

1 Dynamic affordances in human-material “dialogues”

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Introduction

Manipulating a material is perhaps the most central aspect of making an artefact. From an evolutionary perspective, the ability to perceptually “read” the significance of materials and manipulate them has grounded our possibilities to transform and optimally attune with our living environments. Although this is a fundamental condition for any organism, only humans have mastered this skill in unprecedented ways due to owning such nimble hands and high-level planning skills. This ability to improve our artificial environment connects well with Gibson’s (1986) ecological psychology that highlights organisms’ tendency to respond to and to change the affordances of their environment – to better adjust them to their ecological niche. While this theoretical frame is developed in psychology, it has found its way to design and craft and often been mentioned by design and craft theorists, even though the scientific theoretical background is not always articulated.

Gibson’s concept of affordances has interested design and craft practitioners for several reasons. First, it provides a concept and a significant theoretical understanding for sensing and interacting with materials, tools, and artefacts. The concept highlights the practitioner’s dynamic “in-process” regulation of their actions in relation to the material task ecology (Baber, 2021). Second, the notion highlights the key role of sensory experiences and experiential know-how in grasping which specific information in materials or tools that guides technical, aesthetic, functional, or other decisions in the making process.

Designers and craft practitioners are familiar with affordances from the writings of design thinker and computer scientist Don Norman (1998) and interaction designer and researcher, Bill Gaver (1991) who discussed affordances related to product and interface design as well as product acceptance. Within craft research, affordances are more closely connected to material manipulation and phenomenological accounts of craft practitioners having a “dialogical relationship” with their materials, tools, and environment (Brinck & Reddy, 2020; Mäkelä & Aktaş, 2022). At the same time, the interdisciplinary field of cognitive approaches to skilful practice are constantly developing the theory of affordances. In this chapter, we will draw on a transdisciplinary understanding of cognitive psychology and craft practice and combine theory and practice from these disciplines to discuss how affordances shed light on clay throwing before providing a nomenclature for general features of craft practices.

We will first introduce the theoretical background of affordances and connect the notion to how design and craft researchers have described material manipulation. We will then show how affordances can be applied to an analysis of clay throwing and different aspects of affordances that come to light. Finally, we will discuss the possible benefits for the craft researcher and practitioner.

Affordances and their epistemological foundations

Affordances are, following Gibson (1986), opportunities for action that the environment of a living being offers. The concept attempts to explain how organisms, human or animal, pick up information and how this mediates their actions in their environment. Gibson (1986) has described his concept as follows: “The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill” (p. 127, italics in original). Materials and tools provide a good example, offering – and possibly even soliciting – various alternative ways of active bodily engagement with them. According to Gibson’s fundamental idea, instead of intra-mental operations such as categorization or reasoning, cognition is primarily for (inter)action in the world and happens in a continuous loop between an actor and their ecology, commonly referred to as a perception-action coupling. Thus, an affordance is not *in* the things, but rather in the relation *between* an actor and the thing. For example, a medium-sized stone affords sitting for a human but climbing for an ant; it affords very different actions, depending on the actor’s physical composition and abilities.

Gibson’s ecological theory of information pick-up is an early influence on embodied cognition theory. It rejects the idea that the mind computes inputs to give them significance and that the mental process imparts meaning to the inputs, which then get passed down to the action system – the body. Gibson’s ground-breaking hypothesis is that the world frequently offers extremely rich, reliable, perceptual arrays, such as visual flow properties that guide action, so that the mind need not add inferences about what some perceived information means. Moreover, perception is not held to be a passive registration of information; rather, it is based on active movement, manipulation, and exploration of the world, as eye and head movements illustrate well for visual perception. Gibson’s wife, Eleanor Gibson (1988), further developed the theory in relation to learning. She suggested that learning to perceive is not learning to run the correct algorithm on “raw” input but instead involves an optimal *attunement* of the whole organism to the ecology in which the senses are part of a much larger embodied system.

Gibsonian psychologists have since debated definitional specifics, e.g., whether affordances are actual solicitations for action (Withagen et al., 2012) or whether ongoing interactions with people, spaces, or things are necessary for them to arise (Chemero, 2009). Experiments have addressed how specific relationships between ecological information and the actor (body, site, strength, etc.) specify affordances for particular tasks and posit “laws” of actions for given tasks, such as climbing stairs or passing doors (e.g., Warren, 1984). However, psychological approaches often discuss well-defined and set tasks such as opening doors by different handles, which are quite different from what typically happens in the contexts of arts, crafts, or performance improvisation where every moment presents countless affordances and where atypical and non-conventional “actionables” may dominate. For this reason, the next section will look into the contexts of craft and design as they may shed more light on how a person’s objectives, skills, and imagination make some affordances stand out as well as how actors contribute to the creation of new affordances in the process of making.

