Cultural Synaesthesia: 
Neuropsychological versus Anthropological Approaches 
to the Study of Intersensoriality

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Abstract. Neuropsychological theories of synaesthesia treat the phenomenon of intersensoriality (hearing colours or seeing sounds and other such forms of cross-modal stimulation) as a very rare genetic condition which has to do with the brains of certain individuals being "cross-wired." Anthropological theories of synaesthesia interpret it as socially conditioned and culturally inflected. Both the intersensory connections and the significance of synaesthesia can be shown to vary across cultures. For example, some cultures privilege smell-hearing, others coloured hearing; some cultures place a premium on the integration of the senses, others on the separation of the senses. It is argued that the neuropsychological theory of synaesthesia needs to be radically rethought in light of all the anthropological evidence pointing to the historicity and cultural specificity of the forms of intersensoriality.

Key words: intersensoriality, smell-hearing, temperature-colour, colour-grapheme, sensory-social order, cosmology and psychology

Resume. Synesthésie culturelle : approches neuropsychologiques et anthropologiques de l'étude d'intersensorialité. Les théories neuropsychologiques de la synesthésie abordent le phénomène d'intersensorialité (entendre des couleurs, voir des sons, et toute forme de stimulation intersensorielle) comme une rare anomalie génétique conduisant à un « excès d'interconnexions » du cerveau. De leur côté, les théories anthropologiques de la synesthésie voient dans cette dernière le produit d’un conditionnement social et d’une inflexion culturelle. Il est en effet démontrable qu’aussi bien la nature des connexions intersensorielles que la signification de la synesthésie varient d’une culture à l’autre. Par exemple, certaines cultures privilégient les odeurs que l’on entend, d’autres les sons colorés ; certaines cultures prônent l’intégration des sens, d’autres la séparation des sens. On soutient que les théories neuropsychologiques de la synesthésie doivent être radicalement repensées à la lumière des travaux anthropologiques qui montrent l’historicité et la spécificité culturelle des variations d’intersensorialité.

Mots clés : intersensorialité, entendre odeurs, temperature-colour, couleur-graphème, ordre social sensoriel, cosmologie et psychologie.

Introduction

The point of departure for the present inquiry into the varieties of intersensory experience – or, “synaesthesia” – is provided by the work of transcultural psychiatrist Laurence Kirmayer. Consider Kirmayer’s description of the “hierarchical systems view of neural organization”:

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Contemporary cognitive neuroscience understands mind and experience as phenomena that emerge from neural networks at a certain level of complexity and organization. There is increasing recognition that this organization is not confined to the brain but also includes loops through the body and the environment, most crucially, through a social world that is culturally constructed. On this view, ‘mind’ is located not in the brain but in the relationship of brain and body to the world (Kirmayer, in press).

Ideally, Kirmayer states, “we want to be able to trace the causal links up and down this hierarchy in a seamless way.”

**THE NEUROPSYCHOLOGICAL ACCOUNT OF PERCEPTION**

To flesh out Kirmayer’s position, we might begin by considering the neuropsychological account of perception. On this account, perception is a matter of “information-processing.” It begins at the edge of the CNS (central nervous system) and is conditioned by the properties of the receptor organs (Keeley, 2002). Howard C. Hughes explains:

> The events that culminate in perception begin with specialized receptor cells that convert a particular form of physical energy into bioelectric currents. Different sensors are sensitive to different types of energy, so the properties of the receptor cells determine the modality of a sensory system. Ionic currents are the currency of neural information processing, and current flows that begin in the receptors are transmitted through complex networks of interconnected neurons and, in the end result in a pattern of brain activity we call perception. We can distinguish a red 1957 Chevy from a blue 1956 Ford because each car produces a different pattern of neural activity (Hughes, 2001: 7)

Within this framework, the senses are assumed to be structurally and functionally distinct (e.g. sight is concerned with colour, hearing with sound, taste with flavour, and so forth). This modular conception of the sensorium is reflected in the analytic orientation of most of the extant research in the psychology of perception. Such research takes a “sense-by-sense” approach to the study of perceptual processes (see e.g. Goldstein, 2002). However, in recent years, a more interactive, relational approach to the understanding of how the senses function has begun to take shape as a result of the growing body of evidence which points to the “multisensory organization” of the brain (i.e., Kirmayer’s “loops through the body”). As Calvert, Spence and Stein write in their introduction to *The Handbook of Multisensory Processes*,

