Beyond 'the Eye' of the Beholder: Scent innovation through analogical reconfiguration

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Abstract

The current paper examines analogical processes as drivers of innovation in the creative industries. Based on a longitudinal case study of a signature perfume label, we argue that analogies embody cultural schemas in diverse material modalities, a process commonly referred to as analogical schematization. We highlight the role of materiality to ground these analogical processes, bridging embodied cognition and material products. We extend knowledge in this area by showing, among perfumers, how analogies work not only vertically from idea to concrete product but also horizontally across modalities, leveraging material affordances in a process that we label analogical reconfiguration. We discuss the implications of understanding innovation as being driven by analogical processes where materiality is key in creating novel, yet seemingly familiar, products in the creative industries.

Keywords

analogy, creative industries, design, embodied cognition, innovation, materiality, perfume-making

Analogies create inference-making that transcends the similarities at hand. Using an analogy is a creative act through which features of importance are constituted and not simply transferred.

(Meisiek & Barry, 2007, p. 1807)

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The images contain analogies that he [the perfumer] could have translated 1:1 into a fragrance, for example, the laurel note and the red wine. But as we saw in the end product, it was the introduction of the walnut note, which I had never thought about… Eventually it is the walnut note that has come to define the scent.

(Sebastian, creative director)

Introduction

Innovation in the creative industries poses unique challenges and opportunities for organizational scholars (e.g. Lampel, Lant, & Shamsie, 2000; Lawrence & Phillips, 2002). Unlike functional technological innovations (e.g. Von Hippel, 1988), innovation around creative products involves aesthetic, conceptual or emotional possibilities opened up through engagement with new creations. While creative products have functionality, their functions are not only instrumental, but also expressive and communicative of cultural frameworks (e.g. Jones & Thornton, 2005; Lawrence & Phillips, 2002); cultural 'mavericks' (Becker, 1982), functioning at the margins of creative fields, must thus be able to navigate not only technical novelty but also novelty in expression and significance, opening new avenues for experience while not becoming incomprehensible. Mavericks, while flouting conventions of current art worlds (Becker, 1982), contribute to innovation by finding novel ways to represent the difficult-to-articulate bases of cultural life. By doing so, innovations in creative industries reveal aspects of shared experience that were formerly hidden, yet recognizable and intuitive in retrospect (Shore, 1996). As Becker (1976) notes, mavericks reinforce many conventions of their art even as they rupture with mainstream creators. Put differently, innovations are both novel and familiar, with the recognition of the familiar making novelty meaningful. This uncanny aspect lends cultural innovations in the creative industries their surprising feature of producing simultaneous feelings of intimacy and discovery (e.g. Cavell, 1979). Paraphrasing Bloom (2005), cultural innovations seem inevitable without being predictable. By theorizing this seeming contradiction, we explore an undertheorized driver of innovation in the creative industries, the search for new ways to express difficult-to-articulate familiar experiences.

Empirically, studying such a process is facilitated by a site in which creative products are both deeply intimate and difficult to describe precisely, leading to a search for ways to represent new ideas. The field of artistic perfumery, we argue, is an ideal case study in this respect. Perfume-making allows exploration of the paradoxical nature of innovation based on two interrelated aspects of perfumes. First, because scents tap into deep-seated, emotionally charged patterns of associations (e.g. Axel, 1995; Gilbert, 2008; Shore, 1996), perfumes work largely on a principle of familiarity. Enjoying perfume involves being 'taken back' to unexpected associations with emotional experiences (in the current study, associations of 'trust'). This means that perfumes rely on already encoded ideas, evoking and juxtaposing foundational elements of experience. Second, innovation in perfumery occurs because the very depth of cultural encoding of experience means that innovators must tap into foundational experiences, creating through novel means emotional associations to reproduce and communicate such experiences. Thus, perfumery may be a paradigm case, although similar processes should be at play wherever novelty requires innovation around familiar core experience, where maverick creators generate products in which at first 'we do not recognize it, but in the end our memory makes us recognize the original' (Svejenova, Mazza, & Planellas, 2007, p. 547).

To theorize this paradoxical manoeuvring between intimate and novel, we propose that *analogy* serves as a linking mechanism, joining embodied individual experience with cultural models (Shore, 1996), to allow creations that are new, unexpected and yet resonant with collective experience. The value of analogical thinking in organization studies has been recognized in the areas of knowledge dissemination and generation, strategy making and organizational change (e.g.

Cornelissen, 2004; Meisiek & Barry, 2007; Tsoukas, 1993). More recently, analogy has been recognized as a mechanism of institutional entrepreneurship, legitimation, and schema change (e.g. Bingham & Kahl, 2013; Etzion & Ferraro, 2010; Cornelissen, Holt, & Zundel, 2011), linking analogy with organizational and institutional change processes. However, while scholars agree that analogically mediated inquiry reveals new insights and produces novel experience (Meisiek & Barry, 2007), the role of analogy as a driver of innovation and maverick forms of creation (Becker, 1982; Svejenova et al., 2007) remains open for exploration. We argue that this link is possible once scholars acknowledge the dynamic interplay between *materiality* and underlying embodied knowledge, and the role of analogical processes in this relation.

We present our argument as follows. First, we contrast ideas of innovation as creative novelty versus cultural embeddedness, advocating a dual perspective whereby creators *recombine* environmental affordances (Gibson, 1979; Orlikowski & Scott, 2008; Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007) into new possibilities. Next, as a mechanism for recombination, we draw on Shore's (1996) notion of *analogical schematization*, where core cultural models are realized analogically through different modalities of representation. Building on our empirical insights, we extend Shore's (1996) basic model and propose the notion of *analogical reconfiguration*, where horizontal dialogue across modalities facilitates the realization of underlying schemas. In our case, formulaic and visual modalities provide unique affordances for olfactory creation. By 'modality', we refer to the particular mode of representation of a given sense (e.g. visual modalities include colour, movement and shape, touch modalities include temperature and pressure, and so on; see Colman, 2009). By 'affordance', we refer to the possibilities for representation presented by a particular instrument or sensory modality (Gibson, 1979).

To illustrate our conceptual framework, we present a longitudinal, 18-month case study of the complete product development cycle of a new perfume, involving interview, audio/video and olfactory data. We show that *innovation as analogical reconfiguration* involves cognitive processes deeply intertwined in the material affordances of work materials. We discuss the implications of our theoretical arguments and empirical findings with respect to the production of innovation in the creative industries.

To preview, the paper's contribution is threefold. First, we advance knowledge about innovation in the creative industries by addressing the novelty-familiarity paradox from the perspective of analogical mechanisms. Second, building on our empirical insights and the notion that analogical schematization allows for bridging between embodied cognition and materiality, we introduce a process that we label analogical reconfiguration, where analogical mechanisms work horizontally across material modalities. Third, by highlighting the centrality of materiality for analogical processes, we inform emergent literature in material culture and design (e.g. Barry & Meisiek, 2010; Jones, Maoret, Massa, & Svejenova, 2011; Stigliani & Ravasi, 2012), promoting dialogue with organizational scholars exploring material artifacts in aesthetic knowledge and cognitive processes (Ewenstein & Whyte, 2007, 2009; Stigliani & Ravasi, 2012; Cornelissen, Mantere, & Vaara, 2014).

Cultural Innovation: Between Novel Invention and Cultural Familiarity

Emphasizing the 'revelatory' aspect of innovation in the creative industries, we suggest that innovations recombine material artifacts to articulate underlying cultural models in new ways. Recognizing the importance of legitimation (e.g. Jones & Livne-Tarandach, 2008), persuasion (e.g. Etzion & Ferraro, 2010) and institutionalization (e.g. Khaire & Wadhwani, 2010) in framing and making sense of new categories (e.g. Alvarez, Mazza, Strandgaard Pedersen, & Svejenova,

2005; Khaire & Wadhwani, 2010), we suggest that discursive processes do not tell the whole story of innovation in the creative industries.

As Svejenova et al. (2007) note, institutional processes of diffusion and framing processes follow initial creative acts whereby new visions of social reality emerge. The mystery of such acts may lead to 'heroic' conceptions of artistic genius (Becker, 1978), and viewing material and environmental affordances as mere *tools* for artistic expression. By focusing on the material supports for embodied cognition (e.g. Stigliani & Ravasi, 2012), we are able to study the creative process of maverick producers without recourse to a heroic conception of genius, and conversely, explain the embeddedness of producers within cultures without supposing them to be trapped within conventions.

To develop a perspective centred around materiality, we note that cultural products represent implicit, often unconscious schematic models (Jones & Livne-Tarandach, 2008). Distinct from schema change (e.g. Etzion & Ferraro, 2010), translation across different knowledge modalities allows innovation by shifting representations of these deep-seated models. As in Becker's (1982) discussion of cultural mavericks, deep conventions shape even radical innovations, opening questions of where exactly does mavericks' radicality come from.