The reception of affordances in design, crafts, and creativity

Through the applied writings of Norman (1988), especially the book *The Psychology of Everyday Things*, affordances have attained wide circulation among design

researchers. With a focus on user experiences of artefacts, Norman’s early work claimed that the affordances a designed object offers its users are essential for a product’s success. Consequently, the designer needs to be conscious of ways in which users may interact with a designed product’s properties (Norman, 1988). However, in his later writings (Norman, 1999, p. 39, 2008, 2013), he admitted to having misunderstood Gibson’s theory. The ecological model of mind was, at the time, a radical theory that stood in stark contrast to the computational tradition that Norman worked within, and the two scholars clashed over this difference in epistemology (Norman, 2013, p. 12). Revised from *The Psychology of Everyday Things*, *The Design of Everyday Things* (Norman, 2013) developed the idea of “signifiers”, which refers to “signs” of an affordance, not the affordance itself, and these signifiers are what designers should focus on. What Norman missed was that affordances are not in the product but between the product and the user, as products offer different affordances to different people (Baber, 2021, p. 67).

Writing on interaction design, Gaver (1991) identified several types of affordances when navigating and interacting with virtual, physical, or auditive artefacts. Gaver agreed with Gibson’s ecological view that presents affordances as offering a *direct link* between perception and action. He distinguished between used and unused affordances, pointing to the fact that the organism might not act on an affordance but have other intentions and, therefore, aims and preferences play a part. Gaver further differentiated perceptible from hidden affordances and what he called *false affordances* when an object presents confusing affordances that make the user act in an unwanted manner. Gaver (1991) also introduced the notion of *sequential affordances* to capture the fact that, in extended activities, there is an integral relationship between different affordances along the timeline. For example, sometimes one affordance must be acted on for the next one to appear, e.g., when opening a lid and discovering a button to push. Finally, Gaver discussed how visual affordances (the main focus of Gibson) differ from affordances discovered through haptic, auditory, or other modalities.

The concept of affordances has affinities to research on material experience. Barati and Karana’s (2019) *material potentials framework* shifted the focus from the designer’s ideation and conceptualization of a novel material’s potential use areas to the designer’s skilful ways of unlocking novel affordances inherent in a material. With this, they took a step towards highlighting the affective role of materials in a design process.

Similarly, in the context of crafts, attention has lately been turned to the practitioner’s experience of materials in the making process rather than their interaction with designed objects, thus highlighting the responsiveness of materials. Studies of how materials respond and how practitioners listen to their “voice” in the act of manipulation, such as Brink and Reddy (2020) and Mäkelä and Aktaş (2022), highlight the relevance of affordance-based real-time guidance while engaging in a “material dialogue”. This view is not uncommon in design and crafts. Schön (1991) also referred to having a conversation with a material situation – a claim that affordances provide a perceptual lens on.

Ingold (2000, 2013) has further influenced the discussion of affordances in an ethnographic and crafts context. Engaging with Gibson’s epistemological foundations, he spoke of material flows that mediate action and rejected hylomorphic creation, i.e., the idea that makers simply implement work after a set plan or design. Instead, Ingold (2000) stressed that craftspeople engage in a “creative undergoing” with the materials. Through this, Ingold (2013) showed how the “forces” of the material guide the process, emphasizing that the environment has an active and equal role in the “correspondence” with the maker (pp. 21–22 & p. 107).

Affordances have also been studied in research on creativity. Vlad Glăveanu (2014, 2020) discussed affordances as part of a cultural psychology of creativity. He is noteworthy for asking what “creative affordances” might be. His framework of “distributed creativity” describes the interplay of actors, actions, artefacts, audiences, and affordances (Glăveanu, 2014). According to him, creativity happens at the fringes of unconventional, unnoticed, unexploited, and norm-violating affordances, or affordances that need to be brought into existence, i.e., “new collections of affordances generated by the combination or transformation of basic (existing) potentials” (Glăveanu, 2014, p. 219).

