

The illusion of freedom: Towards an embedded notion of constraints in creativity.

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There is an inherent tension in the commonly used, indeed “standard”, definition of creativity. Most theorists have settled on the idea that creativity is something that is both “novel and useful” (Amabile, 1988; Runco & Jaeger, 2012). This definition sets creativity in an almost Janus-like position; one face looking toward breaking free from the mundane and offering something necessarily different to culturally accepted norms and the other checking back to that the world will deem it meaningful. In this way, creativity occupies what has been called a space of immersed detachment (Glăveanu, 2019) both reliant on and extending beyond mundane concerns; a liminal “Goldilocks” space (Ross, in prep) of neither too distant nor too close to the real world.

This tension parallels the uncomfortable relationship between creativity and constraints. Creativity is at once something that is free of the constraints of body and socio-material concerns, where constraints are conceived of as external to the creative person (such as the Press in Rhodes’ [1961] model), and yet one that is intimately dependent on these constraints. This chapter suggests that we can overcome this tension but accepting that all creativity is naturally constrained by the very nature of being in the world. Our argument is that the notion of unconstrained creativity is undergirded by an implicit belief that matter is inert and subject to the unfettered imagination of the creator, the so-called hylomorphic model (Ingold, 2010), and according to which in an ideal creative state the creator has full control over the material environment. Once we move towards an embedded notion of constraints, we are better positioned to understand how creativity is heavily dependent on and emergent from the interaction between a person and her socio-material and cultural environment. From this point we can uncover best to exploit the constraints that arise in these spaces.

We will argue that the growing evidence for the positive effect of constraints on creativity (see e.g Stokes, 2005; Tromp, 2022) demonstrates the need to accept that creative

agency is best conceived of as distributed and that constraints are a natural artifact of being embedded in a dynamic world. We suggest that the framing of the underlying research question, that is whether constraints increase or decrease creativity, presupposes a possible world without constraints; the addition of constraints to creative process suggests an *ideal* which is unconstrained. It is only recently the discussion has shifted; the focus is no longer *whether* constraints affect creativity but *how*. In this chapter, we will argue that the findings that constraints can at times be beneficial as well as detrimental suggests that this braiding with the world is an essential part of creativity. In other words, while contextually, constraints may support or hinder creative expression, ontologically, they are a condition of possibility for creativity.

The Need for Novelty

The generation of novel ideas has been traditionally associated with a lack of constraints. The standard wording of an alternative uses task (Nusbaum et al., 2014) prompts participants with the following instructions:

The goal is to come up with creative ideas, which are ideas that strike people as clever, unusual, interesting, uncommon, humorous, innovative, or different. Your ideas don't have to be practical or realistic; they can be silly or strange, even, so long as they are CREATIVE uses rather than ordinary uses

Leaving aside for a moment the constraints of the audience, we see here that creative rather than ordinary uses are those which are not “practical or realistic”. However, this notion of originality as a necessary part of the creative act grew with the Romantic movement (Glăveanu, 2018). It stemmed from anxiety about the rise of machines that displaced traditional craftsmanship and marked the start of mass production and culture. (Millen, 2010). These worries about mass culture are still relevant today and are now coupled the rise of artificial intelligence, leading to anxiety about what the extent of the contribution of human

intelligence. No wonder that we return to viewing unconstrained creativity as the pinnacle of human achievement in light of these concerns of increased mechanisation (Corazza, 2017).

Prior to the Romantics, much value was placed on imitation and conscious mimicry of the past. Creativity was seen as an incremental departure from the work of those that came before (Ross & Vallée-Tourangeau, 2018). This view of creativity chimes more with the so-called Eastern perspective on creativity, in which radical novelty is less valuable than usefulness (Chua & Ng, 2017). In other words, the view of creativity as a sharp departure from established norms stemming from the disembodied, intellectual freedom of the lone genius which haunts many social representations of creativity (Kaufman & Glăveanu, 2022; Montuori & Purser, 1995) is not a given; rather, it is a historically and socio-culturally situated phenomenon.