> even those experiences that at first may appear to be modality-specific are most likely to have been influenced by activity in other sensory modalities, despite our lack of awareness of such interactions ...[To] fully appreciate the processes underlying much of sensory perception, we must understand not only how information from each sensory modality is transduced and decoded along the pathways primarily devoted to that sense, but also how this information is modulated by what is going on in the other sensory pathways (Calvert, Spence and Stein, 2004: xi-xii).

One example of such modulation would be the “freezing phenomenon”: when subjects are shown a rapidly changing visual display, and an abrupt sound is played, the sound may “freeze” the display with which it is
synchronized. In the result, the visual display will appear brighter or seem to be shown for a longer period of time (Vroomen and de Gelder, 2004: 147). Another example would be the Stroop effect: subjects find it difficult to name the colour in which a word is printed if the word is the name of a different colour (Mattingly and Rich, 2004).

A further body of research which suggests that the senses are not so separate as is commonly supposed concerns the phenomenon of synaesthesia. According to neuroscientists, synaesthesia is an extremely rare condition in which the stimulation of one sensory modality is accompanied by a perception in one or more other modalities. Thus, synesthetes report hearing colours, seeing sounds, or tasting shapes. The most common type is said by some to be colour-grapheme synaesthesia, in which printed words or letters are perceived as having particular colours: it is estimated to occur in 1 in 200 individuals (Ramachandran et al., 2004). Other estimates put the incidence of synaesthesia at 1 in 2,000 or 1 in 25,000 individuals (Marks, 2000: 123).

Neuroscientists are mainly interested in the study of naturally-occurring or “constitutional synaesthesia,” and they have designed procedures for screening out those for whom the cross-modal associations are merely “conceptual” rather than “perceptual”, or “metaphorical” rather than “congenital.” Synaesthesia has also tended to be seen as a “pathological” or “abnormal” condition (perhaps because those studying it tended to be physicians). In recent years, the stigmatization of synaesthesia (i.e. labelling it a pathology) has declined; at the same time, the so-called metaphor explanation of synaesthesia has come under strong attack. For example, V.S. Ramachandran, the doyen of neuropsychology, rankles at the suggestion that it is “no less metaphorical” when a synesthete says “the chicken tastes pointy” than when “normal people say ‘a shirt is loud’ or ‘cheddar cheese is sharp’” (Ramachandran et al., 2004: 867):

The problem with the metaphor explanation is that it commits one of the classic blunders in science, trying to explain one mystery (synesthesia) in terms of another mystery (metaphor). Since very little is known about the neural basis of metaphor, saying that ‘synesthesia is just metaphor’ helps to explain neither synesthesia nor metaphor (Ramachandran et al., 2004: 868).

Ramachandran goes on to offer a physiological explanation of synaesthetic perceptions. Synaesthesia has to do with the “cross-activation of brain maps,” he argues. Such cross-activation may come about in one of two ways – namely: (1) cross-wiring between adjacent [brain] areas, either through an excess of anatomical connections or defective pruning, or (2) excess activity in back-projections between successive stages in the hierarchy (caused by defective pruning or by disinhibition) (Ramachandran et al., 2004: 872).

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1 Some would question whether colour-grapheme synesthesia should even be counted as a form of synaesthesia since it does not involve a cross-modal linkage, but merely an association between two (abstract) dimensions within a single modality (vision). I share this view, but because I have other axes to grind with Ramachandran, I shall let his (arguable) misrepresentation stand.

2 One could object that while little is known about the neural basis of metaphor, a great deal is known about its literary and cultural expressions, but Ramachandran would not consider such knowledge to be scientific, apparently.
In the case of colour-grapheme synaesthesia – Ramachandran’s chosen example -- the brain areas corresponding to graphemes and colours are situated immediately next to each other in the fusiform gyrus, and the potential for excess cross-activation or “hyperconnectivity” as a result of some genetic mutation in those individuals who naturally experience this effect is therefore strongly indicated. On the strength of his “mutation-based hyperconnectivity hypothesis” concerning the nature of synaesthesia (limited though it be to the case of colour-grapheme synaesthesia), Ramachandran proposes that: “far from being a mere curiosity, synaesthesia deserves to be brought into mainstream neuroscience and cognitive psychology.” Indeed, precisely because its neural basis is beginning to be understood, he claims, synaesthesia “may provide a crucial insight into some of the most elusive questions about the mind, such as the neural substrate (and evolution) of metaphor, language and thought itself” (Ramachandran et al. 2004: 881).