Finally, the “skilled intentionality” framework (SIF) developed by Rietveld and collaborators cross-fertilizes Gibson’s theory with Wittgenstein’s ideas about *practices* and applies these to the field of architectural design and creativity (Rietveld & Kiverstein, 2014; Rietveld & Brouwers, 2017; van Dijk & Rietveld, 2017; Yakhlef & Rietveld, 2019). Useful distinctions of affordances have been introduced in Rietveld and Kiverstein (2014), including “landscape of affordances” for opportunities in a domain and “field of affordances” for a person’s situated opportunities.

Evaluating affordances in the broader perspective

Enactivist scholars (after Varela et al., 1991) have contributed (largely constructive) critiques of ecological psychology, pointing out that it focuses too little on action and presents an impoverished view of both intentionality and subjectivity. This is relevant to a craft context when what the maker had planned on doing before starting a craft process or their personal preferences are as pertinent as the affordances offered in the situation. Enactivists stress an organism’s activity and basic orientedness towards its environment. Thus, *how* someone actively shapes the “dialogue” is more than just responsiveness to the existing ecology; it means that a person’s objectives, skills, and imagination make a difference to what affordances are acted on. In this view, it may even be claimed that Gibson’s affordance theory is more of a *possibility theory* than a fully developed *action theory* without a sufficient discussion of intentionality.

Additionally, affordances are cited in emerging alliances between different theoretical orientations. Gibson’s opposition to cognitivist (i.e., computationalist and representationalist) views has influenced embodied, action-oriented, or interactionist cognitive scientists. One strong emphasis overlapping with affordance theory is that thinking can (partly) happen as action in the world through exploration, active manipulation, or perspective change (Steffensen, 2013). Another is that creativity emerges in the ongoing coupling dynamics between practitioners and ecologies (Davis et al., 2015), an idea that has lately become influential in craft research through Material Engagement Theory (MET), developed by Malafouris (2013).

Case example: Affordances in clay throwing on a potter’s wheel

The range of possible actions at each moment in a craft process is delimited by the properties of the materials, the tools, and the set-up of the workspace (i.e., the ecology) in relation to the skills and aims of the practitioner (i.e., the actor), thus reflecting the relationality that Gibson talks about.

How, then, do affordances mediate skilled action? Affordances provided by the situation can be turned into actions once they have been filtered by the practitioner’s



Figure 1.1 Interview study of affordances in clay throwing via Zoom. Screenshots from the Zoom video recording by the authors.

intentions, task-specific constraints, and the general affordance landscape for that craft practice. Affordances depend on the sequential structure of material work processes. For example, throwing clay on a potter’s wheel must follow a particular path, or a certain order of progression to succeed, from centring the clay and making a hole to throwing the sides. Such path-dependency is generally common in craft practices and requires skill and longitudinal experience to master, making crafts less flexible than many other creative practices.

We will now present a case of clay throwing (see also Kimmel & Groth, 2023). The study was conducted online via Zoom and utilized a phenomenological process analysis interview method originally developed by Petitmengin (2006).

In this study, Michael Kimmel, a cognitive scientist and creativity researcher, interviewed Camilla Groth, who is a craft practitioner-researcher, while she was throwing clay in her studio. Due to long distances (Vienna-Helsinki) and travel restrictions during the COVID-19 pandemic, the interview was conducted and recorded via Zoom (Figure 1.1). Groth also recorded the throwing event from a first-person view using a go-pro camera attached around her neck. In the interview, Kimmel posed questions and Groth talked out aloud about the different situations she encountered while throwing the clay and how she interpreted what was going on in the process. The process was later analysed by both authors.

Although it was decided that the clay throwing should aim at making a vase, we kept the process open as to what shape it might have. We allowed emergent affordances of the material give direction to the shape finding process, whilst conforming to the basic order of sub-tasks in the craft process.

Preparing the material

The event started with Groth making an informed choice regarding the most suitable type of clay for making a vase on a throwing wheel. However, she also considered her aesthetic preferences, therefore she chose porcelain despite its demanding properties, such as low plasticity, which makes it difficult to handle. After taking the clay from the bag and noticing that the clay was too wet and too soft to throw, she kneaded it on a plasterboard to dry it out and stiffen it a bit before starting.



Figure 1.2 The clay being first centred and then thrown into a narrow basic cylinder. Screenshots from the Zoom video recording by the authors.