While researchers in creativity acknowledge the role of socio-cultural context (see for example the signatories to Glăveanu et al., 2020), we argue that this Romantic notion of unconstrained artistic liberty underlies the debate around whether constraints support or reduce creativity because both imply the central importance of individual agency to the creative process. The underlying theoretical basis for the negative impact of constraints is that it impacts on this ideal, free-flowing agency which could be achieved if mundane constraints could be removed. Whether because of a scarcity of resources, frustrations with process, or external impositions of an audience on the final product, constraints are painted as those things which thwart creative intentions. This is implicit in the investigation as to whether constraints are or are not beneficial to creativity – such a question supposes that process can be separated from these constraints, that a lack of constraints is possible and that an inviolable core of creativity exists to be influenced by the constraints in one way or another. In this chapter, we will argue that this is simply the wrong question and that how constraints interact

with personal, social and material characteristics to shape creative form would be a more fruitful area of enquiry.

Our first indication of the importance of constraints are the times they are artificially generated to play an important part in the creative process. The use of self-imposed constraints (see also Stokes, 2005) is an engine of creativity in arts, sciences, and everyday life. For example, artists might deliberately want to approach a specific material or medium in a new way, like using scissors to apply paint or newspaper pages to clean it off the canvas. Other times, creativity comes precisely out of resisting change. For instance, even as other people try out various techniques, an artist might want to keep something constant in their work – for example, Picasso’s blue period, in which no matter the content, everything was painted in shades of blue – in order to explore its consequences to the fullest and/or build a personal style. These are a deliberate attempt to restrict the range of choices available and to restrict artistic agency.

This deliberate agency “depletion” can be seen more clearly in movements to disengage the artist by ceding control to chance. Artists regularly report using deliberate serendipity as way of gaining inspiration by relying on chance (Ross & Copeland, 2022). Chance processes can be used to spark inspiration or even to create the final project, such as Marcel DuChamp’s *Three Standard Stoppages*, which he made by dropping three threads, each a metre long, and then cutting rulers to record the shape in which each thread had fallen. The same technique can be seen in the work of Bruce Nauman (*Mapping the Studio I [Fat Chance John Cage]*), a video installation tracking the overnight movements of his cat and a colony of mice in his studios. For each of these works, the strict, agency-depleting constraints of incorporating that which was randomly and non-intentionally generated was integral to the creative process.

However, self-imposed constraints are but one form of constraint that is encountered in artistic creativity. The majority of constraints arise naturally from the process of being in the world. We will examine these constraints from a socio-cultural perspective that holds as axiomatic that creativity depends on constraints. Within this orientation, creative expression is theorised as a form of action in and on the world, an action that involves various actors and audiences and makes use of various affordances to produce novel and meaningful artefacts always within specific cultural contexts (Glăveanu, 2013). Every dimension of this ecology – material, social, cultural, and symbolic – comes with its own constraints and these constraints can enable or hinder creative action, playing different roles at different times.

Indeed, to position constraints as something that are external to the person is an inherently mentalist position that relies on the notion of a mind unfettered from the demands of a world populated by people and things. Rather, we argue that all creativity is constrained because all creativity is situated in a sociocultural ecology. This is a fundamental characteristic of the creative act and, indeed, of all human action. This melting pot of body, people, and things constrains our thoughts and our actions but also constitutes them. Thus, the interweaving of individual and others in creative agency is not a “constraint” to be applied or removed; rather, it is the nature of an interactive mind. Once these socio-material constraints are recognised as part of the process of being in the world, the research question shifts to exploiting the gap between different forms of constraints.

Mentalism and Hylomorphism

Creativity research spans nearly all academic domains, however, within psychology it is predicated on a mentalist ontology. That is, within this domain, creativity is broadly viewed as a brain-based phenomenon even when there are notable exceptions (e.g., Csikszentmihalyi, 1998). For example, creativity is often measured by tasks that require internal cogitation, such as divergent thinking tasks, and is measured by the ability to produce

concepts with a high level of semantic distance (see Vallée-Tourangeau, forthcoming, for more examples). This is not to say that creative contexts are not studied but that they are not the focus of psychological research in creativity. As we make the final touches to this chapter, the lead creativity research journal, *Psychology of Aesthetics, Creativity and the Arts* devotes 8 of the 13 articles in its February 2022 issue to research on creative personalities and their processes. There is only one article which explicitly looks at interactions in the world.