We argue that novelty involves invention, but invention based on existing affordances (Gibson, 1979; Leonardi & Barley, 2010) that can be creatively recombined and transferred (Jones & Thornton, 2005) across domains. Creative actors make sense of existing environmental affordances and create possibilities for new affordances by utilizing material qualities of the environment. Through recombination, innovators move beyond prevailing norms, but do so in a way that allows reception or acceptance (although not always immediate; see Becker, 1982, Ch.7), within the cultural field. Although this 'interactive' feature has been acknowledged by organizational aesthetics scholars (see Strati, 1999) a mechanism is lacking by which invention creatively appropriates and transforms cultural models based on environmental affordances. This mechanism would allow actors *to move from existing material representations of experience to novel representations*. We argue that analogical reasoning (e.g. Bingham & Kahl, 2013; Cornelissen & Clarke, 2010; Gentner & Holyoak, 1997; Shore, 1996) is central to this novelty production. While sensemaking processes have been recently linked to material processes (Stigliani & Ravasi, 2012), we argue that analogy helps explain how sensemaking is anchored in material representations. Below, we posit two interrelated analogical mechanisms, analogical schematization (Shore, 1996) and analogical reconfiguration, as drivers of innovation via the interchange of schematic representations across material modalities.

Analogical Thinking in Organizational Contexts

Analogy is central in reasoning about mental concepts that are difficult to represent directly (Gentner & Holyoak, 1997). Foundational perspectives in analogical reasoning (see Gentner & Holyoak, 1997) note that analogy, by mapping familiarity onto unknown domains, accounts for the juxtaposition of familiarity and novelty problematized above. Bridging diverse cognitive domains, analogy promotes discovery through supporting inferential reasoning (e.g. Hesse, 1966). As a driver of novelty, such bridging has been studied both in terms of mapping analogous structures across conceptual domains (Gentner & Holyoak, 1997), as well as pragmatic mapping across functional domains (Holyoak & Thagard, 1989). In both views, a basic, high-salience concept is projected onto a low-salience, target object, illuminating formerly difficult-to-perceive qualities of the target (Bowdle & Gentner, 2005).

Analogical reasoning was adopted by organizational scholars (e.g. Etzion & Ferraro, 2010), in part, as a way of linking familiarity and novelty. Barry and Meisiek (2010), for example, note how

analogy spurs newness in sensemaking processes. Just as Hesse (1966) had noted the importance of analogy in generating novel inferences and thus driving scientific theory production, organizational scholars (e.g. Meisiek & Barry, 2007; Tsoukas, 1993) have discussed analogy as part of the theory-generation process. Within the entrepreneurship literature, scholars have used analogy to explore how new venture ideas emerge (Cornelissen & Clarke, 2010; Grégoire & Shepherd, 2012) and are framed and legitimated within and between organizations (Cornelissen et al., 2011; Wry, Lounsbury, & Glynn, 2011). Institutional theorists have explored how shared schema emerge through analogical processes (Bingham & Kahl, 2013), and have explained institutional entrepreneurship through the legitimization of novelty through strategic analogy use (Etzion & Ferraro, 2010). In these examples, analogy is useful for understanding new categories, since pre-existing ways of understanding these categories are absent (e.g. Jones et al., 2011).

While the above research focuses on concept emergence and legitimation with the goal of schema change or acceptance, less work exists around analogy and product innovation in the creative industries. Some work (Dahl & Moreau, 2002; Ozkan & Dogan, 2013) uses an experimental paradigm to explore concept generation via analogy, while Visser (1996) analyses field observations of a design process to determine when analogy is used. Further, Seidel (2007) examines radical innovation through 'concept-shifting', a concept somewhat similar to analogy, but dealing with the shifting of a concept domain rather than the superposition of concept domains. Thus, unlike the institutional and entrepreneurial organizational literature, product design perspectives have not unpacked the analogical reasoning process itself, to determine drivers of innovation at the *material* level.

Material artifacts, by providing arrays of possibilities (or affordances, described below) for action, frame how actors perceive and act within organizations (Zammuto et al., 2007). While the literature around materiality is distinct from that of analogy, the two have strong conceptual links, as analogy projects a material, palpable form by which to understand abstract concepts (Ricoeur, 1978). Thus, analogies often take material, and not simply discursive, forms and become embedded as working models of material culture (Shore, 1996).

Our theoretical framework involves the recognition that analogical processes link concepts with material representations, and that the material qualities (affordances) of artifacts can promote innovation in these material representations. Building on the work of Shore (1996), we describe and extend his model by highlighting two processes, 'analogical schematization' and 'analogical reconfiguration', as important in this regard.

Innovating by Analogy: Schematization and Reconfiguration

The starting point for an analogical view of cultural innovation is that existing material artifacts are partial attempts to represent core experiences (both cognitive and affective) through analogy (Shore, 1996). These experiences act as source domains from which actors draw to construct cultural representations. These representations, furthermore, are limited by the material affordances of their media. The core experiences, often drawn from basic bodily, spatial and experiential orientations (Lakoff & Johnson, 1980), are called 'foundational schemas' by Shore (1996), providing templates from which material representations are drawn. Rather than universal or absolute, Shore (1996) claims that foundational schemas are culturally contingent and variable, yet materially grounded and stable enough to support cultural forms. Shore (1996) takes up previous notions of bricolage (Levi-Strauss, 1966) as cultural improvisation, in order to explain how material artifacts embody cultural schema through analogy. Yet, he builds upon bricolage by framing these analogies as rooted in embodied cognitive processes (Lakoff & Johnson, 1980). Just as Becker (1982) describes cultural innovators as bound to yet straining against material media, analogical thinking attempts, through material means, to move beyond material boundaries. Following Meisiek and

Barry's (2007) call to explore mechanisms of analogical thinking in organizations, we describe the processes of analogical schematization and reconfiguration below.

Analogical schematization

Shore (1996) introduced 'analogical schematization' to describe how persistent, shared cultural models are internalized and modified by individuals through daily experience with material culture. Material aspects of culture provide 'affordances', a term borrowed from Gibson's (1979) ecological approach (for organizational applications, see Leonardi & Barley, 2010; van Dijk, Berends, Jelinek, Romme, & Weggeman, 2011; Zammuto et al., 2007) referring to the configurational properties found in material aspects of the environment, from which cognitive models are built. Working with affordances 'recognizes how the materiality of an object favours, shapes, or invites, and at the same time constrains, a set of specific uses' (Zammuto et al., 2007, p. 752). Material culture, often from previous cultural production, underlies foundational schema that exist at the 'macro' cultural level. However, idiosyncratic, embodied experiences ensure that within-schema variations exist among the diverse, emotionally invested, lived experiences of culture (Shore, 1996). Communication across these experienced modalities occurs through analogy, where culture is understood as 'something like' material artifacts (e.g. music, dance, art, ritual, or other modalities).

Analogical schematization refers to the process by which material cultural productions stand in for deep-seated foundational schema. That schematization involves analogy is important because it invokes the non-arbitrariness of cultural signs, contrary to traditional structuralist views of cultural representation as arbitrary and merely symbolic (Levi-Strauss, 1966; Saussure, 1974). Analogy provides material, embodied (see Lakoff & Johnson, 1999) bases for cultural symbols and 'undercuts the perception of arbitrariness' (Shore, 1996, p. 371). Because analogical thinking works in meaningful wholes or gestalts, analogies are not processed without trace across media, as in the case of arbitrary symbols (Shore, 1996). Rather, they depend on material affordances to make sense. Thus, a song, a smell, or a narrative can be 'sweet', or 'bitter', although sweetness and bitterness are material affordances of taste alone, because they have come to represent foundational schemas that can be transferred across modalities. The same affordance, because non-arbitrary, might not exist for 'mintiness', a less intuitive (or at least more subtle) analogization.

Shore (1996) uses analogical schematization to theorize the 'double life' of cultural models, the public life embodied in shared cultural products, and an internal life in the mental appropriation of these products. The analytic distinction between mental/experiential and cultural/artifactual spheres opens up possibilities for theorizing the space between them as a *space of translation, mutation and innovation*. Although Shore's main concern is the culture-to-mind direction of fit, our empirical data suggest that it is in fact the *cross-dialogue between the two spheres that drives scent innovation*.

In our study of perfume-making, the experience of 'trust' serves as a foundational schema that is both deeply personal and culturally embedded. Although members of a culture possess trust-relevant mental schema (Lewicki, McAllister, & Bies, 1998), people's idiosyncratic trust-related experiences cause variations in how trust is *materially imagined* in objects, spatial relations, smells and other experiential modalities. These idiosyncratic mental models of trust are actively constructed via sensemaking processes, but also draw on shared foundational schemas that, if translated across its diverse material modalities, could underwrite collective experience.

