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Multimodal Imaginaries and the “Big Worm”: Materialities, Artefacts and Analogies in São Paulo’s Urban Renovation

**Forthcoming in Research in the Sociology of Organizations, Special Issue on Materiality
and Visuality**

Felippe Medeiros
Insper Institute of Education and Research
300 Quatá Sao Paulo-SP 04546-042 Brazil

Gazi Islam
Grenoble Ecole de Management and Insper
12 Rue Pierre Semard Grenoble 38000 France

Maria Laura Toraldo
Università della Svizzera italiana
Via G. Buffi 13 Lugano 6900 Switzerland

Abstract

Recent interest in the multimodal accomplishment of organization has focused on the material and symbolic aspects of materiality. We argue that current literature invokes diverse “multimodal imaginaries”, that is, ways of conceiving the relation between the material and the conceptual, and that the different imaginaries support a plurality of perspectives on materiality. Using the empirical case of a large urban renewal project in São Paulo, Brazil, we illustrate three different multimodal imaginaries – the concrete, the semiotic, and the mimetic – and indicate how each imaginary determines the way in which the site in question is discursively constructed. After outlining the different approaches, we discuss their theoretical implications, advantages, and constraints, setting an agenda for future studies of materiality in organizational and institutional contexts.

Keywords: imaginary; materiality; multimodal ensemble; representations

*“There is a submerged world, unseen and hidden, underneath the carpet of the Minhocão. Once read, it reveals something of the soul of where we live”
Blog excerpt, “Minhocão and the Semiotic Guerrilla”¹*

A recent surge in interest in materiality in organizational and institutional scholarship (e.g., Alcadipani & Islam, 2017; Vaujany & Vast, 2016; Endrissat, Islam & Noppeney, 2016; Dameron, Le & LeBaron, 2015; Jones, Boxenbaum & Anthony, 2013) has highlighted the importance of material artefacts in accomplishing meaning-making and coordination. Actors use material objects to construct, represent and preserve social meanings, through the collective crafting of discursive-material “assemblages” (Stigliani & Ravasi, 2012). Material processes are fundamentally multimodal; that is, they work across multiple experiential modes, such as sight, touch, hearing, and the like (Pink, 2011). Methodological approaches have given renewed attention to multimodal research strategies (Zilber, this volume), involving the visual (e.g., Meyer, Höllerer, Jancsary, & van Leeuwen, 2013), video (e.g., Toraldo, Islam & Mangia, 2016) and other modalities (e.g., Riach & Warren, 2015; Shortt, 2013) in the data gathering and analysis process. In both research and practice, understanding the importance of material modalities as interacting with and complementing discursive practices has become a priority.

Because organizing involves ensembles of linguistic and material practices (Endrissat, Islam & Noppeney, 2016; Jarzabkowski, Burke & Spee, 2015; Iadema, 2013; Stigliani & Ravasi, 2012), scholars have argued that material modalities can add to our understanding of organizing, over and above discursive approaches (e.g., Orlikowski & Scott, 2013). However, relating the material and the discursive remains perplexing in many treatments, leading to debates as to the relation between the two (Hardy & Thomas, 2015; Orlikowski & Scott, 2015). Theoretical contributions can be built both from the perspective of materiality in contrasting with and complementary to discursive aspects, or by showing how the material

and discursive are bound up with each other (Putnam, 2015). Clarifying this area, therefore, may involve comparing different perspectives on materiality and discourse (what we term “multimodal imaginaries”), to suggest how each way of imagining the meaning-material relation affects the theoretical and empirical stories researchers can tell.

By “imaginaries”, we refer not to specific ontological positions per se (which are often not explicitly articulated in empirical studies), but the broader ways in which ideas about materiality are carried in narratives, descriptions and often implicit theories (Taylor, 2004). Imaginaries underlie and ground theoretical positions, but also run through studies of materiality in the implicit ways of talking about materiality in relation to the social or the conceptual. Because of the tacit nature of imaginaries, and their breadth of expression in images, discourses and other media (Taylor, 2004), imaginaries are more given to contradictions, as well as fantasy (Komprouzos-Athanasidou & Fotaki, 2015), than theories, and thus express implicit cultural ontologies as well as scholarly positions.

The current paper contributes to emerging literature on multimodality and materiality by investigating three common multimodal imaginaries: Where materiality is considered as a set of concrete affordances that can be taken up by actors; where materiality is considered as a semiotic-discursive mode that can be used to represent social meanings; and where materiality is considered in its mimetic capacity to embody analogies and bridge the concrete and the conceptual. We illustrate this theoretical taxonomy through a case study of a large urban project in São Paulo, Brazil, the highly politicized decommissioning of an elevated highway, the *Elevado João Goulart* (João Goulart Elevated Highway), known colloquially as the “Minhocão” (Big Worm). The Minhocão became a site for social struggle because of the brute materiality of its presence, but also because of its legacy of symbolic meanings, and its iconic status as a metaphor for the city’s complexities. We use the illustration of the

Minhocão to theorize a pluralist vision for multimodal studies, examining theoretical affordances and limitations of each of the multimodal imaginaries presented.

The remainder of the paper continues as follows. First, we introduce the concept of multimodal imaginaries as a response to an ongoing ambiguity in organizational studies of materiality and objects. Next, we theorize three imaginaries in which material and discourse are coupled in diverse ways. Illustrating these in our empirical site, we close the paper with implications for theory and future research around multimodality in organizational scholarship.

Making sense of material modalities: Senses, objects, meanings

Materiality affects the lives and practices of actors in a variety of distinct ways. The sensory and affective reactions of individuals depend on the materiality of surroundings, giving a role to aesthetic objects in organizing (Taylor, 2012; Strati, 1992). The material affordances of objects and infrastructures constrain and enable certain kinds of action (Alcadipani & Islam, 2017; Jarzabkowski & Pinch, 2013; Zammuto, Griffeth, Majchrzak & Dougherty, 2007; Islam, 2006). The interpreted meanings of material artefacts represent social values and communicate norms and rules (Hollerer et al., 2013). The form and content of objects act analogically to reenact felt experience and reproduce and create organizational life (Islam et al., 2016; Heracleous & Jacobs, 2008). In each of these cases, materiality matters, but the ways in which it matters differ, and may reflect different underlying conceptions about the modes of materiality that matter for organizational research.