There is much to be said for Ramachandran’s “bottom-up” approach to the study of synaesthesia, and the supposition that there are “strong anatomical constraints that permit certain types of cross-activation but not others” (Ramachandran et al., 2004: 877). His theory points to many potential avenues of investigation. But let us leave it temporarily to flesh out the other perspective on the hierarchical systems view of neural organization suggested by Kirmayer’s work – namely, the historical-anthropological perspective.

**THE HISTORICAL-ANTHROPOLOGICAL ACCOUNT OF PERCEPTION**

The historical-anthropological account of perception may be characterized as “top-down” instead of “bottom-up.” In its treatment of “mind” and “experience,” it foregrounds the “loops through the body and the environment” – including “most crucially, through a social world that is culturally constructed” (Kirmayer). On this account, the sensorium is an historical formation. Perception begins at the edge of the manmade environment and is conditioned by the “social preformation” of the senses. Marx (1987: 109) expressed this position well when he wrote: “The forming of the five senses is a labour of the entire history of the world down to the present.” His claim may be glossed as follows:

> The objects we perceive in our surroundings -- cities, villages, fields, and woods -- bear the mark of having been worked on by man. It is not only in clothing and appearance, in outward form and emotional make-up that men are the product of history. Even the way they see and hear is inseparable from the social life-process as it has evolved over the millennia. The facts which our senses present to us are socially preformed in two ways: through the historical character of the object perceived and through the historical character of the perceiving organ (Horkheimer quoted in Levin, 1997: 63 n. 1)

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3 One could further object that if such an association is to be explained by defective pruning then one would expect there to be many more such associations, not just the one association that develops at the time the child learns to name/discriminate colors and to name/identify graphemes (which happens at roughly the same age). In his eagerness to uncover the neural basis of colour-grapheme synaesthesia, Ramachandran ignores one very obvious environmental explanation: fridge magnets. Many Western children of a certain age (I speak from experience) learn the alphabet from playing with those brightly-coloured, plastic letters fitted with magnets that stick to the fridge door. A is red, B is blue, C is yellow, etc., according to the set to which I was exposed when I started to learn how to discriminate letters - and their corresponding colours.
The historical-anthropological account of perception leads to a very different theorization of the phenomenon of synaesthesia. It begins with the constitution of the social body and the cosmos, rather than the individual. To avoid confusion with “constitutional synaesthesia” as understood by neuroscientists, let us call this type of cross-modal linkage “cultural synaesthesia.” While it helps to introduce this distinction for purposes of exposition, I should note that my aim is actually to blur it, and to show how constitutional synaesthesia is but a special case of cultural synaesthesia. Fortuitously, the polysemy of the term “constitution” lends itself well to advancing this argument. For instance, if one consults the Oxford English Dictionary, one finds that the term “constitution” can refer to: (1) the physiological make-up of an individual, and (2) the psychological character of a person, and (3) the “mode of organization” of a society or state. It therefore spans the body, the psyche, and society. From the historical-anthropological perspective advocated here, the social sense would take precedence over the other two, such that the mode of organization of society would shape the organization of mind and body.

The theory of cultural synaesthesia derives from the work of Lawrence Sullivan, a leading scholar of comparative religion. In an article entitled “Sound and Senses,” Sullivan presents a review of recent work in performance theory, hermeneutics and information theory and draws out the implications of this scholarship for ritual studies. His account culminates in the suggestion that: “The symbolic experience of the unity of the senses enables a culture to entertain itself with the idea of the unity of meaning” (Sullivan, 1986: 6). Sullivan goes on to apply his model to the interpretation of the myths and socio-religious practices of a range of South American Indian societies which make ritual use of the hallucinogenic Banisteriopsis Caapi plant (known locally as yage).