Analogical schematization thus has the virtue of emphasizing the active, agentic aspect of constructing mental models from culturally available source content. However, it is of limited use in the domain of innovation because this agency remains largely limited to individuals'

freedom to internalize culture on their own terms. To produce cultural mavericks (Becker, 1982), however, they require the transformation of idiosyncratic models into concrete cultural products in new ways. Our empirical observations suggest that a second process operates, by which these idiosyncratic models are re-integrated into the domain of material culture by creatively reworking analogies.
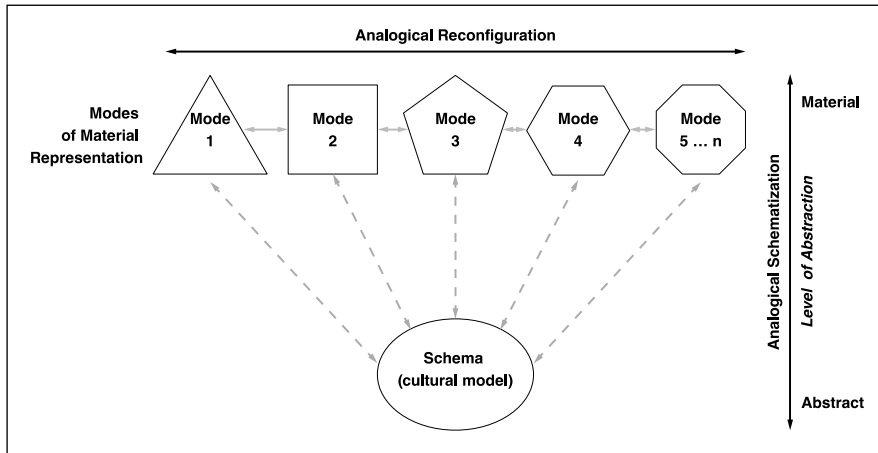
Analogical reconfiguration

We refer to analogical reconfiguration as the process by which internalized mental schema and available environmental affordances interact across modalities to configure innovations in the creative industries. It is reconfiguration rather than configuration because, as discussed above, these schema were themselves drawn from culturally available source content. However, innovation is possible precisely because of the *discontinuities* among modes of representation, which create possibilities for translation across modes.

As outlined above, Shore's discussion of analogical schematization is based largely on a refutation of the idea that cultural models involve arbitrary signs or representations (Shore, 1996). This idea, introduced initially by Saussure (1974) but brought into the study of culture by Levi-Strauss (e.g. 1966), stressed that structural relations between signs, and not internal content, was primary in mental representation. By contrast, analogical schematization requires both structural features and material content for meaning (Lakoff & Johnson, 1980; Shore, 1996). Certain aspects of human experience (for example, cardinal directions, colours, temperatures) are highly salient and thus ripe for analogization. These analogies, abstracted into cultural models, retain traces of their modal properties, as when we call a popular entertainer 'hot', or label a perfume as having 'body' or a 'top note'. Transposed further, they enter language and become imperceptible, as when we call a film a 'dis-aster' (literally, a falling star), or a study 'pre-liminary' (literally, before a threshold).

The insight of the non-arbitrariness of cultural signs means that embodied cognition can provide an anchor for horizontal processes of comparison across modalities, thus creating the possibility of *innovation via analogical reconfiguration.* Different modes of perception offer distinct affordances, giving differential salience to aspects of objects. Translating across media should thus provide insights by highlighting through one mode of viewing (e.g. visual) aspects that would be obscured in a different mode (e.g. smelling).

Returning to the 'trust' schema in perfume-making, we can imagine individuals schematizing trust by 'mapping' diverse environmental features associated with trust experiences, for example, spatial closeness, bodily touch and warmth, certain voice tones. Warmth, to take one example, could be associated in other contexts with colours like orange or red, for entirely different reasons. A painter, nevertheless, might be able to invoke trust experiences through using such colours, intuiting an analogical chain leading from physical closeness. Although this chain is implicit, the art critique might 'see' trust in the painting, recognizing in the material linkages the invocation of a deeper schema, even if the critic had not previously thought of trust as 'red'. The painter's discovery of a material linkage allows her to approximate foundational experiences that were previously shared, but could only be recognized as shared through this cross-modal translation. The experience of trust, long ago abstracted from a collateral effect of bodily proximity, is hence rediscovered through colour, an innovation that is simultaneously a consolidation of shared experience.

In this way, analogical innovation can involve shifting between modes of material representation. Analogies can produce innovation because of their different cross-modal knowledge affordances (e.g. visual, olfactory). Transferring cultural models from one modality to another allow salient features of the models to be perceived that would be obscured under a single modality. It is thus the translation dynamics that drive the innovation.

Figure 1. Analogical processes driving the innovation: schematization (vertical) and reconfiguration (horizontal).

Another way of explaining the schematization-reconfiguration relationship is to recognize innovation as containing both 'vertical' and 'horizontal' forms of translation between source contents. As vertical translation, cultural models are translated and back-translated between culturally available and individually idiosyncratic mental models. As horizontal translation, different modalities of cultural knowledge are cross-translated, deriving novel elements from their differential affordances (see Figure 1).

As seen in Figure 1, a foundational schema can be represented analogically by a series of material modalities, each with specific features. This representation is always partial and provisory, as implied in the dotted lines. Once such a representation exists, it can further work analogically across material forms (e.g. visual to olfactory), establishing the possibility of innovation both in the analogical representation of an idea (schematization) and in analogy work across modalities (reconfiguration).

From this framework, analogy within a given modality offers limited opportunities for innovations. For instance, more incremental innovations occur when ideas are exchanged between producers of a similar form of material culture, honing how a given modality represents a foundational schema. For example, musical scores may borrow rhythms or melody/harmony components from other scores (e.g. Olivier & Rivière, 2001), or perfumers may borrow chemical 'notes' from other scents to produce similar scent variations (e.g. Calkin & Jellinek, 1994; Carles 1962). On the other hand, more radical innovations may be possible when translation occurs across modalities of cultural knowledge. Thus, translating across media, from a folk tale to a musical score, for example, or from an image into a narrative, a score or a scent, involves deeper engagement with foundational schema than translating across scores, and can thereby innovate as a mode of representing underlying social structural features or foundational schema (Shore, 1996).

Material Affordances: Visual Versus Olfactory

As Luckmann (2008) notes, elementary human experiences involve conjunctions of visual, olfactory and other sensory modalities, integrated into holistic phenomenal experiences and referred to as aesthetic knowledge or experience (see Ewenstein & Whyte, 2007; Strati, 1999). Although

experientially integrated, each modality offers unique affordances for understanding reality (e.g. Drobnick, 1998; Howes, 2006). Traditional sensory research has treated each sense as having its own 'sphere', yet increasingly, cross-talk between senses is recognized as a source of 'multisensory' or integrated cognitive experience (Gilbert, Martin, & Kemp, 1996; Howes, 2006). Although each sense offers different experiential affordances, their eventual integration in holistic experience implies a role for analogy across senses (Howes, 2006). Put differently, experience both holds senses together and differentiates their effects, creating both the discontinuities between affordances and the phenomenal unity necessary for creative analogy formation.

Evidence from cross-modal research demonstrates transfer across sensory modalities (see Gilbert et al., 1996; Howes, 2006). However, similar to Shore (1996), this literature explains transfer as a mechanism for constructing experience, while we explore innovation in material cultural forms through cross-modal analogy. Some cross-modal representations (e.g. taste and smell;, Howes, 2006) are so tightly integrated that it does not seem metaphorical to describe scents as 'sweet' or tastes as 'rotten'. Transfers across other modalities beg the question of whether the experience of a 'hard sound' or a 'sour look' are literal descriptions at all, stretching the limits of cross-modal analogy.

In the current case, visual and olfactory combinations may be particularly appropriate for analogical reconfiguration. Olfaction evokes strong associations with materiality and substance, while itself remaining formless (Gell, 1977). As Gell (1977) notes, the status of scents floats somewhere between physical stimulus and semiotic sign, invoking the material but remaining incomplete. Even Horkheimer and Adorno (2002, p. 184) note the 'archetypal' aspect of smell, as marking a desire for unity with the material world.

Visuality and images, alternatively, are characterized by their distancing, objectifying and conceptualizing qualities (Elkins, 2011). Visual images' ability to carry diverse symbolic meanings while embodying concrete, easy-to-reference objects means that images provide ideal bridges between abstractions and material representations (Ewenstein & Whyte, 2009).

The deictic qualities of images imply a capacity for 'cognitive revelation' (Elkins, 2011, p. 4), meaning that they point to phenomena directly, showing object interrelations with a complexity that would be difficult to imagine in the diffuseness of olfactory landscapes (e.g. Henshaw, 2014). Although vision is a sensory, aesthetic experience, it tends toward objectification and conceptual specificity. According to Jonas, 'objectivity emerges pre-eminently from sight' (Jonas, 1954), and experienced phenomena become treated as 'objects' that anchor individual and collective work practices (Ewenstein & Whyte, 2009).