However, qualitative research on creativity (see, for example, Glăveanu, 2012; Malafouris, 2014; March, 2019) suggests that this creator-first model does not reflect the process of creative engagement in which the socio-material environment enters into a dialogue¹ with the maker or artist. The focus of this research programme is on the generation of ideas rather than its implementation. This is not surprising, given that mainstream psychology has disciplinary norms which rely on a form of methodological individualism, and this underpins a successful and productive research programme. Indeed, Guildford's 1950 APA address often credited with founding the field of psychological enquiry into creativity was calling for an investigation into the creative person. However, such a disciplinary allegiance comes with certain ontological assumptions that are brought into sharp relief in the discussion around the role of constraints in creativity.

All creativity is affected by its relationship with its environment. The notion that the ideal artistic state is one without constraints stems directly from an adherence to this internalist perspective, which posits that the creative mind can be disentangled and isolated from the world. Therefore, those things that constrain a person's agency are inhibitors to creativity. But this assumes two things: first, that unconstrained agency is possible and, second, that it is desirable. To move beyond the trope of the lone artistic genius, is to see that

¹ One consequence of the underlying mentalist model of understanding creative processes and an example of the constraints of language, is that there is not yet a vocabulary to describe the interaction with inanimate objects that does not endow them with human attributes, this is unfortunate, and we hope the reader will understand the broadly metaphorical use here and throughout.

constraints are not something to be overcome but are part of being in the world. Although there is some empirical evidence and conceptual reasons that support the idea that an unconstrained mind is better for creativity, there is increasing evidence that constraints foster and nurture creative outcomes (Tromp, 2022).

Forms of Constraints

Acar et al.'s (2019) integrative review suggests a taxonomy of constraints: input constraints, process constraints, and output constraints. This is similar to Tromp's (2022) definition of constraints as the things, concepts, or categories that reduce the problem search space leading to increased possibility of discovery. Tromp suggests that constraints can be *exclusionary* when they reduce the search space by excluding distracting items or *focusing* when they direct attention one way. Constraints can therefore narrow down search space or operate as anchors that direct the search in one way or another. In each of these cases, the constraint is seen as something that comes from beyond the individual and is imposed on them from outside and something that can be removed if necessary. We agree with Tromp that constraints are an essential part of the creative process and creative performance is enhanced by them.

Let us first address input constraints. These are limitations on resources such as time, materials, and people. Acar and colleague review suggests that there is a curvilinear relationship between these constraints and levels of creativity. This is, when time and money are short, then creativity is low, however, when time and money are overly plentiful, then creativity also wanes (Acar et al., 2019). We can draw two conclusions from this evidence. The first is that radical and novel creativity carries a risk and therefore financial buffering is necessary. This is the simplest explanation for why input constraints may disrupt creative outcomes. However, this observation can be undermined if we move to a more incremental and embedded model of creativity and draw from models of bricolage, a form of creativity

which characterises low-resource environments, of getting by through combining already scarce resources is often present (Busch & Barkema, 2021). The important thing to note is that the form of creativity moulds to the surrounding environment. Resource-poor environments do not stop being creative but the type of creativity that can be witnessed shifts. This is similar to the interaction effect suggested by Tromp & Sternberg (forthcoming), only we argue that that it is not only the outcome which is dependent on task, person and environment but the task itself shifts dependent on the necessary constraints of being in the world.

Second, that creativity appears to rely on some level of constraints and the seeming lack of creativity where there are plentiful resources points to the necessity of distributed agency for creativity to flourish. Rather than viewing constraints as something to be resisted, this evidence suggests they are something to be worked with, and that they form the building blocks of creativity by forcing a ceding of agency. The combinatory approach that characterises low-resource environments is also one that can flourish in high-resource environments once it has been learnt.