Across most of these approaches, material modalities are usually considered because of the ways in which the sensory qualities of materials, or their spatial-kinesthetic features, can support certain kinds of communication. For instance, Hollerer, Jancsary, Meyer & Vettori (2013) discuss how Corporate Social Responsibility is materialized into visual images. Kaplan (2011) analyses how the material affordances of PowerPoint help to realize strategy

decisions. Islam et al. (2016) discuss how visual and olfactory aspects interact during perfume design to support innovation. In these situations, sensory modalities, often in combination, support organizational action in ways that are difficult to describe using only discursive models of organizing (Orlikowski & Scott, 2015).

Yet modalities are not simply sensory qualities of objects; rather the nature of objects and “objectifications” (Shankar & Cavanaugh, 2012) themselves is varied, and scholars have recognized diverse object-modalities that are distinct from, although related to, their sensory qualities. For instance, Nicolini, Mengis & Swan (2012) distinguish between material infrastructures (where objects are taken for granted), epistemic objects (where objects act as translation devices), boundary objects (where objects enable collaboration) and activity objects (where objects trigger innovation). In a different framework, Schiermer (2011) distinguishes quasi-objects, cult objects and fashion objects as encapsulating different forms of social relationships. Presumably, multimodality perspectives should be able to account for not only the diverse sensory qualities of organizational life, but also for its diverse ways of framing the world as objects and object-like categories.

Implicit in the discussion of objects shown above is the idea that objects are material in the sense of concrete, sensorially present, but also that they support meaning making, discursive and relational activities. The deep entanglement of materiality and discursivity has been the object of recent discussion (Zilber, this volume; Cartel, Colombero & Boxenbaum, this volume; Putnam, 2015; Orlikowski & Scott, 2015; Hardy & Thomas, 2015). While the importance of discussing both discursivity and materiality together has been acknowledged, how to link the two theoretically remains an open area for research.

We argue that approaches to studying materiality tend to fall along three broad ways of “imagining” the material, each involving ontological, representational, and social-relational assumptions about the materiality being studied, and many studies juxtaposing elements of

each. First, materiality can be framed in contrast to, or as a limit upon, the discursive. In such approaches, materiality is interesting because it proves an alternative to “purely linguistic” views of social life. Second, materiality can be framed as a modality of the discursive, in its representational or semiotic functions. Such approaches use a hermeneutic or interpretive approach to code the meanings of material objects or their role in representational practices. Third, hybrid approaches frame materiality as both discursively meaningful and inherently or aesthetically impactful, or explain these aspects in terms of the other. Such approaches draw on embodied analogy, metonymy and metaphor to link the material and the conceptual. We do not argue that these framings are opposed, or claim epistemic superiority of one over the others; thinking of them as “multimodal imaginaries” allows us to explore how underlying conceptions of materiality’s action and effects on social life affords different views on the social, providing a given material setting a plurality of possible interpretations, as the researcher works across these multimodal imaginaries.

Below, we elaborate on the three multimodal imaginaries, giving examples of each from the literature. Next, we provide a theoretical illustration of how the same material-discursive object can be theorized differently from each of the modal imaginaries, leading to distinct ways of imagining a research site.

Materiality as concrete

Organizational scholarship increasingly recognizes the importance of concrete practices involving artefacts within diverse organizational contexts, from reinsurance trading companies (Jarzabkowski, Burkee and Spee, 2015), to architectural planning (Cartel et al., this volume) to medical settings (Eikeland and Nicolini, 2011; Fele, 2012; Nicolini, Mengis and Swan, 2012). Common to these studies is the interest in studying human interaction; thus, considerable attention has been devoted to both verbal and non-verbal actions (Jones and LeBaron, 2002) and how actors use their bodies, facial movements, silence and gazes to

confirm, alter or change social contexts (Jarzabkowski and Pinch, 2013). The material environment provides insights into such actions (Jones and LeBaron, 2002; Orlikowski and Scott, 2015). Actors engage, interact with and make sense of material objects and spatial resources surrounding them, emphasizing the environment's material properties (Leonardi, 2013). Following Jones and LeBaron's (2002) conception, the material environment can be a resource drawn upon by organizational members. Artifacts such as computer screens, notepads and keyboards allowed reinsurance traders to construct social space, for instance (Jarzabkowski, Burkee and Spee, 2015); their body movements depended on physical surroundings while co-constituting the work space. An important feature of material objects is that, rather than simply influencing the occurrence of social interaction, they are used by individuals and collectives to accomplish certain kind of actions (Jones and LeBaron, 2002; Jarzabkowski, Burkee and Spee, 2015).

The increasing applications of aesthetic perspectives in organization studies are another important development in imagining materiality (Bell et al., 2013; Warren, 2002). As alternatives to discourse, visual materials draw attention to the material practice and experiential knowledge that relies on social interaction (Cook and Yanow, 1993). Studying a redesigned office space in an IT company, Warren (2002) captured employees' emotions, somatic and visceral experiences, exploring non-conscious and aesthetic knowledge. As further observed by Jack et al. (2013), symbolic and aesthetic aspects of organization culture, including colors, forms and materials, extensively influence emotions and the human sensorium. Such studies highlight the interplay between aesthetic and material phenomena (Jack et al., 2013; Riach and Warren, 2015). Further, Ewenstein & Whyte's (2007) study of visual objects in architectural firms revealed that aesthetics is often embodied in tools. As Ewenstein & Whyte (2009) pointed out, objects present certain properties defining them as concrete or abstract: 'boundary', 'epistemic' and other types of objects act as intermediaries

of practices, offering different affordances for action. A major current trend in these approaches is to emphasize the concrete nature of artefacts. As such, artefacts and spatial resources are usually implicated in affecting material relations and social dynamics.

Materiality as semiotic

Beyond the concrete effects of material in affecting emotion and facilitating action, materiality and material experiences form an important part of meaning-making (Pratt and Rafaeli, 2006; Iedema, 2005). Objects act as carriers for social and organizational meanings through their symbolic functions, which are constructed and interpreted by organizational members (e.g., Pratt & Rafaeli, 2006). Symbols act as a “rich, non-verbal language” of organizing (Pratt & Rafaeli, 2001). Taking a hermeneutic approach, for example, Hollerer et al. (2013) analyze how an understanding of globalization is captured through visual artefacts, while Barley, Meyerson & Grodal (2011) analyze how email becomes symbolically infused with meaning relating to stress and work overload. Recent work, drawing on van Leeuwen’s (e.g., 2004) social-semiotic perspective, have extended notions of meaning to multi-modal ensembles and have thus drawn links between materiality and discourse, particularly in the case of visual artefacts (cf. Meyer et al., 2013)