However, while olfaction may not lend itself to 'deictic', objectifying cognition like vision, it offers distinct cognitive qualities compared to vision (Gilbert, 2008). Olfaction is closely related to affective responses and deep memories (Axel, 1995), involving a closer link between immediate experience and long-term memory than in non-olfactory memory (Danthiir, Roberts, Pallier, & Stankov, 2001). Compared to other sensory modalities, olfactory memory endures (Doop, Mohr, Folley, Brewer, & Park, 2006; Herz, 2009). Odours work as 'mnemonic cues that can revive, refresh, retrieve and re-create entire episodes of one's life' (Doop et al., 2006 p. 66), and are used as important markers for social meanings and markers of social spaces (Wilson & Stevenson, 2006). On the other hand, odours remain an elusive and ephemeral phenomenon that can only be addressed metaphorically (Classen, Howes, & Synnott, 1994; Drobnick, 1998). The affective, socially meaningful and deep memory aspects of scent make it ideal for representing foundational embodied cultural schema such as trust. Yet, the diffuseness and openness of scent make it difficult to specify operationally.

Visual analogy may help in this respect, affording objectifying, deictic, relational landscapes of meaning. These serve as analogy maps for the diffuse, ephemeral and holistic landscapes of scent.

The immediate and objective qualities of visuality anchor olfactory memory processing, linking immediate experience with deeply encoded cultural knowledge.

As such, the open, non-objectifying nature of odour creates both difficulties and opportunities for design. While able to take on diverse meanings, signifying deep emotion, odour has creative potential, yet this very openness makes it difficult to specify particular design features. The complementary nature of modalities (here visual versus olfactory) provides a design solution relying on moving across the relative affordances of each modality.

Empirical Case

Research context

The niche perfume industry is an ideal context to study foundational cultural schemas and cross-modal representation, as site for analogy work in innovation. As described below, niche perfumers attempt to capture deep-seated emotions and meanings through innovative scents, and do so using analogies across senses, notably employing visual artifacts. Fragrances involve tacit, emotionally charged experience, closely linked to culture and memory (Gilbert, 2008). The perfume industry actively communicates cultural information via associations and emotions related to fragrance (Kubartz, 2011; Lampel & Mustafa, 2009). While mainstream perfumery largely relies on previous market trends and close copies of strong-selling fragrances, the signature or artistic perfume market remains largely insulated from these pressures, facilitating attempts to communicate complex ideas through novel scents (see Becker, 1982, on industry insulation and cultural mavericks).

Among emerging artistic perfumery brands, Humiecki & Graef (henceforth H&G) is increasingly recognized as a 'maverick' in Becker's (1982) sense, in that, while holding insider status, the firm employs paradigm challenging concepts and methods. H&G has been labelled by experts in the field as 'the new Comme des Garçons' (i.e. a recognized breakthrough scent; Silvio Levi, personal communication); international perfumery blogs (such as www.basenotes.com; www.cafleurebon. com; www.fragrantica.com) highlight H&G's uniqueness, with comments that their products smell 'like nothing else out there' (Basenotes, 2011). H&G organizes its production around a basic human emotion as core idea rather than the market-driven production of mainstream perfumery. Typical images found in perfumery (e.g. desire, sex, celebrity) are replaced by complex, emotionally ambivalent images (e.g. motherly pride, fury, melancholy) to touch upon commonly unexplored emotions. Additionally, H&G has expanded the spectrum of olfactory notes used in perfumery and is known to combine notes in uncommon ways (for example, milk and linden).

While it is notoriously difficult to *prove* the innovativeness of cultural producers, with diverse claims to distinctiveness (Alvarez et al., 2005) – unlike technical innovation, cultural innovation does not exhibit a clearly observable new functionality – the above characterization suggests that H&G is appropriate for illustrating our theoretical perspective. According to Siggelkow (2007), illustrative case study approaches are judged by their ability to show how abstract theoretical frameworks are embodied in real-world phenomena; such illustration is useful for expository, and also for theory building, purposes. Illustrations neither simply exemplify existing theory, nor only test theory on representative samples, but shorten the distance between theory and the world, allowing us to imagine theory more concretely (Siggelkow, 2007). By examining Shore's (1996) analogical perspective in the case below, further, we were able to apply it to a concrete case while, iteratively, noting that schematization was only a *partial* explanation of the innovation process. Thus, we argue that H&G operates according to principles of analogical schematization *and* reconfiguration, made possible by the differential affordances of the perfumers' visual and olfactory artifacts.

Data collection and analysis

Data were collected over eighteen months (October 2010–April 2012), in close interaction with the Zurich perfume design agency and the perfumers' studios in Berlin and New York. Observing the product launch event in Milan, we additionally interviewed the marketing manager, distributors, industry experts and perfumers. We recorded extensively in audio and video, including naturally occurring talk, and collected extensive fieldnotes (500 typed pages), photographs (1200 photographs) and video (200 hours). Audio-recorded formal interviews (40 minutes to 4 hours in length) were transcribed (and if necessary, translated from German by the authors), in addition to approximately 100 hours of informal interviews with the creative director and perfumers, involving specific questions arising from observations. We collected internal documents related to perfume-making (e.g. email correspondence, sketches) and material artifacts (e.g. perfume versions that were disqualified and thrown out). Overall, our data included the observation of two product development cycles, around the perfumes *Blask* (October 2010–April 2011) and *Candor* (January 2011–April 2012). *Blask* (Polish for 'radiance, shimmer'), thematizing the concept 'trust', is our current focus.

As an analytical approach, we moved iteratively between data collection, analysis, theoretical illustration and theory development (Charmaz, 2006; Corbin & Strauss, 2008). We transitioned between multiple readings of the interview transcripts, videotapes, field notes, coding of recurring themes, and the elaboration of categories. As mentioned above, while our case study is illustrative (Siggelkow, 2007), the placement of theory in empirical context also allowed deeper exploration of theory itself, leading us to introduce the notion of *analogical reconfiguration.*

Initially, our research question circled around innovation processes in the creative industries, with a particular focus on the role of visual representations and analogy. Using Shore's (1996) notion of analogical schematization as theoretical starting point (or 'sensitizing concept'; Blumer, 1954), our data analysis and coding began by (1) identifying 'vertical' processes of analogical schematization. At this phase, we coded for links between the foundational concept and the material artifacts used to represent the concept. After the initial, vertical analogical process following a design concept, we noted the proliferation and eventual dominance of cross-material work by the perfumers, leading us to expand our analysis to (2) 'horizontal' processes of analogical reconfiguration, coded through identifying cross-modal translations of visual representations into olfactory ones. Table 1 summarizes the concepts, their underlying mechanisms and illustrative examples from the data.

Scent design process

Initially, the creative director decides on a general idea (a human emotion) for the perfume, developing a visual representation. This 'visual concept' (i.e. visual representation of the emotion), developed over approximately one month, is used as briefing information and reference for the two perfumers throughout the perfume development process. Consisting of three-to-six visual images (see Figure 2), the brief is considered the force, as the creative director refrains from intervening after the initial briefing via the visual concept. He explains:

> So even when we do talk [creative director with perfumers] I do not say too much … Because the more I try to intervene, the more I risk confusing the message of the visual concept.

The scent development process involves clear, sequential steps (Calkin & Jellinek, 1994; Carles 1962). Initially, between four and six alternative formulae, representing the overall composition, are developed and the ingredients precisely weighed. The alternatives are smelled and compared,

Table 1. Illustrative data of analogical mechanisms (schematization and reconfiguration) from case study data.