The experience of cross-modal associations and transpositions commonly reported by persons under the influence of hallucinogens is a form of synaesthesia, of course, though not one neuroscientists like Ramachandran have any interest in studying. Indeed, Ramachandran dismisses “pharmacologically-induced synaesthesia” as uninteresting because “psychedelics-induced synaesthesia is far less organized than congenital synaesthesia,” amounting to little more than “sensory confusion” (Ramachandran et al., 2004: 868). This suggests (to Ramachandran’s mind, anyway) that drug-induced synaesthesia does not involve the same neural mechanisms as congenital synaesthesia, since the latter tends to be quite precise in the sorts of intermodal associations (or cross-sense linkages) it evokes.

Sullivan, by contrast, does take drug-inspired hallucinations (or “visions”) seriously, as do the people he studies. Here is his summary-analysis of the myth of the “origin of communication” among the Desana, a Tukano-speaking people of the Northwest Amazon:

For [the Desana] ... the crying sounds of a mythic baby called Cajpi are also the tastes and visual images of the hallucinogenic drink made from his body (the magical plant, Banisteriopsis Caapi) ‘for as soon as the little child cried aloud, all the people ... became intoxicated and saw all kinds of colours.’ The divinity named Yepa Huaké commanded that the child be dismembered. A piece of his body was given to each social group. This distribution established
not only the ranked hierarchy of groups in society today but also the
different qualities of vision and modulations of sound that constitute
each group's cultural existence as art, musical performance, and
speech (Sullivan, 1986: 26).

Sullivan’s highly condensed sketch of the Desana sensory and cosmogonic
order can be expanded by drawing on Constance Classen’s account of same in
“Sweet Colors, Fragrant Songs” (1990). According to Classen’s reading of
Desana myth and culture, in the beginning there was sound (the baby's cry).
This sound embodied colours and temperatures, as well as smells and tastes.
These sensations are meaningful to different senses now, but were
indistinguishable from each other in the mythic world; that is, the sound of the
baby's cry is understood to have contained the Desana “sense ratio” (to borrow

The division and distribution of the parts of the child's body modulated the
original sound, just as it modulated society, partitioning the latter into ranked
groups, each with its own style of singing, speaking, and use of colours as well
as other sensory media (odours, tastes). The division of sound, the division of
the senses, and the division of society all arose together. Thus, the Desana
social and symbolic universe is structured – or “constituted” we might say
(keeping in mind the polysemy of the term) -- in accordance with a model
derived from the interrelation of the senses under the influence of yagé.

Social norms are sensory norms (Howes, 2003). The arrangement of society
mirrors the arrangement of the senses, and vice versa. This fundamental tenet
of the Desana sensory-social order finds expression in the way the different
flavours with which each of the social groups were imbued at the moment of
partition are to this day used to regulate marriage: “Compatible marriage
partners are those with opposite flavours” (Classen, 1991: 249). It is also
expressed in, for example, the synaesthetic associations which the Desana
make with the sounds produced by a certain kind of flute. The sound of the
flute is said to be yellow in colour, hot in temperature and masculine in odour.
The vibrations it produces are said to remind people of correct child-rearing
practices. The connection between sensory norms and social norms is otherwise
embedded in the contemporary ritual use of yagé: “Through the use of
hallucinogens, and a controlled sensory environment, shamans attempt to
‘make one see, and act accordingly,’ ‘to make one hear, and act accordingly,’
‘to make one smell, and act accordingly,’ and ‘to make one dream, and act
accordingly’” (Classen, 1990: 728). The need for the shaman to control the
sensory environment follows from the fact that each social group embodies –
or is “constituted” by – a different modulation of the senses. A shaman would
not want his patients to see red where they ought to be seeing yellow, or smell
a pungent odour when they ought to smell a sweet one, for it is believed that
were the senses to be crossed in this way people would commit incest and
other contraventions of the Desana moral order.