While multimodality emphasizes the multiple sensorial modes in which materiality has effects, the majority of research to date has focused on visual modalities as a complement to the discursive. For instance Meyer et al., (2013) discuss the use of visibility in multimodal communication. Here, multimodal combinations based on the use of visual repertoires are used by entrepreneurs in planning strategic actions. The visual mode is considered immediate and powerful in communicating and transmitting specific values or ideas, and visual cues are treated as a system of signs (Kress, 2010; Iedema, 2005) which managers or entrepreneurs manipulate and employ as legitimation devices (Meyer et al., 2013). Studies of visual symbolism have further been used to understand how organizations construct identity

(Bullinger, this volume) and build organizational legitimacy (Vaujay & Vaast, 2016). Such approaches move beyond visual artefacts as purely sensorial affordances by suggesting that organizations make use of multimodal semiotic resources to construct meanings. For example, Iedema (2005) has introduced the notion of ‘resemiotization’ as the movement from different semiotics that resulted from practice. To illustrate, when Apple’s manuals changed from the IISI manual to the iMac one, the new manuals shifted from a user’s guide based on linguistic text and static images to a focus on visual representations to explain the company’s new vision. Regarding resemiotization, the company’s image as having a user-friendly ethos is backed up by captivating visual constructs; by disregarding the technical language of manuals, the visual modality provides a transposition of meaning and rematerialization (Iedema, 2005).

Another important line of work has focused on the multimodal properties offered by tools such as videos, analyzed as a supporting multimodal research (Toraldó et al., 2016; Fele, 2012). Arguably, video data offer multiple modes of presentation (Toraldó et al., 2016), such as sounds, image, movements, and facial expression. Videos have been used to capture the multimodal interactions of team members in an emergency center (Fele, 2012). Researchers can analyse the materiality of actions, talk, positions, and bodily movement and gain access to meanings that lies beyond discursive, text-based tools (Fele, 2012). Here, the key issue concerns representing ongoing actions, by analyzing materiality in its capacity as a “sign” of social meanings, norms and identities. In this vein, exploiting the material potential provided by the medium may prove fruitful in interpreting the semiotic system that lies behind social functioning, such as team interaction and communication.

Materiality as mimetic

While imagining the material as concrete involves causal relations, sensorial effects, and functional affordances, imagining materiality as symbol focuses on the representational

and discursive possibilities of material objects as they are inscribed with social meanings. Related to but distinct from both is the mimetic quality of material artefacts (e.g., Taussig, 1993; Shore, 1996), which relies on the embodied dimension of objects as supports for meaning itself. Differently than a purely concrete analysis, mimesis operates via associations and meanings; yet differently than the semiotic, it is the material arrangement or position of the artefacts, and not their arbitrary symbolic representations, that support meaningful interpretation (e.g., Islam et al., 2016; Shore, 1996). Mimetic relationships have been studied most clearly in the cases of embodied metaphor and analogy (Lakoff & Johnson, 1999; Shore, 1996), and their organizational uses (e.g., Islam et al., 2016; Cornelissen, Holt & Zundel, 2011, Cornelissen & Clarke, 2010, Heracleous & Jacobs, 2008).

Analogy and metaphor, studied for the most part as discursive phenomena (cf. Cornelissen et al., 2008), are materialized when the physical arrangements of objects or sensory stimuli evoke conceptual knowledge through mimicry (Shore, 1996). The notions of a hot idea, a sweet business deal, or a stinging report all involve embodied phenomena that do not define, but evoke, a concept through mimicking the sensory. Thus, how the material is arranged can provide templates for the arrangement of ideas, and thus can represent ideas in an indexical, rather than a symbolic, fashion.

Recent studies of materiality have evoked notions of arrangement and embodied analogy to explain organizational processes. Stigliani & Ravasi (2012), for example, show how designers use visual materials such as sketches, drawings and post-it notes to assemble templates that serve as common understandings of products. Islam et al. (2016) examine how embodied analogies work across different sensory modalities, and how material affordances link with cognitive schema to create innovative designs. On the consumer side, Patterson & Shroeder (2010) examine how embodied analogies influence tattoo purchase decisions, based on whether users imagine their skin as “container”, “projection surface” or “cover”. In terms

of sales practices, Darr & Pinch (2013) describe “material scripts” in which sellers dramaturgically enact material practice to mimic structured interactions in ways that allow desired outcomes. In all of these examples, the material is important not only for what it is concretely, nor for what it means symbolically, but for how its material constitution allows users to imagine conceptual meanings that are not themselves concrete.

In short, materiality is not a single concept, but relies on different imaginaries, each of which carries different implications for how the material will play out in organizing processes. In particular, three of these imaginaries – the material as concrete, the material as discursive/symbolic, and the material as mimetic – lead to different explanations for the role of material processes, and provide different sources for theorizing. A summary of these three imaginaries and their distinctive features is given in Table 1.

 Table 1 about here

As outlined in Table 1, each imaginary offers potentials for thinking about materiality, along with drawbacks. Imagining materiality as the concreteness of “stuff” allows a contrast with discursive perspectives, as well as ringing true to phenomenal experiences of materiality as physically “real”. Yet this imaginary may occlude the semiotic and discursive construction of the material, lending an illusion of solidity to social reality that is in flux. Imagining materiality as semiotic reveals the discursive element of the material, but can paradoxically lose the distinctiveness of the material and reduce the world to a system of signs, occluding the excessive or unrepresentable aspects of the world. Imagining the material as analogical can navigate a course in-between the discursive and the material, but remains locked into a system of associational and analogical reasoning that forecloses critique and favors the intuitive over the discursive use of reason. Understanding how each imaginary facilitates and forecloses conceptual possibilities is a step towards applying that imaginary more reflexively.

To illustrate these three imaginaries empirically, we draw upon the case of an urban renewal project centered around a material object – an elevated highway. We illustrate how each of these imaginaries was drawn upon in ongoing discourses around the past, present and future of the highway, and how each imaginary supported advocacy agendas regarding the ways in which the highway and its decommissioning would be handled.

Illustrative case - Background

The Minhocão was originally named the *Elevado Costa e Silva* (Costa e Silva elevated highway) and conceptualized architecturally by Luiz Carlos Gomes Cardim; initially, the concept was refused by the prefect at the time, José Vicente Faria Lima, and became a source of contestation, with many arguing that the highway would lead to the destruction of the downtown urban landscape². The project was taken forward by the new prefect, Paulo Maluf, starting in 1969. Maluf was associated with ARENA³, the political party linked to the military dictatorship of the time, and the structure was named after the military leader Costa e Silva⁴.