Theoretical concept	Analogical mechanism driving the innovation	Illustrative data
Analogical schematization	*Vertical fit* (between idea and representation, see Figure 1) To represent an emotion or idea according to a set of material associations that, while varying among individuals, can coordinate their position vis-a-vis a shared foundational schema.	With *Blask* there was a clear idea how this responsibility feels like. In other cases, the images helped to concretize the feeling … (creative director) I heavily drew upon my inner library [my iconic memory] Because I knew, ah there is still this and this image. For example, one of the central images is the one of the two men, the kissing men, the older nude men, the grey-haired ones. (creative director) Skimming through the magazine and the images seemed to validate the choice of trust. I thought of trust as a situation between old and young. And suddenly, I found in these magazines many numerous older men, men with grey hair. (creative director) I see the fragrances as images. When you spray on the perfume, an image comes up in front of your 'inner eye', or a memory. You can also see a poem as an image. (creative director) To always refer back to the images. You can write in the text that the fragrance should be warm, but what does that mean? And the images are able to create a different dimension. (creative director)
Analogical reconfiguration	*Horizontal fit* (between material modalities, see Figures 1 and 3) To use analogies between different modes of representation to leverage the affordances of one mode to drive innovation in the other mode.	The images contain analogies that he [the perfumer] could have translated 1:1 into a fragrance, for example, the laurel note and the red wine. But as we saw in the end product, it was the introduction of the walnut note, which I had never thought about … Eventually it is the walnut note that has come to define the scent. (creative director) There are different materialities in the formula. … This is a good example where we need to talk or think of different things that are totally…they don't have anything to do one with the other … (perfumer) So overall it is very well matched. But there is an aspect in the fragrance that was not present in the images. (creative director) They had the same experience in earlier fragrance development processes. When the emotion was motherly pride the perfumer mixed milk with linden even though these ingredients did not appear in the visual concept. (creative director) There was this idea, that it [trust] should feel soft/tender. This is not the exact expression but then, all we needed to do was finding out how this softness/tenderness, by which materiality, it can be achieved. (perfumer) It smells really brown. But there is also the lightness/brightness in the concept and you find this in the laurel notes, the pointed/sharp/spiky notes. So I think the colour composition is very well reflected in the fragrance. (creative director) The fragrances confirm the images that take place in our heads. We won't commit to the same images, like, not everyone is going to say 'thinking of trust we have this and this image in mind' but I think there are some aspects, like the warmth, that the fragrance emanates/sends out, that there is a like a common denominator. (creative director)
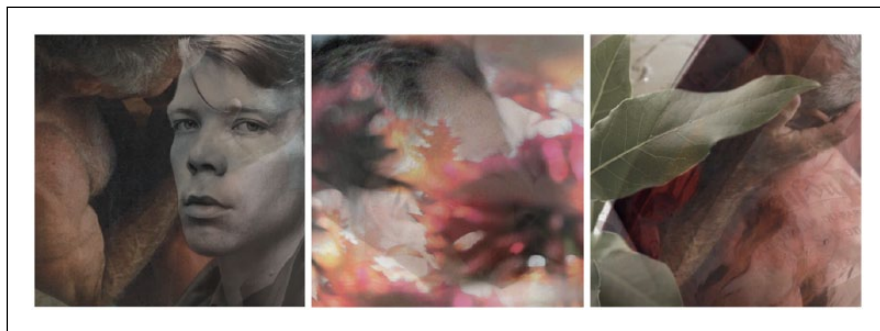
Figure 2. The visual concept: 'Trust – the feeling of being in good hands'.

and the chemical formulae changed accordingly, adding or subtracting combinations of materials, until the final fragrance is attained. Each of these practices works across media to transfer aspects of the visual concept to the scent.

Important to the visual concept is the attempt to work with an initial abstraction of the original idea or emotion to help the perfumers interpret the images according to their own experiences.

> The transfer [from visual to olfactory] basically takes place in the moment, where… there are these images and the images still have – despite their urgency – an abstraction, because it is about scent. And these images describe the scent with an analogy, because the scent is not described how it is actually going to smell, the content, the composition is not actually defined. This is the central point: it is not about precisely defining what scent I want, because else I could give them a list [of ingredients] and say: I want a perfume in which these and these ingredients are combined. (Sebastian, creative director)

Thus, the visual concept is meant to pass along a shared schema, while allowing for idiosyncratic ways of materially representing the idea of 'trust'. Below, we describe analogical schematization and reconfiguration as underlying mechanisms for formulating such representations and thus driving innovation.

Analogical Schematization: Achieving 'Vertical' Analogical Transfer

The design of *Blask* begins with the idea of focusing on 'trust'. When asked about the origin of the creative director's choice, he recounted a recent personal experience of disappointment in a relationship, but also that, riding his bike to the office on a sunny October morning, he was struck by the golden light, the changing colours of the leaves from yellow to brown, the mixture of late summer warmth and autumn coolness. In the context of a later interview, the creative director elaborated:

> The images mirror back that sunny October day. Maybe it would have become the same concept in the end, even if it were a rainy day. But I am actually pretty sure that this mood, when the concept was started, that this mood was present in that day.

Arriving at his office that morning, he explained that he was now certain that the new perfume would be about trust. The decision appears to have 'flashed up', such that the memory of emotions felt (familiarity) became linked to a set of unique images (novelty) that then became the basis for

creation. While we focus on the processes following this initial decision, it is important to note that the foundational concept for the process was composed of a familiar feeling, linked to a set of aesthetic experiences. The process of transferring the abstract and poorly articulated, yet compelling, notion of trust into a workable model for organizing a fragrance involved a wide search for inputs to formulate the visual representation. While claiming to have a clear and powerful vision of trust, the director nevertheless searched in a relatively haphazard way through photographs, fashion and lifestyle magazines, internet sites and reference works from both highbrow and popular culture. The process, he claimed, involved *the associations and visual representations of trust.* He slowly 'concretized the vague feeling' with which he had begun. Among these concretizations were the following associations, verbalized on the first day of working on the visual concept:

> *Warm, deep, warmth: inside, closed*
> *A traditional Sunday roast*
> *…something of a red wine*
> *…something sexual, to confide in someone, to open up to someone*
> *…something with basket – a basketwork*

From these diverse aspects, the creative director begun to draw conceptual links:

> *Creative director: There should be a woody note; the red wine is still missing; dry laurel; grey hair. […] Grey hair mirrors the colour of trust.[…] Unfortunately, this is green.*

From this process the 'vague feeling' is first linked to sensual and visceral qualities, primarily through visual images; yet already some hints of olfactory translation ('a woody note') are apparent.

Although the creative director recognized the attempt to articulate deep-seated schema, these seemed not to be limited to his own, idiosyncratic schemas, but formed the basis for collectively shared foundational concepts. On the one hand, these concepts seem extremely intimate, e.g. *Personal attachment, intimacy, and projection characterize the relationship between the evolving visual representation and the creative director* (from fieldnotes). On the other hand, the visual representation means to transcend the personal, to tap into collectively communicable representations (Endrissat & Noppeney, 2013). During the making of the visual concept, he explains:

> *It is necessary to distance oneself from one's own biography…I have to erase the personal links. I want to see the images as mere images, because the perfumers do not share my experience. They can hardly relate to this. I must try to communicate the ideas without talking about myself.*

As a composition of analogies that illustrate a foundational schema, the visual concept enables the perfumers to work on a singular schema while maintaining diverse idiosyncratic perspectives on this schema. The explanation of analogical schematization as a series of material representations encoding abstract ideas was echoed in the creative director's discourse:

> *The image [visual concept] has its own abstraction. And due to the collage, due to the fact that it is not a real image but things are brought together that do not exist together in reality, the abstraction is even greater.*

The final version of the visual concept is shown in Figure 2. As a series of progressively more specific visual analogies, the first picture introduces the emotion of trust; the second specifies the selected emotion, and the third picture hints at possible olfactory notes for the fragrance. In this

case, such notes would not be derived from, but might evoke, a branch with laurel leaves, grey hair and red wine.

Working through these visual analogies was a major part of the perfumers' task after receiving the visual representation. In the ensuing telephone conference with the creative director, the perfumers searched for analogical linkages with the image: *Does devotion capture the essence of page one?*, *How does the feeling of being in good hands relate to trust?* Jointly, they identified possible conceptual linkages with the image: *Longing*, *nuances of melancholy*, *a sense of love*, *dedication*, and *security*. The visual concept mediated the creative director's internalized schema and the external collective representations. Asked about the collective aspect of the visual concept, the creative director recalled:

> We [perfumers and creative director] are not necessarily able to commit to the exact same images, like, not everyone is going to say 'thinking of trust we have this and this image in mind' but I think there are some aspects, like the warmth in the images, that … acts like a common denominator.

Described as 'surreality', the visual concept presented objects and relations without demanding logical consistency, only analogy, thus allowing new combinations, and enabling each actor to idiosyncratically connect to the foundational schema.

> Creative director: It is really about the connection between old and young. […]

> Perfumer: I can get the point of the concept, because it is really the feeling of a boy [short silence] – it has happened to me a few times.

In another instance, one perfumer associated the visual concept with an 'intensive, ideal type relationship between two people', while the other saw an '*erotic*' and '*sexual aspect*', '*daring*', and felt '*challenged*'. Making sense of the visual concept by using their own associations, intuitions and experiences enabled the perfumers to connect individually to the underlying concept. The visual concept thus helped transition the director's idiosyncratic understanding of a foundational schema into a material representation that could be shared.

Here, cognitive sensemaking processes (e.g. Weick, Sutcliffe & Obstfeld, 2005) occurred around the visual concepts, involving discussion. However, differently than the *storied* focus of most sensemaking research (e.g. Weick et al., 2005), the creative director explicitly *limited* discursive accounts, maintaining focus on the material artifact. He explained that limiting direct explanation gave weight to material affordances, avoiding possible discursive closure that, while providing coherence, could close off new artistic possibilities (see quote above). Further, within the visual approach, the insistence on an abstract visual representation, rather than choosing images directly representing scents, differentiates this technique from mainstream 'ingredient-driven' briefings. The latter involve client-selected images representing ingredients-based images, without trying to represent the underlying concepts. In an example given by one of the perfumers:

> A beautiful picture of a lemon …. And then on the top, the lemon became the dress of a woman. It was a very pretty picture and so the idea was to make a 'lemony' scent (Perfumer 2).