The Desana have their own theories of how the brain works. Desana
neuropsychology derives from the observation of the effects of head injuries on
behaviour, and extensive experimentation with the hallucinogenic
Banisteriopsis Caapi plant. The right hemisphere of the brain, they say, is
concerned with practical and biological matters. The left hemisphere has as its
sphere matters divine. The right hemisphere perceives different sensory
phenomena, the left translates them into underlying moral values.
It would be interesting to compare the Desana model of the lateralization of brain functions with the contemporary neuroscientific literature on this subject, just as it would be instructive to compare the images of the brain which the Desana entertain with the visualizations of cerebral structures and processes which emerge from the application of fMRI, PET and other scanning techniques (see Joyce, 2008). One immediately apparent observation is that Desana neuroimaging is much more multisensory than the latter. For example, in one Desana image, the brain is formed by a bundle of pencil-shaped hexagonal tourmaline crystals standing closely packed side by side, each crystal contains a sequence of colors which, from bottom to top, express a range of sensibilities. In another image a brain consists of layers of innumerable hexagonal honeycombs; the entire brain is one huge humming beehive ... Each tiny hexagonal container holds honey of a different color, flavor, odor, or texture, or it houses a different stage of insect larval development (Reichel-Dolmatoff quoted in Classen 1991: 250; see further Reichel-Dolmatoff 1981).

It bears underlining that all of these different sensory characteristics, or “qualia,” are associated by the Desana with different cultural values: “[One informant] pointed rapidly to different areas on an outline of the brain he had drawn and said: ‘Here it is prohibited to eat fish; here it is allowed; here one learns to dance ...’” and so forth (Reichel-Dolmatoff quoted in Classen, 1991: 250). Note also that such cerebral models are not the domain of specialized individuals (i.e. constitutional synesthetes), but are generally shared among the Desana. Synaesthesia is a cultural, not an idiosyncratic phenomenon.

**Loops and Intersections**

As will be recalled, Kirmayer holds that we want to be able to “trace the causal links” up and down the hierarchy of neural organization (which subtends “mind” and “experience”) in a “seamless way.” While I agree in principle with Kirmayer’s stated goal, there is evidently a gap between the bottom-up approach of the neuropsychologist, which is centred on the individual, and the top-down approach of the anthropologist, which starts with the organization of society and cosmos (as illustrated by the case of the Desana). The two approaches should intersect, but it is difficult to see how. The problem here centres on the fact that the neuropsychological framework is focussed on tracking neural impulses from receptor organ to brain, and due to the narrowness of this ambit, it is unable to comprehend either the phenomenal reality of qualia, or the moral values which imbue said qualia with meaning and power. Put simply, neuropsychologists rarely, if ever, succeed at ascending the hierarchy of neural organization beyond the level of the psychological, and when they do invoke the cultural it is in terms that anthropologists would generally regard as too simplistic. Conversely, while a number of anthropologists have attempted to trace the links (and the loops) from the cultural level (including the cosmological) on down to the physiological level of neural organization (see e.g. Reichel-Dolmatoff, 1981; Laughlin, 1994) their attempts generally fall on deaf ears beyond their own discipline. After all, what

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right-minded psychologist would think of the brain as structured like a beehive (the way the Desana do)? What possible relevance does a people’s cosmology have to their psychology? Where else could perception go on if not in the head? Perception consists of “patterns of neural activity” period (Hughes, 2000). To put the matter another way, perception is “all down to our DNA” (Holingham, 2004; see further Hughes, 2000)

Or is the matter that simple? Not according to Kirmayer’s model, and not according to the Desana model. For the Desana, perceptual phenomena such as synaesthesia go on between the senses, between bodies (or heads), and between self and environment. (This in-betweeness is what Kirmayer means by “loops”.) It is a collective, not an idiosyncratic, phenomenon. Constitutional synaesthesia is a special case of cultural synaesthesia.

These are bold assertions, certain to rattle the brains of neuroscientists. But the matter cannot be put too boldly, from the historical-anthropological standpoint advocated in this essay. The fact is, for all their talk of the “plasticity” of the brain, neuroscientists are remarkably insensitive to how culture “tunes our neurons” (Sacks quoted in Howes, 2004: 22). For example, in all the 900-plus pages of the Handbook of Multisensory Processes, there is but one reference to cross-cultural variation in the modulation of perception: it is noted that the McGurk effect is weaker in Japanese test subjects than in American test subjects (Bernstein, Auer and Moore, 2004: 207). That is it!