The same is true when it comes to process constraints. These constraints are those which act on the process of creativity whether they are rules to facilitate brainstorming or static product development hoops and obstacles. Traditionally, these constraints are seen as being problematic because they restrict the agency of the creative people and they are successful when they narrow the search space and facilitate finding a satisfactory solution. However, an embedded view of constraints sees this loss of agency as an essential part of the creative process. Rather than restricting process, an embedded view of creativity sees it as arising from a series of “conversations” with materials and things. Take, for example, the creation of a wooden bowl (Ross & Groves, under review). This requires the bowl maker to turn a blank of wood into a bowl using a series of tools. Each of these things, from the

material reality of the wood, the tools and the skills of the maker, are interdependent and changeable. The creative skill is not overcoming the constraints but working with them.

Ingold's (2007) description of the process of sawing a piece of wood illustrates the nature of constraints in the world in even simple generative acts and processes. These constraints are not externally imposed but are an integral part of the creative act as it unfolds in the world. Sawing a piece of wood for a bookcase is not the imposition of a mental plan enacted on inert material and sometimes thwarted by the constraints of that material. Rather, it is a relationship between the skills and learned knowledge of the maker, the affordances of the tool, and the properties of the material.

Finally, we can address output constraints. From an embedded perspective, the audience is pivotal to creativity, so the output constraints are part of the nature of the creative process (Ross et al., 2020). We follow Csikszentmihalyi (1998, 2014) in arguing that creativity emerges from an interaction between person and audience. While this can be more obvious in performance art such as jazz (Sawyer, 1992), it is even the case for less obviously interactive forms of creative relationships, such as reading where the imagination and skills of the reader work together with the author to make the book intelligible. Alongside rejecting the stereotype of the creative person as a lone genius, we suggest there should be a parallel commitment to considering constraints not as impositions on artistic agency but part of the process of creating in an embedded world. We would suggest that while research on the value of constraints is fruitful and appears to be converging on the inverted-u relationship described above, a wider view is needed which sees the creative act as arising in collaboration with these constraints.

Toward An Embedded View of Constraints

To unpack the sociocultural system in which creativity is embedded, we can focus on three interconnected elements (see Figure 1), namely, intentionality, materiality, and normativity.

Intentionality refers to the person's action orientation within the situation (i.e., what the person *would* do), materiality captures the physical constraints of what is possible for action (i.e., what the person *could* do), while normativity points to symbolic and ethical constraints (i.e., what the person *should* do). When these elements 'converge,' we are in the space of conventional and thus predictable actions. For example, sitting on a chair is how most people intend to use this object, the object's canonical affordance is to support a person's weight, and, culturally, we are encouraged to use chairs in this way (unless, of course, the chair in question is an antique exhibited in a museum). *Creative actions exploit the gaps and tensions between our intentions, material affordances, and cultural norms.*

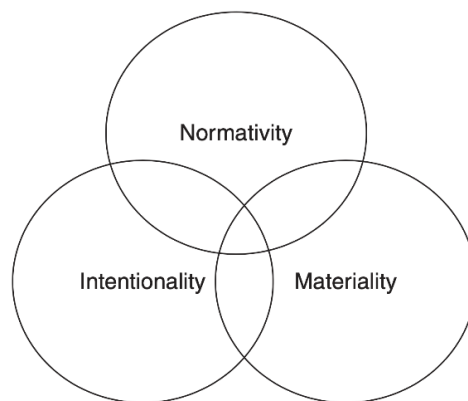


Figure 1. A sociocultural system of constraints (from Glăveanu, 2016, p. 15)

This is where constraints take centre stage. Our intentions constrain us vis à vis what we perceive and act upon in the world around us. Returning to the example of the chair, if we are not tired or in need to sit down, a chair's conventional affordance will be ignored. But if we are tired, we will actively look to sit somewhere and even things not primarily meant to be set on, like the steps of a staircase, will be infused with this new possibility. Material constraints are thus connected to our intentions and perspectives. Not everything around us can be comfortably sat on; it will depend on the physical properties of the support we are looking for vis à vis the physical properties of our own bodies. And there is also another constraint,

particularly for human action, imposed by cultural norms and values. If solid enough, a coffee table could be sat on under specific circumstances (e.g., nobody sees us, we get permission from others) but we would stop ourselves if the coffee table in question was painted or otherwise artistically decorated because, culturally, things that are art-like are meant to be appreciated and kept safe.