In the end, although it smelled like lemons, the client disliked the lemon-smelling perfume, so a new, flower-based briefing was introduced, leading to a similar reaction. In this example, analogous transfer was required from image to scent. However, its lack of basis in an underlying schema differentiated it from H&G's visual concept. The latter explicitly attempted to reach 'beyond' the image through visual abstraction, as described above. This aspect made the visual concept more

complex, which may explain the divergent interpretations by team members. Yet, the perfumers claimed that despite this ambiguity, the visual concept had greater coherence, presumably attributable to the presence of an underlying idea.

> *I always make sense of his [Sebastian's] concept…it's very unusual because, number one, they are very strong, they are very unusual and the pictures sometimes are, ah, they're ambiguous… (Perfumer 1)*

But they are also '*very thought-through and therefore work better than many other briefings'* (Perfumer 2).

To situate this point theoretically, the ingredient-driven briefing, as a juxtaposition of images without reference to underlying content, approximates the notion of bricolage (Boxenbaum & Rouleau, 2011; Levi-Strauss, 1966), contrasting with analogical schematization. The latter, also relying on juxtapositions and differences, generates meaning not only through its internal structure, but based on an underlying representation. As Shore (1996) argues, unlike bricolage, schematization is embodied, avoiding the structuralist (Levi-Strauss, 1966; Saussure, 1974) notion of empty signifiers that represent only by their differences, to ground differences in embodied (although diffuse and difficult to define) lived experiences (Lakoff & Johnson, 1999).

Because H&G's design process grounded analogy in underlying schemas, it provided coherence to a process that, using bricolage, might have been more fragmented. As Michlewski (2008, p. 384) argues, creative design processes involve 'epistemologically unconfined exploration' and openness to newness that risks overly discontinuous, anarchic behaviour. By anchoring material processes around a commonly held, yet difficult-to-articulate schema, diverse 'polysensorial aesthetics' (Michlewski, 2008, p. 381) may have been possible while minimizing the danger of losing coherence.

Analogical Reconfiguration: 'Horizontal' Transfer between Modes of Representation

Moving beyond Shore's (1996) basic model that emphasizes processes of analogical schematization, our data suggest that in order to create and modify the scent from the visual concept, there is likely another process at work that we have described above as analogical reconfiguration. For example, attempting to make sense of the laurel image in the visual concept, perfume notes such as 'dry', 'balsamic' and 'herbaceous' were invoked. The polysemic nature of the images allowed exploration both of diverse notes, and of various interpretations of the foundational schema, for example, when one of the perfumers read 'Roman Empire' into the laurel leaf, whereas for the creative director, it represented a 'traditional Sunday roast'. Thus, rather than contradicting schemas, analogy allowed the general schema to englobe different dimensions, and thus, horizontally, to suggest innovative new olfactory notes. As suggested in the introductory quote, analogy does not work according to a simple transfer or comparison model (Meisiek & Barry, 2007) but through 'the generation and creation of new meaning beyond an antecedently existing similarity' (Cornelissen, 2004, p. 708). We note, for example, the walnut note which is absent in the visual image but able to define the new perfume (see introductory quote above and Table 1).

As observed in the videos, the visual concept, the mixing of the compounds and the chemical formula are involved in an interactive process centred around the perfumers. The visual concept is repeatedly consulted after smelling the different mixtures, as if to 'match' the scent with the picture's message. One instance shows how the lead perfumer, dissatisfied with a scent version, consults the visual concept.

Noticing a 'milky' aspect, he returns to the formula, adding notes. A few minutes later, noting the 'repetitiveness' among the pictures and sensing something 'elegant', he decides 'to play with some woods' (wood notes). Putting the visual concept aside, he returns to the chemical formula and mixture, for technical modifications. (field notes)

In these short, frequent, consultations of the visual concept, the perfumers systematically built olfactory models analogous to the visual. The visual concept representing trust orients the more technical work on the formula. The formula spreadsheet defines and specifies the composition and ingredients, while the visual concept guides the perfumers back to the fundamental design concept, preventing them from getting lost in the technical details.

Importantly, it was not enough for the fragrance to smell 'nice'; it had to capture an analogy with the image. In one instance, the perfumers had looked for 'masculine, floral notes', associating these with trust, but ultimately dropped this search because it did not cohere *horizontally* with the visual image. Not simply a matter of a pleasing smell, the perfume, according to its own affordances, had to mimic the conceptual schema embodied in the visual image.

Contacts with the visual concept thus provided a general orientation distinct from the olfactory experience and the chemical formula. Regarding analogical transfer between levels, the scent was brought into line with the visual concept, while the chemical formula was constructed to represent the scent, providing visual feedback. In both cases the visual affordances were used to structure the more diffuse olfactory notes.

To summarize, working cross-modally allows difficult-to-represent aspects in one mode to be translated from a different mode. It is the strategic use of the *discontinuities between different analogical representations of cultural models across modes of representation that drives cultural innovation.* By selecting modes of representation that offer different affordances, we can illustrate how these differences give innovators space in which to rework cultural models through a process of analogical reconfiguration (see Figures 3 and 4).

In a telling counter-example, we see how a lack of differential affordances hinders innovation via reconfiguration. Simultaneously to the perfumers, the team's photographer used the visual concept as briefing information for a marketing campaign photograph. Hence, the resulting product was a visual-to-visual creation, not crossing modalities. Paul, a visual design professional associated with the project, expressed disappointment at the resulting image, which he regarded as lacking originality and novelty. Comparing the two images revealed the striking similarity between visual concept and photograph, with many key visual features in common. While direct, mimetic borrowing was impossible at the scent level, where cross-modal translation was necessary, the reconfiguration process was less effective across visual representations. Although anecdotal, this comparison suggests that the differential affordances were related to the success of analogical transfer, reinforcing Gentner and Markman's (1994) postulate that analogical similarity requires an initial difference for analogy to bridge (see Figure 5).

Similarly, both the visual concept and the chemical formula involve using analogies. Yet only the visual concept is a driver of innovation, being based on an embodied cultural schema whose representation grounds innovations. The chemical formula, in other words, is empty of deeper meaning, and can only specify or represent aspects of the scent (although it does provide a limiting factor, based on the formulaic combinations known or archived by the perfumers). This is why, in the scent-formula interaction, adjustments are made to both artifacts, while in the scent-visual concept relation, the visual concept is fixed and only the scent is allowed to vary. The anchoring of the visual concept in a foundational schema means that, while both visual stimuli are sources of *variability*, only the visual concept is a source of *innovation*, in the above sense of a rediscovery and recombination of shared meaning.
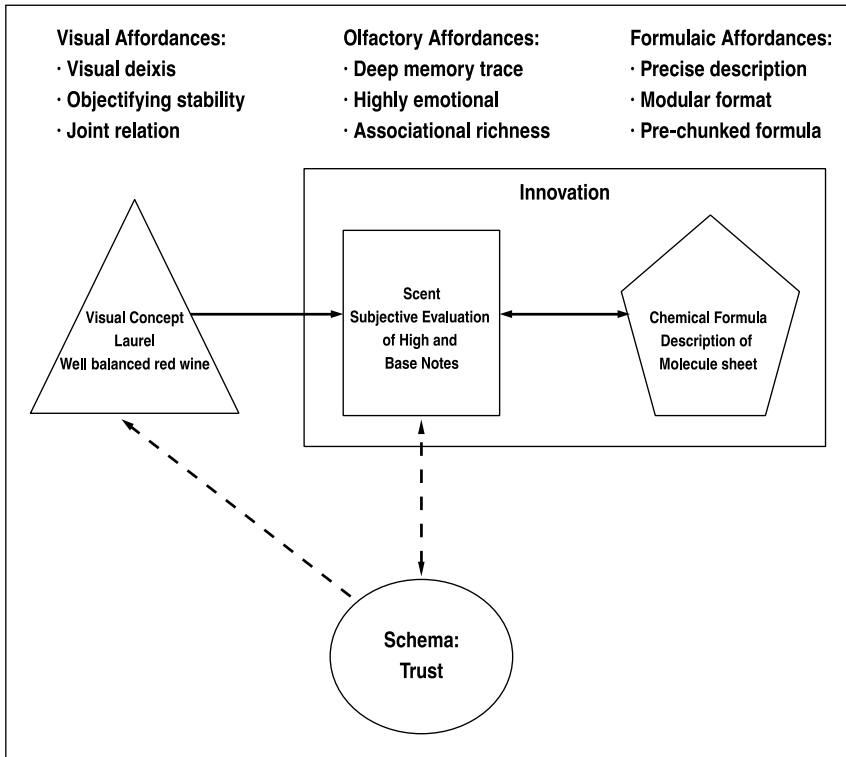
Figure 3. Material affordances and analogical reconfiguration driving the innovation.
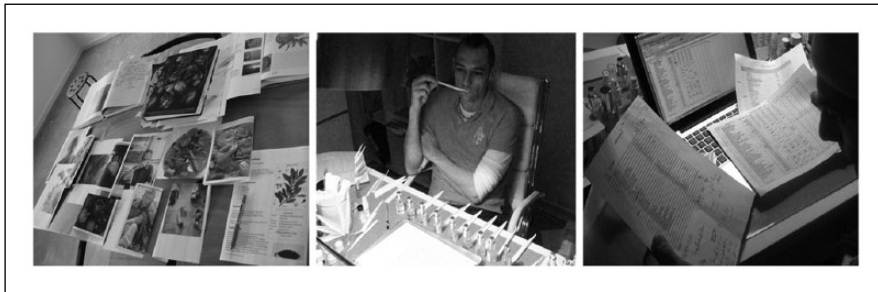
Figure 4. Material affordances and analogical reconfiguration driving innovation (photographic illustration).