Preparing the process

She then sat by the wheel and started centring the clay on the wheel head. Doing this carefully is necessary for proceeding with the process. The base of the vase was prepared by making the shape of the clay ball high and narrow before hollowing it. Then, the sides were slowly turned up into a straight narrow cylinder that makes the starting point for any kind of vase profile (Figure 1.2).

So far all efforts had gone to setting up the generic structure for a vase shape, while maintaining a broad field of affordance opportunities for the continuation. There were not many creative choices to make in relation to the shape at this stage of the process yet. The main task was to set up an enabling condition for future possibilities and keep basic material affordances in a workable state. This was done by choosing a suitable material, correcting the degree of humidity, keeping the clay centred, and shaping the base narrowly – thus making sure that no future possible affordances were diminished by accident.

Once the clay cylinder was high and thin enough, the next step of shaping – or rather “shape finding” – of the vase could ensue, and, with it, placing an additional focus on the type of affordance that would indicate the creative path itself.

Finding a shape

At this moment, Groth looked at the rim of the cylinder which was still a bit thick and clumsy and, in her view, did not conform to how a technically well-made vase should look. She also knew that adjusting the thickness and regularity of the rim might get more difficult at a later stage. Therefore, she decided to make a correction at this point by cutting off excess clay with a little stick (Figure 1.3). This action caused the rim to bulge out slightly under the top. A minor distortion like this could normally be corrected before continuing the process. However, the tiny bulging shape appealed to Groth as a nice starting point to give direction to the “shape finding”. She followed the shape of the neck to continue shaping the rest of the vase by bulging out the middle of the vase and narrowing the foot – in this way echoing the shape of the rim.

New opportunities along the way

While working on the shape, Groth noticed excess clay in the base that should be utilized to make the vase taller, and so the base would not get too thick. While thinning out the



Figure 1.3 Cutting the rim causes a bulge in the shape but provides an inspiration for the rest of the vase’s shape. Screenshots from the Zoom video recording by the authors.



Figure 1.4 Attempts to manipulate the base cause the “tired” clay to sag, which is accepted as a serendipity. Screenshots from the Zoom video recording by the authors.

base by pressing the clay from the sides, not only did the rest of the upper parts move up, but the general shape was also slightly distorted due to the now very wet and soft (tired) clay (Figure 1.4). This was expected and could easily be corrected, but again, the effect was embraced as a positive affordance instead. Groth decided to accept the unintentionally achieved shape as *serendipity* (Ross & Valée-Tourangeau, 2021). This meant directly picking up on an emergent affordance and further accentuating it or following its “lead”. It was more than just finding and accepting a useful affordance; it triggered a much further reaching creative “vision” in the imagination as the affordance led to an inspirational insight and a new direction. The decision to follow the affordance imparted a “wider creative perspective” to use Glăveanu’s (2020) notion. Groth thus had an emerging mental image of a bulging shape and how different features, existing and future ones, would be coherent with the shape. Affordances and the imagination began to interact at this point of the throwing process.

The material has its limits

By now, the porcelain clay was reaching its limits for manipulation. It had got very soft due to the added water that was needed to keep the fingers slipping smoothly over the clay but wore the material down in conjunction with gravity. This reduced the field of



Figure 1.5 Narrowing the base further causes the clay to sag even more. Screenshots from the Zoom video recording by the authors.

affordances, as the deteriorating condition of the material narrowed the possibilities for action and even threatened the entire process. Groth decided to finish the process quickly while still slightly narrowing the base for aesthetic reasons and removing water from inside the vase with a sponge to hinder further deterioration. However, even this minor manipulation immediately caused the shape to sag more and the rim to open up slightly in a not-so-appealing way (Figure 1.5). A final effort was made to fix this unwanted development by narrowing and correcting the rim and the “shoulders” of the vase. This was only partially successful, and the shape ended up sagging slightly more than what seemed aesthetically ideal to her.

Groth finished the vase by smoothing out the lines in the surface of the clay caused by her fingers, which she deemed an unwanted feature and thus decided to remove it. For this, she employed a kidney-shaped metal tool commonly used for this purpose – again an example of affordance-based regulation through feedback.

Discussion

We may now discuss how affordances can become a focalizing lens when analysing craft processes and skills. To use the terms proposed by Rietveld and Kiverstein (2014) mentioned earlier, a focus on *affordance landscapes*, i.e., what a material such as clay affords *in general* is insufficient. Therefore, we focus our discussion on the *field of affordances* (Rietveld & Kiverstein, 2014) that emerges in a specific making process.