The figure below shows the inauguration of the Minhocão by the São Paulo prefecture. The infrastructural work was seen by many as a way to promote the speed of transport in the city and the use of automobiles, increasing consumption and promoting modernity through an auto-centric model⁵.

Figure 1 about here

Almost immediately after its inception, questions regarding the viability and social and economic impact of the structure became prevalent. According to the spokesperson of one group that proposed to convert the structure into a park, each generation of politicians has had to deal with the political fallout of the “Structural Scar” of the Minhocão:

“Since Olavo Setubal [mayor of São Paulo from 1975-79], the decommissioning has been discussed...In truth, the theme of demolishing the highway structures and

recovering the quality of life provided by the urban and collective spaces (public and private) which were destroyed in order to build the highway, is old and recurrent in the so-called first world (from the late 70's), and a bit afterward among us.”⁶

Despite the lack of public debate in the atmosphere of the military government throughout the 1970's, discontent over the bridge continued, becoming more public after the democratic opening of Brazil in the 1980's⁷. Such discontent was concretized in 1990, when the prefect Luiza Erundina prohibited vehicle traffic on Sundays and holidays and placed restrictions on traffic during the week. From this opening of the elevated space, a culture of week-end leisure use developed on the space, including festivals, informal markets and use as a walkway and exercise area, similar to a temporary public park.

Public debate around the future of the Minhocão was stimulated by a proposal made in 2010 by prefect Gilberto Kassab to de-activate the area. Debate was particularly heated in social media spaces, in blogs and newspapers, which were the sources from which we drew our discursive examples. In 2014, a Strategic Direction Plan under Law nº 16.050 of 31 July 2014, article 375, was passed, stating:

"A specific law will be elaborated determining the gradual restriction of individual motorized transport on the Elevado Costa e Silva, defining progressive limits until its complete deactivation as a traffic channel, its demolition, or its partial or total transformation into a park.”

In this opening of a space for possible futures of the structure, two key developments may be noted: First, the structure was made the object of a specific law, differently than previously, where public discussion was less structured around specific policy debates. Second, the idea of creating a park to overlay the highway was introduced, an element which became central in discussions of the possible gentrification of the surrounding neighborhood⁸.

The appearance of multiple options became the topic of a sequence of organized public meetings (“audiências públicas”, similar to open city hall meetings), where various stakeholders discussed the social and environmental significance of the Minhocão, its role within the city, and what its removal or conversion would imply for urban life in central São

Paulo. These public meetings, seen against a penumbra of media and internet coverage, were a textbook definition of a “discursive struggle” (cf. Barros, 2014; Hardy & McGuire, 2010), in which different narratives and interpretations of the phenomenon, linked to diverse stakeholder groups, vied for institutional prominence. For the purposes of the current study, we illustrate how notions of the materiality of the *Minhocão* became part of this discursive struggle, which involved different imaginings of the material in its relation to public culture.

Data and methods

Our illustration draws on a wider research project of the *Minhocão*, in terms of its history and the uses of materiality in discursive struggles around urban renewal (for a comparison of multimodality in urban architecture, see Jones & Svejenova, this volume). The current paper does not engage in a full empirical analysis per se; our purpose is not to “prove” a set of claims about the *Minhocão*, but to illustrate, through the case, the different multimodal imaginaries discussed above. We provide empirical examples, quotes and images to clarify our points, so as to enable a broad overview of different analytical lenses within the same paper. Thus, it remains for further empirical research to validate and extend the preliminary sketch drawn here and to substantiate the particular analyses of the *Minhocão* described.

Our data are themselves multimodal, involving interviews with residents, occupants of the *Minhocão*, and city officials, as well as photos and videos of the *Minhocão* made during (but not exclusively) events held at the site. We draw on official archives, in video format, of city-hall and other public meetings held about the site, as well as on a wide-ranging archival search of Brazilian media sites and blogs dedicated to the site and the controversy surrounding it. A systematic coding of these materials is forthcoming, but for the purposes of the current paper, we draw freely on these various sources in illustrating the different ways of considering material-discursive relations.

Materializing the Minhocão: Three multimodal imaginaries

Minhocão as material-spatial object: Passages, markets and occupations

The enormity of the Minhocão structure and its prominence in the dense urban area of central São Paulo made its materiality immediately relevant in concrete terms of the use of space, its structural properties and affordances for action. A veritable “elephant in the room”, the Minhocão acts as an impermeable barrier, a support for and constraint on action and as a space for public action, a physical aspect that was central to treatments of the structure. The imaginary of materiality as concrete included material effects on habitation and traffic, economic consequences for exchange, ecological consequences for the surrounding neighborhoods, and democratic implications for the future of public spaces. We illustrate each of these in turn.

Material consequences. Central to the debate over the Minhocão were the implications for traffic in a city already suffocated by congestion (cf. Caldeira, 2015). For instance, the center for Traffic Engineering (CET) released a report that tentatively supported the demolition of the structure:

“..we may conclude that the demolition of the Minhocão is possible, but would imply adjustments to the existing traffic system, principally on roads already operating at capacity limits...Nevertheless, the demolition would make possible the amplification of the capacity of Avenue Gal. Olimpio da Silveira, as the central axis supporting the structure would be freed for use by traffic”⁹

Here, the Minhocão is considered essentially as a concrete structure with specific possibilities, which would change with its demolition. These possibilities are not symbolic, but physical, in nature, and action possibilities are considered solely as technical possibilities (e.g., the “central axis supporting the structure”) rather than as an outcome of social interaction or political interests. Policy action is not advocated, yet suggested implicitly as an outcome of technical adequacy:

“The results of the macrosimulation indicate that the impacts ... are not significant, permitting the deactivation of the Minhocão. In terms of mobility, demolition is more adequate because in the place of the removed pillars, it is possible to implement actions such as, for example, the construction of bicycle lanes and increased car and bus capacity”¹⁰.

The aforementioned bicycle lane had been a showcase policy of recent urban renovation, and in its implementation, the materiality of the Minhocão was only too evident as an architectural constraint:

Figure 2 about here

In Figure 2, the bicycle lane twists and turns around the central axis, rendering precarious any actual use. Unable to avoid the brute materiality of the structure, the city marked such spots with signposts, as pictured in Figure 2 (“Be careful of pedestrians”). The juxtaposition of the signpost with the blind curve of the twisting bicycle lane testifies to the inadequacy of purely discursive mechanisms to undo the concrete “stuff” of materiality.