The above point explains why the creative director was so adamant that, once fixed, the visual concept not be adjusted. Although derived from the director's subjective experience, it was treated as non-arbitrary for the analogy process to work. The perfumery team, to produce thematic coherence, anchors itself around the visual concept as a source of symbolic order. Seen as a quasi-sacred inspiration, the visual concept grounded analogical reasoning around a single, although interpretively open, material artifact.

The resulting product was met with critical acclaim and was seen as a 'maverick' in its field. It was received by experts as a unique and innovative creation, as well as a return to something already familiar:

Figure 5. Campaign photograph for *Blask*.

> *Blask is a mesmerizing fascinating return to form… The core of this is a mix of bayleaf, red wine accord, and walnut. These three notes come together to create something wholly unique and something completely modern… Blask is not a fragrance for everybody but if you are someone looking for a line that takes risks and challenges your perception of what perfume could be, Blask is something you need to try… (Mark Behnke, Cafleurebon, 2011)*

Discussion and Contribution

This paper began with the problem of reconciling newness and familiarity in innovations in the creative industries. While even mavericks rely on socially constructed experience (Becker, 1982), their innovations appear as discoveries, astonishing in their originality. By acknowledging that foundational cultural experience is often hidden (Shore, 1996), innovation can appear as revelation, at once creative and immediately comprehensible, or even, with perfumes, intimately familiar. From this insight, we explore the mechanisms by which material artifacts represent foundational schemas, and how these artifacts' cross-modal affordances influence translation across modes of representation in signature perfume-making.

The attempt to explain our empirical observations theoretically led us to explore Shore's (1996) notion of analogical schematization. This seemed promising due to its dual focus on material innovation and embodied experience. Our observations resulted in proposing the derivative notion of analogical reconfiguration, focusing specifically on how materiality can support innovation in cultural products. Innovation thus results from the combination of *schematization* and *recombination.*

The current research contributes to a growing interest around analogy in organizational scholarship, particularly around innovation and change (e.g. Cornelissen et al., 2011; Etzion & Ferraro, 2010; Bingham & Kahl, 2013). While past literature has established the importance of analogy in innovation, it has done so by showing analogy across autonomous conceptual domains (see Bingham & Kahl, 2013). Yet, analogy can work within an existing conceptual schema, through the cross-application of diverse material modalities. For example, existing approaches (e.g. Bingham & Kahl, 2013; Etzion & Ferraro, 2010) highlight simultaneous similarity and differentiation, showing how analogy impacts emergent autonomous conceptual domains. We also examine analogy as a support for change, however, by describing product innovation within existing conceptual schemas. Thus, we show continuity not from shared material or structural analogies that bridge diverse schemas, but from shared schematic reference across materially discontinuous modalities.

Innovation by analogy is possible within a single schema because, first, foundational schemas allow diverse material interpretations, and second, because material modalities have different affordances, thus generating novel perspectives on a single schema as representation moves across these modalities. Our conceptualization, thus, not only explains change but explores why innovations can be novel and unpredictable while seeming intuitive and familiar.

Although we studied scents specifically, cross-modal qualities likely characterize a wide variety of cultural production sites, as aesthetic knowledge involves multiple sensory modalities used in conjunction (e.g. Strati, 1999), suggesting that analogical schematization and reconfiguration may occur frequently across these settings. We also observed, in the case of visual concept versus formula that analogy can act as either a *support* for innovation, where analogy allows the operationalization of concepts, or as a *driver* of innovation, where analogy generates cross-modal experimentation into formerly unexplored areas. Future research should specify the conditions under which the separate functions of analogy are realized.

For instance, the creative director's insistence on creating a visual concept that is both materially grounded and open to diverse interpretations links nicely with recent work on the openness of 'live' versus 'dead' metaphors in analogical thinking (Bowdle & Gentner, 2005; Cornelissen & Kafouros, 2008). According to Cornelissen and Kafouros (2008), 'live' metaphors require active sensemaking to produce new connections, while 'dead' metaphors take on literal, taken-for-granted meanings. Similarly, while some analogies involve looser connections between elements (such as in the abstract visual concept), others might have tighter connections, bringing to mind analogous pairs more readily. From this perspective, analogical schematization in our case uses 'live and loose' analogies, creating possibilities for innovation by forcing the elaboration of schemas into unknown cognitive territory. Such analogies might be more apt for maverick innovation, while mainstream creations might focus on 'dead, tight' analogies, making commonplace comparisons that seem more obvious. The example of the lemon picture given above, used in an overly literal and less abstract fashion, serves as a good example of a tight but uninteresting connection, as opposed to the abstraction of the visual concept. The looseness of the latter allowed cross-modal exploration to support the search for new pathways for expression, as opposed to repeating more well-worn analogies. Because little work has looked at the variety of analogy types in different levels of innovational radicalness, future research could examine how live analogies are maintained, reframed or closed off as maverick cultural products become integrated into mainstreams.

Translation across modalities thus drives discovery only when it is open enough to allow a degree of interpretive free play in representing an underlying concept. This link between material supports and analogical thinking coheres well with organizational perspectives regarding the power of analogy, but also with materiality, in creating possibilities for cognitive processes in organizations (e.g. Cornelissen et al., 2011, 2014; Stigliani & Ravasi, 2012). For example, by linking shared collective schemas with embodied experience, material artifacts can link individual and group cognitive processes (Stigliani & Ravasi, 2012). We elaborate on this linkage by showing how translation across multiple material modalities allows innovation, leveraging the distinct material affordances to discover hidden aspects of an underlying schema.

We note the increasing interest in material practices as an emergent theme in organization studies, as both a sensemaking mechanism (e.g. Cornelissen et al., 2014; Stigliani & Ravasi, 2012) and as a way of working across boundaries (e.g. Star & Griesemer, 1989), a perspective which our study furthers in several ways. First, studies examining material representation as 'boundary objects' (Star & Griesemer, 1989), for example, focus on boundaries between social groups, disciplines, or fields. Some recent work has elaborated on the mechanisms of boundary objects (see Bechky, 2003a, 2003b; Carlile, 2002, 2004), but does not focus on innovation drivers or the sensual aspects of objects. Our interest here is around the boundaries between sensory modalities,

contributing an aesthetic focus that coheres well with, yet is largely absent from, the organizational literature (Endrissat & Noppeney, 2013). It may be that the visual and chemical representations used by team members act as boundary objects, for example, by connecting chemists, designers and marketers. This perspective cannot, however, explain why the resulting perfume *smells* so unique, and how such an innovation results from the combination of material representations with foundational schema. Our perspective complements current perspectives by stressing a turn toward representing foundational schema in material and experiential possibilities.

We rely for this added insight on the idea that the specific qualities of visual images, as elliptic and incomplete, yet representationally complex and expressive (Elkins, 2011; Jonas, 1954, 1962), make it possible to frame different objective and relational features in one visually consistent picture whose aspects are perceived simultaneously. As Ewenstein and Whyte (2007, 2009) argue, visual representations embody diverse knowledge types, such as engineering-specific knowledge and aesthetic knowledge, making visual images ideal mediators between conceptual and non-visual aesthetic forms.

As a further contribution, empirically illustrating material representations as analogical supports for cognitive processes (such as sensemkaing) helps to unify historically divisive anthropological and psychological accounts of cultural meaning, with the former treating meaning as *external/*structural, and the latter, as *internal*/cognitive (Shore, 1996). Analogy, as explained above, bridges these two approaches by framing artifacts as external supports around which information processing occurs. It thus avoids both 'undersocialized' and 'oversocialized' views of innovation in the creative industries.