I would argue that to produce a unified account of such perceptual phenomena as synaesthesia, it is the neuropsychological account that will have to give way to a more phenomenological and socialized understanding of the sensorium,5 and a more culturally-grounded understanding of the category of the individual or self, such as anthropology provides. The remainder of this essay will be concerned with laying the foundations for such an account, beginning with these two questions:

1. Are synaesthetic perceptions purely an effect of some genetic predisposition, or can synaesthetic associations be learned? If synaesthesia can be learned, it follows that it may be shaped by culture as well as biology.

2. What produces the perception of synaesthesia as being an abnormal or unique condition? If synaesthesia can be shown to be a shared experience in some cultures, then its peculiarity, from a Western perspective, must be considered a peculiarity of Western culture.

THE ROLE OF LEARNING IN THE FORMATION OF INTERMODAL ASSOCIATIONS

The role of learning in the formation of intermodal associations has been discussed extensively by the psychologist Lawrence Marks (1978; 2000). Marks (2000: 125-7) notes, for example, that the letters of the alphabet or words of a language that figure as the inducing stimuli in the case of colour-grapheme synaesthesia are not raw sense data, rather they are learned within a particular linguistic culture (a fact which Ramachandran elides in his search for

5 In what follows, for a phenomenological understanding of the sensorium I shall be deferring to Marks, while for a social understanding of the sensorium I shall be relying on Classen.
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synaesthesia ground zero). Marks also points to the example of the synaesthetic connection between temperature and colours, as evidenced by the widespread notion that blues and greens are “cool” colours, while reds, oranges and browns are relatively “warm.” These colour-temperature relations reflect associations that are acquired through experience, Marks says, based on his observation that “preadolescent children do not reliably perceive or judge the colors orange and brown to be warmer than blue and green unless the children have been explicitly taught this scheme” (Marks, 2000: 128).

Other examples of studies which point to the role of learning and experience in the formation of synaesthetic perceptions include Stevenson and Boakes (2004) on odour-taste synaesthesia, and the varieties of colour-sound synaesthesia discussed by Marks (2000), and others (van Campen, 2006), such as that between auditory pitch and visual brightness or lightness. Thus, low-frequency sounds tend to be associated with dark colours like blue or brown while higher-frequency sounds suggest light or bright colours, like white or yellow. Marks’s explanation for this is couched in terms of what he calls the “common neural coding hypothesis”:

synesthetically related sensations may represent, at least in part, the outcome of similarities in neural coding mechanisms in different sensory systems. This is to say that the contents of synesthesia comprise, at least to some extent, a set of consistent and widespread alignments of sensory dimensions, and these alignments may represent the ways that the nervous system encodes various stimulus properties. According to this hypothesis, perceptual dimensions such as auditory pitch and visual brightness or auditory loudness and visual brightness correspond synesthetically because the nervous system uses similar rules [in the instant case, a time- or frequency-based rule] to code variations along these dimensions (Marks, 2000: 143)

It will be appreciated that the psychologist Marks takes a broader view of synaesthesia than the neuropsychologist Ramachandran. Marks’s emphasis is on coding rather than wiring, on phenomenology rather than physiology, on the experiential rather than the congenital — or, one could say, Marks’ focus is as much on the first term in each of these pairs as it is on the second, whereas Ramachandran’s focus is exclusively on the second term (the wiring, the physiology, the congenital condition). Marks uses the term “strong synaesthesia” to refer to the congenital condition of interest to Ramachandran and “weak synaesthesia” to refer to the everyday experience and also literary evocation of intermodal correspondences. He allows that “strong” synaesthesia is characterized by traits such as automaticity, intensity, and consistency over time that are lacking from “weak” synaesthesia, but nevertheless insists that the two be treated as forming a “continuum.”

Marks’s phenomenological-psychological approach to the study of synaesthesia represents an important opening in the direction of the unified or general theory of synaesthesia we have been exploring in this essay, but even though it treats literary expressions of synaesthesia on a par with those of a physiological nature, it is not yet a “cultural” account of synaesthesia. For it to qualify as the latter, Marks (like Ramachandran) would need to accept that there are cultural constraints above and beyond anatomical constraints that permit or facilitate some types of sensory cross-activation but not others; and he (but especially Ramachandran) would need to start looking not just to the
brain for answers, but to those “loops” through the environment to which Kirmayer introduced us.\(^6\) By way of example, take the case of audio-olfactory synaesthesia, or “smell-hearing.”