Beyond affordances for transit and movement, the light and shadow effects of the Minhocao created possibilities and problems for residents. The smothering effect of the overhang, which kept pollution close to the ground, was a key source of complaints, for example. At the same time, the overhang provided shelter from the elements, prompting homeless people to stay under the structure, which was considered an affordance by some and a constraint by others (see Figure 3 below).

Figure 3 about here

News reports focused mainly on the negative implications of the dark in promoting crime and prostitution, and residents supported a well-lit avenue. In one popular news

program, residents commented on the area as a blighted neighborhood due to the darkness, “*It is always night in the stretch of avenue covered by the Minhocão*”¹¹. The resident continued:

“That dark section is bad for those who live there, for businesses. That is the principal argument of those who defend the most radical of propositions – Demolish the construction. It’s not hard to imagine. Just turn around 180 degrees and you can see the same avenue, free of the Minhocão.”

In short, the physical structure distributed possibilities for movement and closure, light and dark, protection and risk, in ways directly related to its physical affordances.

Economic affordances. The physical space of the Minhocão also created economic possibilities through its direct effects on opening/closing spaces for construction and land development, as well as economic activity taking place within the space itself.

The freeing up of space imagined by the demolition created the possibilities for high-rise buildings, and the physical separation of the north and the south sides of the city would allow developments in the center to spill into the north side. Alternatively, the creation of a leisure park, with resulting noise reductions and cultural activities, was expected to valorize real estate in that part of the city. As Tiago Carrapatoso, a member of the activist movement São Paulo without Minhocão, put it:

“According to an estimate from SECOVI [real estate syndicate], the valorization of buildings and rents could vary from 70-120%. Keeping in mind that this region is inhabited essentially by the lower middle class – and that many are renters, the (creation of a) park would expel many people from there”¹²

Although gentrification is a social and economic transformation, its relation to the materiality of the Minhocão ran throughout the discourses, with the idea that the physical medium of the highway would either block the spread of real-estate speculation, or alternatively, if it were converted into a space for consumption activities, its presence would do the same:

“The transformation of the Minhocão into an event space of any type, commercial or not, raises real estate values and contributes to the expulsion of low-wage residents ... therefore [prefect] Haddad should halt immediately the realization of events and

monitor its use on weekends, if he really wants to slow gentrifications provoked by the re-signification of the Elevado through its spectacularization by mass culture.”¹³

Yet, the commercial opportunities of the Minhocão as a space were not limited to real estate; the opening of the space gave rise to an informal economy of week-end sellers, who drew upon the incoming crowds. Although some sellers sold “gentrified” goods such as alternative clothing and artworks, most market space was used to sell low-end products in improvised stalls, as seen in Figure 4 below. In such cases, the availability of space and people, rather than the symbolic meanings of the space, were sufficient to set up shop.

Figure 4 about here

Ecological affordances. The densely populated nature of the central region meant that any major change in urban structure would create ecological concerns in terms of pollution, green area possibilities, and quality of life. In the municipal justification for the deactivation decision, the city justified the action on ecological grounds:

“For over 40 years the population that lives in the vicinity of the Elevado Costa e Silva has suffered severe inconvenience due to the atmospheric and noise pollution from the motor vehicles that pass daily.”¹⁴

From the beginning, the idea of turning the space into a kind of “hanging garden” was central to ongoing debates, with various architectural prototypes adding to the ecological imagination of the Minhocão. Architecturally, the physical space and possibilities therein became supports for environmental engineering projects that depended on the material aspects of the structure and surroundings:

“The continuation of this idea involves the implementation of suspended plants in the most polluted areas of São Paulo. It is calculated that such plants will have the capacity to filter 20% of the CO2 emissions produced by cars. Its irrigation will be done by a system of water evaporation and collection and will also contribute to cleaning the air and surface of the marquise.”¹⁵

Along with the debates over and imaginings of the Minhocão garden, parallel initiatives to imagine the space as “green” cropped up around the highway and surrounding neighborhoods. As can be seen in Figure 5, some of these involved imaginings of plants in the form of murals painted on the so-called “blind sides” of neighboring buildings. Such initiatives were taken a step further, however, as actual plant-covered building sides became a feature of several of the neighborhood high-rises.

 Figure 5 about here

In this last example, the contrast between material and symbolic imaginings is most evident. In both cases, the importance of green space in the city is emphasized through visual spectacle. In the right-hand image, however, the actual materiality of plant life acts as a visual reminder of the material affordances of urban architecture and challenges the idea that urban landscapes are unsuitable for sustaining ecological diversity.

Democratic affordances. A key element in the spatial and material possibilities of urban landscapes is the possibility of political and social mobilization. The use of the Minhocão as a vehicle for industrial mobility can be contrasted with its use as a space for popular events, mobilizations and festivals, which were made possible by the closing of the Minhocão to traffic on weekends. The city document describing the decommissioning project was explicit about the democratic affordances that this conversion would portend:

“Article 4 - The Minhocão park will have democratic and participative governance, mediated by a horizontal administrative council, and will come under popular social control”¹⁶

The use of the space as a social forum involved the proliferation of politically oriented manifestations, as well as graffiti and other sign-postings on the structure itself (see Figure 6). Graffiti is particularly interesting in this respect, since it takes advantage of the material

“writability” of the objects to redefine them as a space of discourse, objects that would otherwise have been “silent” or inert. As seen in Figure 6 (“feminism that pleases men is not revolutionary”), such graffiti was not limited to the Minhocão issue itself, but represented a wide variety of social agendas.

 Figure 6 about here

The opening of the Minhocão to foot traffic also allowed its use as a space for occupations and other public gatherings. During the carnival season, alternative carnival organizations organized politicized versions of popular carnival “blocks”, using the space as a rallying point and theme. Playing on the popular São Paulo carnival organization “Vai Vai”, the alternative “Agora Vai” (Now Go) organized around the chant “Occupy, occupy, occupy the Minhocão”¹⁷, highlighting the importance of the Minhocão both as an object of contestation and as a space affording such contestation (see Figure 7). Both an “occupation” and a carnival parade, the group moved along the area during carnival, taking advantage of the dual nature of the space as a channel of transport and as an open space allowing aggregation.

 Figure 7 about here

In short, each of the above “affordances” is based on the materiality of the Minhocão and its surroundings in terms of the architectural possibilities of the structure, its environmental effects, and its possible uses. Complementary to these, and mingled with these material imaginaries, were the symbolic uses of the structure, to which we turn next.

Minhocão as semiotic artefact: Scars of dictatorship, names of modernity

Beyond its physical structure and affordances, the Minhocão as an object was the locus of symbolic meanings around the nature of Brazilian modernity and politics and was used by different stakeholders as a beacon for national values.