The first question to consider is the specific relationship between the practitioner’s sensory know-how and situated actions. When we look at specific momentary decisions, craft practitioners generally draw on their rich longitudinal practical experience of material properties and processes as well as processing repertoires that they use more or less consciously. With their previous experience in mind, they actively “query” the material for its afforded potentials through probing by touch, sight, tool-use, perspective change, and other epistemic actions (Kirsh & Maglio, 1994). This affordance probing can be strategic, and the feedback revealed by materials when manipulated can suggest the next possible decisions, both at a technical and creative level.

Evidently, in relation to the practitioner’s intention and the task logic that is building up, only a few of all possible affordances can actually be acted on. Practitioners only consider an affordance actionable if conforming to technical constraints that ensure the

process’s integrity and to functional and aesthetic constraints of the finished artefact. What a material affords in general (and clay allows doing *many* things) is filtered through the demands of the ongoing task and the practitioner’s personal views and preferences. This means that there are technical limitations for aesthetic choices, as some ideas for shapes are simply not feasible. Similarly, even if a creative shape is technically feasible, it might still not be deemed to be of aesthetic value.

Due to the extended task of managing the process as a whole, craft affordances span different timescales and functions. Thus, practitioners monitor various levels and functional layers simultaneously in the progression towards a finished artefact. These levels include, for example, making sure that actions for the next stages of the process are prepared at the same time as working on the task at hand. Some affordances signal whether the practitioner is on track with the task-dependent order of the activity, and whether the material condition and constellation are ready for the next stage to begin. Other affordances orient the maker with respect to technical details, such as possibilities for error correction and specific haptics of handling the clay and monitoring that a decision, such as a particular thickness or shape of the walls, comes along as intended.

Acting on one particular affordance both reveals and has consequences for the next possibilities, as described by Gaver’s (1991) term *sequential affordances*. Affordances to which a craft practitioner responds in an earlier phase sets the scene for what can happen later. This is quite unlike contexts such as dance improvisation, where each affordance stands for itself and each creative action of the dancer is ephemeral. In craft practices, affordances are limited by the fact that the sequence of actions needs to make sense *as a whole*, as effects build on each other. The artefact embodies a trail of evidence of those action sequences, which experts who possess “code-competence” may recognize through analysing the finished piece (Almevik, 2012). This all means that the affordances, while path-dependent, must also be integrally and holistically handled at the task scale.

What have we learned so far?

In examining clay throwing through the lens of affordances, we can identify several broad categories in which affordances (directly or indirectly) mediate behaviour. This begins with a category of *basic enabling* actions, whereby the practitioner sets up the possibility space for later affordances to emerge, including “preparing the ground” through workshop maintenance, clay preparation, making sure all tools are ready, and reserving enough time (see also Baber et al., 2019, p. 288). Experts generally minimize the risk of unwanted situations while laying the ground for wanted affordances to appear, drawing on the experience of similar situations and materials, which provide some “foresight” (cf. van Dijk & Rietveld, 2021). Such activities are not yet constitutive of *specific* affordances; they simply create a background for a whole range of possible ones, with wide leeway for later decisions.

Looking at affordance-based task regulation also clarifies how practitioners organize *task maintenance* as well as how they manage the *artefact-specific order of actions*. On the one hand, this concerns the use of multi-sensory feedback to decide when the next phase is ready to begin. On the other hand, it involves micro-practices of handling the clay for each particular sub-goal, such as centring the clay or throwing the first cylinder shape. In this, short-lived affordances are provided by the sensory feedback and used to fix small issues, “saving” a situation or working around a problem. More broadly, practitioners must also know how micro-practices depend on one another and,

thus, recognize dependencies between affordances across the task. For example, Groth manipulated the clay through several stages of action, so that it offered desired affordances later (e.g., the centring of the clay as a precondition to creating even walls). Finally, task maintenance through affordances involves balancing the process between risk and opportunity. The expert's skill lies in knowing not only what to keep constrained and what to keep flexible but also how to hold the process "alive" to enable the global affordance of seeing the work through to its end.