A creative process navigates this multitude of constraints by *changing one or more elements of the situation* (e.g., intentions, material properties, cultural norms) or, on the contrary, by *keeping an element constant* when the situation has changed. We will illustrate these two pathways separately for intentionality, materiality and normativity, even if it should be noted that these dimensions are intertwined and co-evolving.

Intentionality

Changing intentions and shifting perspectives are fundamental components of creativity. These processes constantly take place within the course of action whenever the person needs to take stock of the new reality set up by his or her previous actions (a dynamic referred to by John Dewey as the interplay between doing and undergoing; Dewey, 1934). These experimental, trial-and-error episodes within creative work are marked by flexibility and the capacity to adapt to changed circumstances. Sometimes we change intentions almost automatically, when the environment presents us with an obstacle that can be overcome only by acting differently; other times, we intend to approach the situation differently ourselves (either compared to what is usual for us or what is usual for other people, or both).

Materiality

In other circumstances, constraints are explicitly material. All creativity has a form. This is a truism. The creative process is the realisation of creative products in a material form if for no other reason that it requires the judgement of an audience to be creative and so it must take a form which is able to be judged. Even if that form is words on a page, those

words are expressed in a language and written with tools that dictate the form that they take. Consider the backwards and forwards writing process of this co-authored chapter and the way that this process was dictated by the constraints of the machine on which it was typed. This machine afforded certain actions – deleting, cutting and pasting, sending to a co-author – but it also prevented other actions.

What is important to note, however, when considering material constraints in a sociocultural manner, is their interdependence with the psychological (intentions) and the institutional (norms). Oftentimes for creative work to continue, what the person needs to do is find other tools to work with. This process can be guided by the person's goals and intentions, and, in this case, there will be an active search for things with pre-specified properties, or it can be an open-ended exploration in which the person allows him or herself to be surprised by the affordances of different objects. At times the two types of change take place in succession. A designer, for example, might look for specific materials to work with but, in the process, discover materials that unexpectedly fit the task (and, thus, get to change the designer's own intentions). This is a form of serendipity--when an accidental discovery points to a new creative form. Such moments, unsought, open up possibility spaces and indicate a new way of considering the world which could not be conjured by mental gymnastics alone. Creativity thus comes from working with the constraints of the material to offer new perspectives.

The use of objects can also resist change in creative ways. A good example of this is represented by those photographers who, despite a general move toward digital camera both by the general public and fellow professionals, insist on using film and older technologies (Juelsbo, 2016). This self-imposed material constraint can seem counterproductive, given the time spent to develop photos and the lack of an immediate feedback loop for the

photographer, but they have other qualities, including aesthetic, that are attractive to creative individuals.

Normativity

Last but not least, changing cultural norms is perhaps the most difficult to accomplish; and yet, this can be done more easily by moving to a context in which new or different cultural norms apply. Given that norms are tied to the functioning of groups and communities within society, people can choose, to some extent, the groups they might want to affiliate with in view of their shared norms and values. A classic example of creative individuals actively promoting their own cultural norms in art is offered by the Impressionist movement. Within it, like-minded artists who shared a disregard for the values of classical painting promoted by the Salon in France started collaborating and upholding their own artistic views (including through the development of counter-exhibitions). Changing the mind of the general public, however, took considerably more time and yet Impressionists were able to increase their productivity (and arguably, their creativity) by challenging cultural norms. In other circumstances, it is precisely upholding cultural norms and values, in the face of wider changes, that fuels creative expression. Think, for example, about migrants who instead of assimilating within their new society make a deliberate effort to keep at least some of their own cultural beliefs and practices intact. These processes can lead to interesting and potentially creative phenomena, such as the hybridisation of culture and identity often encountered in multicultural spaces (Stockhammer, 2011).