Legacy of modernization. In its unveiling, the Minhocão was already conceived as a symbol of modernity and industry in a rapidly developing Brazil. The exclusive focus on the automobile and the route which connected the center of the city to nearby industry was part of a more general narrative about development. As described by one architect writing about the Minhocão:

“The privileging of individual transport, represented by the automobile, expresses the spirit of development of that historical period. The final result of a “school of urban thought” is articulated using techniques from the 1920’s in the urban administration of large centers in Brazil”¹⁸

The status of the Minhocão as more than simply an instrumental tool for traffic direction, but as a sign of grandeur and a symbol of Brazilian success, can be inferred from public discourse around the construction. Maluf (see Figure 8 below) presented the project in 1969 as one befitting a Latin American regional power and conforming to international standards of excellence:

“We are three months into the program which I present to you, which is the greatest work in reinforced concrete in all of Latin America ... it inaugurates a new highway system for the city of São Paulo, similar to those that have been applied in other world capitals”¹⁹

Figure 8 about here

Sign of corruption and authoritarianism. In contrast to the developmentalist interpretation of the Minhocão as a sign of modernization, the movement to decommission the Minhocão saw it as a symbol of corruption and graft and a symptom of a lack of popular representation.

A key feature of the symbolism conferred on the Minhocão involved its origins during the Brazilian dictatorship (1964-1985) and at one of the more authoritarian moments of the

military government. This link was made completely unambiguous by the name. Costa e Silva, who was a leader of the military government itself. Critics of the Minhocão regularly repeated the connection, seeing the highway as an artifact of a dark period in Brazilian history:

“The authoritarian nature of the raised platform, made a metaphor in the name that pays homage to the dictator Costa e Silva, is in its DNA: it could only be constructed in an era of suppression of liberties, when the affected population had no way of manifesting its indignation. It is also symbolic that its closure in specific periods began in 1989, immediately after the implementation of the new democratic constitution”²⁰

Beyond the dictatorship itself, however, the highway symbolized for many a larger industrialist-authoritarian trend that was linked to corruption and favoritism. The technological and modernist utopias described by Maluf were contrasted with a narrow view of development as individual consumerism and neoliberalism, as well as a rigging of the development game to favor some stakeholders over others. As a critic of this model argued,

“It continues as the anti-postcard of the city, oeuvre-symbol of the old myopic urbanism, that saw all transport only in the individual car ... Malufism, for a good part of the 70’s, 80’s and 90’s, stole all hope that we would change our direction, and brought joy to businessmen and construction companies, with high-cost and low-function public works. Legend says that the Minhocão’s real purpose was to facilitate the journey from Paul Maluf’s house to his family’s business, Eucatex – a legend that shows the affinity between creator and creation”²¹

While the creation of the park to replace the highway was framed as an improvement to the neighborhood and a replacement of the industrial focus with an ecological imaginary, skeptics extended the notion of corruption to the purported ‘progressive’ uses of the garden and framed the ecological focus as a literal greenwashing. For instance, one of the founding members of the movement “Take apart the Minhocão”, criticized the public excitement over the vertical gardens (see Figure 5) as a principle of urban ecological development:

“If you took 100 plant vases and put them on a table, horizontally, these horizontal vases would not be accepted as environmental compensation for enterprises. Why then would they be accepted if put in a vertical form?”²²

Thus, the symbolism of the Minhocão as an object was permeated with its historical association with corruption and lack of transparency, even as the proposed plans for the structure changed over time.

The importance of a name. The association with the military government became a specific point of contention regarding a specific initiative to rename the structure. Within the context of the election of a prefect from the workers party, Fernando Haddad, and the continued prominence in national politics of this party, the choice to remove the name “Costa e Silva” was a clear nod to the symbolic importance of naming urban structures. Artur da Costa e Silva was the second president after the military coup of 1964 and was widely associated with the beginning of the more repressive aspects of the dictatorship. The coup had deposed the popularly elected president associated with the workers party, João Goulart. In 2016, Haddad signed into law the renaming of the Minhocão from “Elevado Costa e Silva” to “Elevado João Goulart” (see Figure 9).

Figure 9 about here

On the national scene at that moment, impeachment hearings were taking place to oust the president, also from the workers’ party, from her position, an impeachment which was successful and ended 14 years of worker-party rule.

Upon signing the law, Haddad was quoted in newspapers as giving the following rationale for the name change:

“[We must] not erase from the memory of Brazilians what it was to have a military dictatorship .. we must reiterate at all moments how painful the period of more than 20 years in our country was, to avoid that this ever happens again, under whatever cover, military or otherwise.”²³

The thinly veiled reference to the ongoing political crisis in Brazil suggests that the Minhocão had become an object in the construction of the public narrative around an ongoing struggle between political forces in Brazil.

Immediately after the name change, family members of the former general and president Costa e Silva protested about the change and insisted on the sanctity of the object and its meaning. His niece, Teresinha da Costa e Silva Puglia, was reported in the press as saying that *“men that change names and knock down statues are not democrats .. they are mistaken if they think they can erase history. Truth and justice will always resurge, sooner or later”*²⁴

At the same time, Goulart’s family defended the legacy of the deposed president, and claimed the mantle of “history” as their own. Goulart’s son, Joao Vicente Goulart, was reported as stating

“I consider this act very symbolic, as an initiative by citizens that are united by democracy and the restoration of national memory. It is emotional for our family and for those that believe in progress, social justice and national sovereignty.”

Goulart’s daughter, Denize Goulart, in the same report, added that *“This shows that the force of the elite and the media to erase Jango [Joao Goulart] from our history has not succeeded in its objectives.”*²⁵

To summarize, beyond imagining the Minhocão as a material object with structural properties and concrete possibilities for use, actors around the structure imagined it as a reservoir of symbolic and historical meanings. Actions on or around the Minhocão were conditioned by these meanings, over and above any physical possibilities or effects.

Minhocão as mimetic object: Concrete representations and embodied analogy

As described above, imagining the Minhocão as a concrete object takes into account its material (e.g., size, structure) and causal (e.g., traffic, pollution) properties. Alternatively, the semiotic imaginary considers associated meanings and discursive possibilities independently of the concrete; neither the name “Costa e Silva” nor the name “João Goulart”

depend on material properties of the structure, but are inscribed upon it. Imagining the Minhocão as a mimetic object involves a consideration of its concrete properties, but uses these analogically to “stand in” for wider social and political issues. In this sense, the mimetic imaginary is a hybrid of the concrete and the symbolic and uses the concrete as a basis of representation. In this sense, it imagines the concrete object as an embodied analogy of abstract meanings.

