally shaped and unintentionally shaped (Table 1). Expected affordances are those that are designed into the artefact and culturally 'preferred' (Loveland 1991) and are complemented by extended and secondary affordances, which emerge when users perceive additional, more creative uses of the artefact. Affordances can also emerge from users' spacing and their operation of synthesis (Löw 2016). This can mean placing or removing bodies and artefacts to encourage or constrain certain activities, directly or via atmospheres. But arrangements of bodies and artefacts can also have affordances (including atmospheric affordances) that were unintended.

Table 1 summarizes the five types of affordance and the roles played by designers and users in their creation. With Table 2, we propose a set of key questions and sub-questions to ask when applying the typology of affordances in further research. The questions offer a way of combining design and user perspectives in the planning and design of (semi-)public spaces, in order to anticipate or understand mismatches between design objectives and actual use, potential use conflicts or unmet demands for activities (Gu 2021; Lanng and Jensen 2022).

Positive extended and secondary affordances can act as best-practice models for new projects or redevelopments, while negative ones indicate how spaces may be improved and made more inclusive. Shaped affordances, on the other hand, call attention to their orchestration: who creates these new affordances and for whom? This question links to issues of publicness and the dialectic between inclusion and exclusion (Qian 2020). The additional furniture at Hallwylplatz, for example, multiplies the affordances of the square and creates a more intense use, especially during lunch hours and on summer evenings. But the furniture does not afford equally for everyone as it makes

Table 1. Five types of affordance and their distinguishing features.

	Expected	Extended	Secondary	Intentionally shaped	Unintentionally shaped
Role of designers	Designers deliberately plan the affordance	Affordance technically created by designers, but not as a preferred affordance	Affordance technically created by designers, but not as a preferred affordance	No direct involvement of designers	No direct involvement of designers
Role of users	Users actualize the prescription as planned	Users perceive an affordance diverging from the conventional use. Actualization is more demanding in terms of conditions of affordances	Users actualize an affordance that is usually the preferred affordance of another user-artefact-arrangement. Actualization is more demanding in terms of conditions of affordances	Users intentionally modify or augment the environment (spacing of bodies or artefacts), creating affordances directly, or via atmospheres	Users unintentionally modify or augment the environment (spacing of bodies or artefacts), creating affordances directly, or via atmospheres
Representative artefact and affordance found during fieldwork	Bench invites sitting	Gravel surface allows playing pétanque	Electrical cabinet offers use as a bar	Additional furniture provides places to eat	Additional furniture repels because of intimate atmosphere

Table 2. Set of questions to ask when studying affordances.

Dimension	Key question	Sub-questions
Who?	What is the role of the designer?	• Who defined what affordances there should be? • Who put the artefact there, or who designed the environment?
	What is the role of the users?	• Do users actualize the affordance as planned? • Do users creatively actualize affordances provided by the artefact/environment that go beyond the primary function and conventional use? • Do the affordances stem from users placing additional artefacts, or from users modifying the environment? • Do the affordances stem from the atmosphere created by the spacing of human beings and artefacts?
What?	What potential behaviours are offered?	• Which are the positive affordances? • Which are the negative affordances? • Which affordances are actualized? Which are not? • Are important positive affordances missing?
How?	What is the mechanism of affordance?	• Is the mechanism the same for everyone? (→ see 'For whom?') • Does the mechanism shift, e.g. depending on the weather or the time of day?
For whom?	What conditions need to be met for the affordance to be actualized?	• For whom is the affordance perceivable? (e.g. depending on body height, lighting conditions, receptiveness to atmospheres) • What cognitive and physical skills are needed to actualize the affordance? • What other capabilities are needed? (e.g. purchasing power, familiarity with the context) • For whom is the potential behaviour deemed legitimate, for whom not? Is this legitimacy set by a formal authority or by more informal normative patterns?

some users feel out of place. The actualization of secondary affordances might also require some sense of entitlement to public space that people might not have, e.g. if they have newly arrived in a city. Further research could explore how the actualization and creation of positive affordances can be facilitated while keeping public space open in the sense that it is usable by many and not just a few.

The different types of affordance serve as a reminder for researchers in urban studies and for the urban design profession that uses of urban settings go beyond what is formally designed into them. In our case studies, city residents and visitors shape the affordances of the squares both intentionally and unintentionally, and appropriate them in sometimes unexpected ways. The concept of affordances sharpens our understanding of urban public space, indicating the wide range of unpredictable activities that can occur in addition to those that the spaces have been designed for. It thus invites us to think of ways to create unfinished, loosely programmed environments that are open to more activities and users, and adaptable in the future (Sendra and Sennett 2020).

Our typology is empirically grounded in affordances in public squares. However, we contend that our study offers a relevant framework that could be applied to other contexts and types of public space. Further research could investigate in what combinations and relations the types of affordance we have identified can be found in other public or semi-public spaces such as parks, playgrounds, swimming pools or housing estate courtyards. We believe that our approach is applicable not only in urban contexts in the Global North, but also in small towns or rural areas and in the Global South. In the future, there could be further efforts to theorize the concept of affordances for designing public space (like Stevens, Daly, and Dovey 2024), to use the typology in post-occupancy studies, and to study the role of designers in providing affordances to diverse users.

Notes

1. 'Artefact' is used here to refer to an object that is not (solely) the result of natural processes but crafted or altered by human skill.
2. Stevens, Daly, and Dovey (2024) have shown how assemblage thinking and ANT helps conceptualizing affordances in urban design that go beyond what is predictable and designable.
3. Kim (2017, 2019) argues that affordances are used exclusively to look at interactions between humans and the environment or artefacts in the physical realm, whereas the inscription–prescription perspective (Akrich 1992), which is based on actor–network theory (Latour 2007), also includes 'nonphysical types of communication between users and objects' (Kim 2019, 282). However, because we also look at uses that were not created on purpose and therefore are not an inscription, we prefer to use the term affordance even to describe nonphysical affordances.
4. It should be noted that perception is closely linked to planning concepts like the visual quality of urban environments described by Lynch (1971), or 'legibility', cited by Bentley et al. (1985) as one of the key concepts of a responsive environment.

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