An example

In this section, we will make the varieties of constraint discussed above more concrete by discussing the roles they each play in a specific case: jazz improvisation. We will focus on experimental work done by Ashley Walton and colleagues (Walton et al 2015, 2018). Walton recruited 12 pairs of professional jazz piano players to come to the lab, suit up in motion-

capture sensors, and perform together over different backing tracks. The backing tracks were either the sounds of a drone or the chords for the jazz standard “There is no greater love”, which was familiar to all the participants. In half the trials, the pianists could see each other; in half, a curtain was pulled between them so they could hear, but not see one another. Participants also sat for post-session interviews.

There were many significant findings; we discuss just a few here. First, surprisingly, the curtain did not affect the coordination of the players; their coordination dynamics were the same whether they could see one another or not. Second, participants showed much greater coordination in their head movements than in their hand movements. This was true whether they could see one another or not. This effect was stronger with the drone backing track than with the jazz standard. In post-experiment interviews, many participants discussed the fact that the drone track did not have a built-in time signature and that it was necessary, therefore, to create a time signature in collaboration with the other pianist. Finally, there was a correlation between the strength of the coordination of head movements and listeners’ response to recordings of the trials: the more coordination, the more positive the response. (See Walton et al 2018 for details.)

Although, arguably, this study and others like it have consequences for a theory of creativity in general (Van der Schyff et al 2018), here we will focus on the constraints that were in place in the experiment and that enabled the creative performances.

Among the *intentional constraints* were the motives that the participants had in their participation. They intended to comply with the instructions for the experiment; they intended to cooperate with the other pianist; they had evolving ideas for how to play interesting improvisations with this particular partner and this backing track. In each trial, the performers engaged in a constant negotiation of their contributions to the improvisations. As Dewey puts

it, they were always shifting between doings and *undergoings*. There was frequent trial and error and flexibility in the what the pianists were trying to accomplish.

The most important of the *material constraints* were supplied by the instruments. The keyboards only allowed certain activities. The players were standing, which is not how they typically play. They were wearing motion sensors that might have made playing awkward. The backing tracks provided intentional constraints, as mentioned above, but they were also material constraints: They structured the auditory environment that the pianists had to respond to. The same is true of the playing of the other player. Constraints are often of multiple of types simultaneously. The players' bodies also provide material constraints. First, they needed to continue to do all of the things that animals need to do as part of simply being alive: They needed to thermoregulate; they needed to breathe; they needed to maintain upright posture; etc. Another bodily material constraint was the requirement for highly coordinated head movements, especially with the drone track when the players needed to create the time signature. Head-nodding is apparently required to constrain rhythmic keyboard playing. Surprisingly, the visibility of the other player was not a material constraint. It did not affect performance.

There were also *normative constraints*. In some, but not all, cases, these overlap with the intentional constraints. For example, the pianists desired to play appropriately given the backing track; they desired to play appropriately, given what the partner was doing. What is appropriate and interesting is a matter of cultural norms. So too is the desire to make interesting or compelling or surprising or just plain good music. Jazz musicians are, in a deep way, historians; their playing is highly constrained by the history of the style, including especially what have been judged to be especially good past performances. This is especially so in the case of the jazz standard backing track "There is no greater love". Jazz musicians have been playing this song ever since it was written in 1936, and there are canonical

versions of the song by Miles Davis, Billie Holiday, Sonny Rollins, Chet Baker, Dinah Washington, and Ahmad Jamal, among many others. There is a famous popular version by Amy Winehouse. These past performances apply constraints on what counts as a good performance of the piece, and players typically “quote” them in their improvisations, with the expectation that the other participant will recognise and respond to the quote.

In conclusion, sociocultural constraints on creativity are ever-present as they relate to some of the most basic dimensions of our existence as embodied social and cultural beings (see also Tromp, 2022). Second, they are not ‘enemies’ of creativity nor even its enabler but they are woven into the process of creating. While taken in isolation, we can identify constraints related to intentions, tools, and norms that are inhibiting, creative action is always born out of dealing with specific constraints, by necessity or by choice. By trying to change one or more elements of the creative ecology discussed in this section or to keep them stable in the face of change are creative ‘moves’ employed by everyone from Big C to little and mini-c creators (Kaufman & Beghetto, 2009). The question to ask, then, is not how to release creativity by eliminating constraints but rather how to best use the constraints that are a necessary part of being in the world.

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