Minhocão as crystalizing the problems of the city. Discourses around the Minhocão were replete with references to how the structure was typical of the city as a whole. News media, for example, contained statements such as “*The city of São Paulo continues to discuss, but still does not know what to do with one of the worst symbols of the city: The Minhocão*”²⁶. The part-whole logic here is reminiscent of a metonymic relation, in which the part stands in for the whole, and the pollution and chaotic traffic of the highway were projected as a vision of the city more generally. Similar comparisons could be found in dedicated blogs, such as one dedicated to Minhocao graffiti:

*“This is the face of SP. Along the same road, joy and sadness in an accelerated rhythm. There are topics discussed all around the city, posted in an illegal appropriation of the Minhocão columns. Obviously, it is a democratic area begging for intervention .. the Minhocão is a symptom of the city”*²⁷

Beyond representing the city, the Minhocão was often characterized in bodily terms, often seen as the “scar” of the city. Such comments took forms such as “*The new São Paulo Directive, finally, recommends the deactivation of this urban wound that is the Minhocão, in the near future.*”²⁸ The metaphor of scar or wound both referred directly to the shape and position of the highway, which “cut” the city down the middle and evoked the “wounds” of the dictatorship, as referred to above. In the words of another blogger:

São Paulo is a juxtaposition of mutilations. The Minhocão is the object that most represents this in SP. Yet again, another plastic surgery is proposed for it. The

Minhocão is the home of mutilated people, the city is non-stop agitated and the architectonic construction is a mutilation of the city. What is being evidenced is the degeneration of the human being, cut into pieces.

The above description is used to depict the graffiti art shown below in Figure 10. Along the length of the highway, columns depicting figures of nature, the female form, and indigenous Amerindian and African icons proliferated in ever-changing temporary artistic representations.

Figure 10 about here

Figure 11, a gigantic art installation that took the place of earlier advertisements linking adjacent buildings, is characteristic of the mimetic logic. The form of a human being reveals an interior composed of twisted highways with no apparent destination. The Minhocão composes the facial features of the urban individual, ending abruptly in the elevated highway as the “nose” of the face. Here, the Minhocão figures an embodied analogy in the most direct way: as the inner composition of the city as an individual.

Figure 11 about here

The idea that the Minhocão mimics the city at large is aptly presented in a volume by architects dedicated to the structure and its social and political ramifications. The mimicry theme is depicted here as involving processes of doubling and portraiture, problematizing notions of straight-forward representation:

“Its size frightens in revealing the enormity of the problems that it tries to solve: a city that does not fit into itself, a traffic doubly bottlenecked, a distance which is ever increasing while it is needs shortening. Staked between buildings, it is a spreading from above, a stretched highway, a tunnel in the air. Its famous ugliness is also revealing – emblem of the much bespoke inhumanity of the metropole, summary of all that one does not want around, portrait of a world where urban aesthetics seems to have no place. Maximum degree of all that is uncomfortable, offensive and noisy in the life of Paulistanos, it has become an inside-out icon, an anti-symbol of São Paulo.”²⁹

The idea of a thing that does not “fit into itself”, that is “inside-out”, reveals an imaginary of materiality with a dual ontology: thing and idea, physically imposing yet somehow unreal.

Elevation as class distinction. While the intermingling of traffic ways provides an analogical support for notions of confused urban life, the vertical segregation of the structure and its resulting light and shadow constituted aspects that were ripe for analogization. The darkness of the underlying area was often compared to an underworld of crime and prostitution, with the vertical differentiation of the elevation mimicking a social differentiation.

Figure 12, taken from a blog about the Minhocão, specifically attends to the analogical figure of the rat as an underground city dweller, using this trope to describe the underworld beneath the highway:

Another reiteration of the depths of the city. This rat is strong like those who live under the marquise formed by the elevated road. Immunological resistance and the resistance to a hostile place form antibodies in those seen as messengers of fear throughout the city, but who are really only victims of consumption and real-estate speculation. Because of the lower level, there flows the waste, the degradation, humiliation and stigma of life. How strange that this part is marginalized and neglected, even as it is an essential part of the whole.

Figure 12 about here

As one blogger reports from a news interview, “*While the space above has leisure, below there is darkness and insecurity*”³⁰. Reinforcing the importance of the top-bottom structure, another blog noted that “*What is hoped is that its deactivation becomes a tool to guarantee and amplify the right to the city - and not to reinforce its excluding character, from top to bottom*”.³¹ A third noted, “*The upper canopy is part of it and cannot be ignored, but it is the supports of the structure that are an emblematic case of all of the conflicts that have recently been occurring in SP*”.³² All of these excerpts have in common the metaphorical mapping of social diagnosis onto the physical structure of the Minhocão, conferring meaning analogically through the material configuration.

The depiction of verticality as an analog of social class relations can be seen in Figure 13, an artistic depiction of the “top” and “bottom” of society, beside the Minhocão. Above, a naked individual clings onto (or climbs towards) the top of the building, surrounded by the caption “From trash to luxury!”. Far below, worker ants carry leaves under the seeming watch of a vigilant monkey, with the caption “Who hopes, never succeeds”. A large blank area separates the two layers. Despite the many allegorical possibilities of this image, a critical gesture seems to be made here, comparing the travails of the lower level (who are not depicted in human form), with the naked and precarious state of the human at the top.

 Figure 13 about here

To sum up, the mimetic imaginary uses spatial and material means to represent, through analogy, complex ideas that combine aspects of the material and the semiotic to present the Minhocão in its allegorical role as a stand-in for social and political issues in the city.

Discussion

The above empirical excerpts illustrate the diversity of imaginaries mobilized around a material artifact, in this case, the Minhocão. As a multimodal ensemble of space, image and sound, the Minhocão, we have argued, is best thought of in its potential for divergent multimodal imaginaries, each of which has distinct effects on how the artifact comes to effect, represent, or enact wider social themes.

While the empirical material sampled above is not intended to provide an exhaustive analysis of the public debate around these themes, it illustrates the directions that such an analysis can take, either by focusing on a single imaginary or by comparing divergent imaginaries. As part of a larger concern with materiality and multimodality, the central contribution of the current paper is to show how the concept of multimodal imaginaries

provides traction in explaining the plural ways in which materiality is socially relevant and is reflected in discourses and representations by social actors.