Relatedly, discussions of analogy and metaphor have emphasized the embodied nature of knowledge (e.g. Cornelissen & Clarke, 2010; Lakoff & Johnson, 1999; Shore, 1996). Part of this research stream's objective is to situate embodied cognition without succumbing to biological determinism, instead integrating embodied and cultural perspectives (Shore, 1996). From an analogy perspective, the body provides basic relational and orientational coordinates used in analogizing, influencing subsequent cognizing without determining it per se. As argued above, most analogy literature has remained focused on schema change, while the material representations of schemas receive less attention. Alternatively, organizational research on sensemaking, materiality and aesthetic forms of knowledge is proliferating (e.g. Cornelissen et al., 2014; Ewenstein & Whyte, 2007, 2009; Stigliani & Ravasi, 2012). By grounding analogy in material processes, we leverage the notion of affordances to clarify that the material offers possibilities for product innovation without determining specific forms of innovation. We thus further the connection of materiality to the analogical cognition literature, promoting embodied views without overly 'biologizing' cultural production.

In highlighting the role of analogy, further, we note that similar concepts appear in the organizational literature; it is thus important to distinguish analogical schematization and reconfiguration from different yet related concepts. While multiple processes may occur during product innovation (see Seidel, 2007), these may be analytically and empirically distinct from analogy. For example, as discussed above, bricolage, like analogy, involves juxtaposing or overlapping diverse representations (see Boxenbaum & Rouleau, 2011; Duymedjian & Ruhling, 2010; Levi-Strauss, 1966); thus, bricolage provides analogical opportunities by superimposing representations. However, the deeply encoded, underlying bodily schemas we discuss (Shore, 1996) fit poorly within bricolage, which, influenced by semiotics (Levi-Strauss, 1966), arises from the arbitrary nature of signs (see Shore, 1996, on the bricolage/analogy distinction). The notion of conceptual blending (Cornelissen, 2004; Fauconnier & Turner, 2003) is also related to analogy, positing combinations of conceptual categories as drivers of newness. Yet, blending involves creating a 'third space' where new concepts are constituted, contrasting with our treatment of analogy as creating novel perspectives on

existing underlying schema. Alternatively, concept shifting (Seidel, 2007) involves schema change through the progressive expansion of existing schemas, rather than through either analogical schematization of material objects, or through material transpositions of representations, as we describe above.

Of the concepts related to analogy, metaphor is perhaps the most closely related (e.g. Cornelissen et al., 2011; Lakoff & Johnson, 1980). For example, Cornelissen et al. (2011) differentiate the terms by framing metaphor as cross-category comparisons, while analogy involves within-domain comparisons; however, their argument acknowledges the fundamental link between the two concepts, as does the foundational work (Gentner, Bowdle, Wolff, & Boronat, 2001) upon which they draw. Further, Shore's (1996) analogical schematization perspective discusses analogy and metaphor together throughout, as embodied concepts distinguishable from the 'metonymic' or associational nature of bricolage. Finally, Bowdle and Gentner (2005) argue for metaphor as a subspecies of analogy, the more general term for mapping structural relations. We thus employ analogy as a general term, while acknowledging that much of this theoretical framework also applies to metaphor.

Limitations and Future Research

Despite these contributions, limitations remain. First, in discussing the relationship between creators and their media, we largely bracket the interpersonal processes occurring among team members and their co-construction of social meanings. Yet, our theoretical framework assumes that innovation is thoroughly social, whether or not a single creator is involved, because it involves evoking and communicating shared cultural foundations (Becker, 1982), reproducing and contributing to collective fields of experience. While recent organizational work (e.g. Leonardi & Barley, 2010; Stigliani & Ravasi, 2012) has examined the micro-processes of collective sensemaking around material artifacts, little work exists applying such work to aesthetic models. While we focus primarily on interactions with sensory artifacts during innovation, future work should also examine interpersonal sensemaking among creative groups, who may use artifacts to negotiate collective meaning (Stigliani & Ravasi, 2012).

Second, at the level of material affordances, further work should unpack the different dimensions of modalities that affect innovation possibilities. Here, we focus on visual versus olfactory affordances, arguing that the objectifying and deictic aspects of visual artifacts lends coherence in translation into the more diffuse and inarticulable olfactory form. This example fits well with the challenge of representing 'trust' in an artifact (a perfume) that is difficult to describe conceptually or analytically. We chose this task because, as argued above, the creative industries often involve products whose interpretation is 'open', or not easily specifiable in functional terms. However, could the same process be used, for example, to design an innovative food product, a clothing design, or a new theoretical idea? Or conversely, were the situation reversed, could a scent drive innovations in visual design? Evidently, the answer requires a case-by-case diagnosis of affordances across sensory modalities, honing in specifically on the translation possibilities across modalities. Thus, while the reconfiguration notion is meant to be general, it could take on very different results across specific cases. Until more work is done on materiality and material affordances (see Orlikowski & Scott's (2008) call for such work), direct application across domains is limited.

Specifically, studies should focus on (1) different sensory modalities, and the affordances for action and perception across modalities, and (2) how ideas and material representations affect each other over a design process. Our site involved a single underlying schema, but as we know (e.g. Bingham & Kahl, 2013), many innovation processes involve schema change as well. It is likely that schemas and material representations co-influence each other in the innovation process. While

we introduce a dynamic than can generate newness, it stops short of completing the dialectic view of material and schematic representations that likely takes place in innovative contexts.

Relatedly, while we describe affordances and schema knowledge structures, the embodied nature of these structures also implies emotional and aesthetic, rather than only cognitive and analytic, affordances. Our focus on analogy does not disallow such non-cognitive aspects. Rather, drawing attention away from 'rational' models of cultural cognition to embodied, analogical and aesthetic modes of knowing, we open up a space for relationality and emotion, a space to be further explored in organizational research.

Third, a further difficulty is acknowledged by Shore (1996) regarding the schema notion used in analogical schematization. While conceptual, schemas are also embodied, largely unconscious, and describable primarily through their analogues. The necessity of representing schemas indirectly is the motor of analogical processes (Gentner & Holyoak, 1997) since representation thus rests on comparison and inference, rather than direct awareness. Thus, while we refer to the foundational schema in our case as 'trust', the schema is perhaps more accurately described as an embodied sense of closeness or intimacy that is only known as trust indirectly. While beyond our scope, future research should explore relations between embodied and cultural aspects of foundational schemas, assessing the degree to which, as in Shore (1996), the two are fundamentally inseparable.

Fourth, as mentioned above, we deal with a single underlying schema, rather than the schema change that characterizes previous literature on analogy and innovation (e.g. Bingham & Kahl, 2013; Cornelissen et al., 2011; Etzion & Ferraro, 2010), constituting a scope limitation of our paper. Yet, this focus complements current literature, while broaching the counter-intuitive possibility that schema change is not the only pathway to innovation.

It is possible to imagine the inverse situation from our own, where a single material modality is used to embody different foundational schema. Rather than a case of different embodiments of a concept, it would be a case of different conceptualizations of a material artifact. Such an inversion would be more closely aligned with past literature, but would obscure the central role of materiality, since the driver in such a case would be more completely conceptual, rather than material. It is likely the case that both material and conceptual possibilities drive innovation, and thus future research might look more closely at how the mechanism we describe could be integrated with a view of schema change.

Additionally, scents, because of their unique form of representation, may be an 'extreme' example of horizontal, cross-modal representation, and thus not generalizable (although still valid for illustration purposes). Indeed, cross-modal uses exist across diverse work settings – figures in scientific and mathematical presentations, plastic models in science, etc. These exemplify analogical reasoning across modes of presentation. Recognizing cross-modality as a driver of innovation based on analogy's use of differential material affordances thus contributes to organizational process far beyond perfumery. That said, our study is an initial step, relying on future research for extension into other domains.

Finally, it may seem like the 'foundational schema' concept suggests a coherent and unified cultural model, while recent work in organization theory has stressed the fragmented, contested nature of organizations (e.g. Dunn & Jones, 2010). This seeming coherence is illusory; the fact that analogies are drawn from foundational models does not imply that these models do not themselves contain contradictions or inconsistencies. In fact, such inconsistencies provide rich material for innovation, whereby cultural artifacts demonstrate underlying cultural tensions in concrete form (Shore, 1996). Thus, future research might focus on how analogies represent differences and dissonances, rather than underlying similarities.

In sum, we have argued that analogical processes constitute an important driver of innovation, particularly when mediated by material supports that allow it to produce novel associations. We

illustrate analogical schematization and reconfiguration in innovation in a unique setting. Such work, we hope to have shown, is a driver of new insights, as knowledge passes across borders, whether between actors, or sensory modalities, or academic fields. The flash of recognition sensed when an analogy is perceived to be apt, felt in moments of artistic insight, is also a driver of innovation for organizational theorists, as they translate concepts across areas. It is our hope to have brought such a translation about in the current work.

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