A wider issue is that of the role of affordances in *decision-making*. As we saw in the vase making when the mistake in the denting of the rim was picked up on, decision functions of the crafts process can be supported by just noticing an unexpected affordance that fits in. Affordances that unintentionally emerge can provide an option for interesting new shapes. The ability to spontaneously recognize affordances offers a way to explain creative ability as a perceptual skill (Withagen & van der Kamp, 2018), which many theories of creativity disregard. Yet, we should not overstate the perceptual emphasis by neglecting how practitioners actively produce or invite desired affordances. Firstly, an initial action afforded by material properties must often be further developed. Secondly, affordances may be brought forth by strategic actions, drawing on technical and processual know-how (see task maintenance, earlier in this section). There is a deep material know-how regarding which directed shaping efforts make desired affordances available or give a new twist to a known shape or process. Affordance *shaping* is especially manifested in skilled creative twists that are actively proposed in the material dialogue. This can involve immediate interventions but also indirect activities. For example, a task constraint can stimulate the practitioner's exploration, or the practitioner may actively move towards an interesting new area in their familiar practice matrix to stimulate their creativity. Strategies of *niche-shaping* (Heft, 2007; Ramstead et al., 2016) are utilized, e.g., when using a new tool or moving to a different workshop that shifts the field of affordances (Rietveld & Kiverstein, 2014).

Our analysis indicates that affordances not only influence technical best practices but also shape creative decisions. We discussed, for example, how *serendipitous* affordances contributed to ad-hoc aesthetic decision-making. However, serendipity is not just about finding and accepting an emergent affordance. Every "happy accident" must be actively recognized as useful as well as actively developed. When a serendipitous affordance triggers ideas about how to proceed, the practitioner must consider how the newly found feature can contribute to a larger coherent and aesthetic whole. Thus, affordance responsiveness typically works hand in hand with the practitioner's imagination or creative vision. Glăveanu's (2020) proposition that affordances and creative perspectives complement each other dialectically captures this well. A wider perspective responds to the broader layout of existing affordances but, once embraced, determines which of the newly emerging affordances seem most relevant to a creative project. This is one example of many in which affordances need to be discussed in the context of other mechanisms.

Conclusion

We can see that various applications of affordances provide the craft and design discourse with a tool for analysing and explicating the role of sensorimotor know-how and skills, including, for example, task preparations and maintenance through in-process action regulation, decision-making, aesthetic development, and even creativity. When a practitioner orients towards affordances that matter in the practice, ongoing "material dialogues"

offer guidance. Affordances thus help ground the epistemology of craft processes in ways consonant with Malafouris’ (2008, 2013) Material Engagement Theory or Ingold’s (2013) notion of *correspondence*. As craft or design processes do not simply draw on *hylomorphic* implementations of earlier ideas, the focus shifts to a perceptually guided in-process regulation or a real-time “dialogue” with material mediated by affordances as makers feel their way forward. While affordances highlight a certain openness and dynamicity of skilled action, they equally bring to the fore normative aspects, e.g., how failing to act in the right way at the right time will lead to failure, or inversely how experts maintain the process’s integrity by keeping affordances intact through respecting the material’s constraints.

As our case example suggests, if we want to understand how affordances are selected and worked with we need to do two things: Firstly, we need to look at multiple nested timescales and functional roles of an affordance-regulated activity, from microscopic to macroscopic and from technical to aesthetic issues. Secondly, we need to consider how a highly skilled practitioner attunes with the material ecology through knowledge of task constraints, aesthetic/functional constraints, and general domain orientations such as style and repertoire. Only the expert practitioner’s longitudinal experience of material properties and contingencies can unlock desired affordances and avoid unwanted ones. This rich experiential backdrop needs to be considered for giving affordance-based analysis sufficient nuance and context.

At the theory level, affordances explain how creative and aesthetic processes can be regulated while orchestrating the interplay of a highly skilled body, a well-kept workspace, and material properties. They encourage us to embrace a genuinely relational perspective on the relationship between actors and ecologies, emphasizing their connectedness in evolving loops. This relational way of thinking is a cornerstone of theories of ecological cognition, which also resonates with practitioner viewpoints and with post-human theories as well as approaches that see material interactions as a dynamic dialogue between makers and materials (Fredriksen & Groth, 2022). From this perspective, affordances correspond to what practitioners subjectively care about, thus connecting the experiential realm with the theoretical one. As seen in this contribution, transdisciplinary conversations between sciences and creative practices (see also Groth et al., 2020, 2022) allow studies of expert practices to enrich both theory and practice (e.g., van Dijk & Rietveld, 2017; Baber et al., 2019). Craft and design are a central arena for leading this conversation and can help practitioners and researchers from both craft and design as well as the cognitive sciences to understand the nature of crafts and making processes more generally.

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