Through this illustration, we compared concrete, symbolic, and mimetic imaginaries, each of which conceives of the material in a unique way. Concrete imaginaries take the material in the “raw” sense of the physical, looking at the possibilities and effects of the physicality of an artifact. Semiotic imaginaries take the material as a vehicle for the inscription of social meanings, extending the symbolic from language to other modalities of meaning. Mimetic imaginaries combine concrete and symbolic aspects, seeing analogies in the material for concepts, and enacting the concepts in material form. As seen above, each multimodal imaginary results in a distinct range of discourses about the material, in terms of what constitutes the material and what role (i.e., cause, text, enactment) it plays in social life.

The plurality of imaginaries that are possible around materiality involves different actors within an empirical site, and also theoretical imaginaries as reflected in research on materiality. Thus, comparing imaginaries can be used both as a tool for understanding a given artifact or site, on the one hand, or in understanding variations in theoretical or empirical research, on the other.

Regarding the first, for example, scholarship on a materiality or tools might ask questions such as: “Are these objects seen by participants as tools, as symbols, or as some combination of the two?” Differences in material imaginaries is likely to affect how individuals coordinate around objects, and to which objects they give significance. For instance, a piece of technology which is seen as an instrumental affordance by one group, could be seen as a sign of being technologically advanced by a different group, leading to different considerations about the uses (or the usefulness) of the technology. Tracking such differences in multimodal imaginaries by participants, as well as the processes by which such differences are produced and maintained, provides a rich area for empirical research.

Regarding the second, to compare and contrast theoretical perspectives, scholars working with materiality concepts often work with implicitly different imaginaries, rendering comparison difficult. For instance, scholars from the sociomateriality tradition, who often study technical tools or machinery (e.g., Nicolini et al., 2012; Orlikowski, 2007), may tend toward concrete views of material as support and tool-use, with a focus on material affordances (e.g., Fayard & Weeks, 2007; Zammuto et al., 2007). Perspectives focusing on the interpretive encoding of images, on the other hand (e.g., Hollerer et al., 2013), may draw rather on semiotic approaches emphasizing the reading of material artefacts (van Leeuwen, 2004). Finally, work on materiality as analogical for the organizing process is evident in recent research on multimodal design (e.g., Islam et al., 2016), as well as work on how people understand “resources” (Johansson & Metzger, 2016), approaches which see the material as meaningful though analogical relations. Understanding these different, yet related currents within our own scholarship allows researchers to articulate the nuances that mark the field of material studies.

As a research agenda, multimodal researchers aim to « demonstrate the potential of multimodal studies to rejuvenate and extend the study of institutions and the social construction of meaning(s)» (Hollerer, Daudigeos & Jancsary, 2016). The current study moves this agenda forward by exploring how multimodality itself relies on conceptions of materiality as underlying, signifying, or analogically performing meanings, and that each of these conceptions leads to different ways of treating material objects as social artefacts. We suggest that multimodal imaginaries underlie current work and that future research should clearly articulate and justify the imaginaries used in framing a particular study. Such an articulation adds reflexivity to this nascent field and helps organize the diversity of multimodal possibilities now emerging in the field.

As such, multimodal research can benefit not only by understanding how different material modalities operate together in collective practices (e.g., Stigliani & Ravasi, 2012), but also how ways of understanding the material itself are implicated in material practices. Acknowledging such implicit imaginaries allows increased reflexivity around the notion of the material, a concept with various and sometimes opposing meanings which are often a source of difficulty (Miller, 2005). These difficulties hinder academic understandings of materiality, but also become practical problems as organizational members struggle to understand what is relevant in their own material practices.

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End Notes

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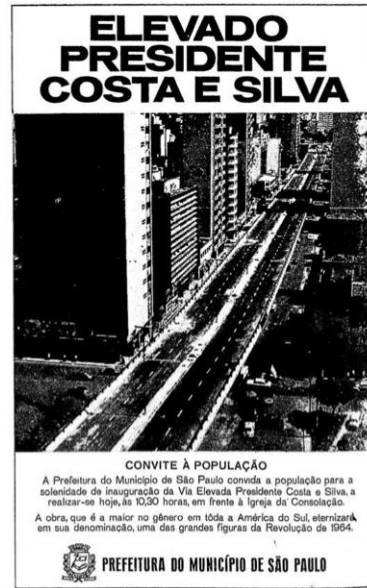


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Table 1: Three imaginaries and their distinct features

<i>Multimodal imaginary</i>	Material as concrete	Material as semiotic	Material as analogical
<i>Ontological position of material</i>	Material as phenomenological « reality », poses constraints, provides affordances.	Material as representational vehicle, sign. Relation to the conceptual is contingent (arbitrariness of sign), convention-based.	Material is embodied schema, hybrid of concept and concrete. Mutual interdependence of body and form.
<i>Relation to discursive</i>	Limit to the discursive. Involves sensory and practical knowledge that is “beyond words”.	Subsumed by the discursive. Objects form symbolic system that displays grammatical and semiotic properties.	Interacts with discursive through embodied metaphor and metonymy. Realizes and enacts the discursive through situated material manifestation.
<i>Nature of materiality effects</i>	<ul style="list-style-type: none"> - Sensory modalities - Intentional and practical affordances - Affectively salient 	<ul style="list-style-type: none"> - Conceptual transfer and cross-modal translations - Communication-based, material as “media” 	<ul style="list-style-type: none"> - Performative, realizes conceptual in material form. - Analogical transfer and reconfiguration, “media” participates in “message”.
<i>Theoretical advantages</i>	<ul style="list-style-type: none"> - Complements and extends discursive perspectives. - Phenomenologically accurate description of lived experience of “reality” - Aesthetic and affective experience 	<ul style="list-style-type: none"> - Allows interpretive and hermeneutic analysis. - Theorizing is possible because the material is also conceptual. - Transfer of semiotic theories to the material (e.g., visual semiotics). 	<ul style="list-style-type: none"> - Allows synthesis of material and discursive traditions. - Recognizes embodied nature of concepts. - Does not “black box” sensory and material experience.
<i>Theoretical shortcomings</i>	<ul style="list-style-type: none"> - Posits elusive realm beyond the reach of conceptualization. - Does not explain the meaningfulness of sensory and artefactual data. - Risk of reification by placing the senses beyond the social. 	<ul style="list-style-type: none"> - Risks reductionism of the material to the discursive. - May treat the material as a closed system of signs, underestimates the uncapturability of the body. - Arbitrariness of the sign ignores embodied experience. 	<ul style="list-style-type: none"> - Risks biological essentialism by rooting signs in embodied schema. - Mimetic nature of communication taken for granted. - Tendency to posit a semiotic “origin” in lived experience that is opaque to analysis.