According to neuropsychologists Richard Stevenson and Robert Boakes (who are best known for bringing the phenomenon of odour-taste synaesthesia to light), smell-hearing (unlike smell-tasting) is an impossible connection. “Odors display taste properties,” they assert, as when a strawberry smell is experienced or described as sweet, “but do not elicit auditory or visual sensations” (Stevenson and Boakes, 2004: 73); for example, there are no blue smells. However, in the course of my ethnographic research in Papua New Guinea, I found evidence of audio-olfactory synaesthesia. For example, in many Melanesian languages one speaks of “hearing an aroma” (and this association is carried over in Pidgin English, “mi harim smel”). The experiential basis for this association would appear to be that most communication takes place face-to-face (i.e. within olfactory range of the other) and odoriferous substances (e.g. anointing the body with aromatic oil, chewing ginger) are used to augment the power of a person’s presence and words (Howes, 2003: 74-6; 146-50).

This association between smell and hearing is not unique to Melanesia. For example, among the Dogon of Mali, it is understood that speech “has material properties that are more than just sound ... It has an ‘odour’: sound and odour having vibration as their common origin, are so near to one another that the Dogon speak of ‘hearing a smell’” (Calame-Griaule, 1986: 39 and 48, n. 69). Among the Dogon, words may be classified by smell: good words smell “sweet,” and bad words smell “rotten.”

These instances of audio-olfactory synaesthesia contradict Stephenson and Boakes' claim regarding the discreteness of olfactory and auditory sensations. Plainly, in Melanesia as in Mali, auditory sensations do have olfactory properties. If one were to ask why this is so, an anthropologist responding might begin by noting that the cultures in question are “oral societies” as opposed to “literate” societies. In other words, they are societies in which the dominant mode of communication is “aural-oral” as opposed to “graphic,” whether chirographic (having to do with writing), typographic (having to do with print), or electronic (having to do with computing). In a literate society, words tend to be experienced as quiescent marks on paper or a computer screen. They are visual marks. In an oral society, words (being aural) are not visible: words may be felt or smelled as well as heard, but they cannot be seen. It could be hypothesized on this basis that the incidence of colour-grapheme synaesthesia would be higher in a literate society (where words – and letters -- are more susceptible to being visualized) than in an oral society. Conversely, proneness to audio-olfactory (or audio-tactile) synaesthesia would likely be higher in an oral society than in a literate society.

The above hypothesis would make good sense to many an anthropologist but appears never to have been entertained, much less tested, by neuroscientists. Perhaps this is because neuroscientists are focussed inward and remain too preoccupied with tracking neural impulses on their route from receptor organ to brain to pay much attention to the senses as outward channels

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\(^6\) Marks is already on the verge of doing so, as appears from his notion of “mediating mechanisms,” to be discussed presently, but Ramachandran remains fixated on the brain.
of communication. Their interest in perception starts and stops at the edge of the CNS. But as the preceding discussion has shown, neuropsychologists must desist from simply peering at the insides of brains in their effort to plumb the mysteries of synaesthesia, and start investigating Kirmayer’s “loops,” or what Marks (2000) at one point calls “mediating mechanisms.”. These mechanisms include learning and language, but also “media” – conceived of broadly as “extensions of the senses” following McLuhan (1962). On McLuhan’s account, everything from clothing and writing to television and hallucinogens count as media, and it is their interrelationship that frames a given culture’s experience of the world. This is one of the main tenets of the field of sensory anthropology pioneered by Classen (1993; 1997) and Stoller (1989; 1997) among others (e.g. Howes, 1991; 2003; 2004), which informed our earlier discussion and analysis of the Desana sensory order. This approach may be characterized as cultural phenomenological to highlight both its continuities and discontinuities with the phenomenological psychology of Lawrence Marks, and very different orientation from the neuropsychology of V.S. Ramachandran.

By way of example of this media-centred, cultural phenomenological line of investigation, consider the sensory order of the Tzotzil Indians of Mexico, as analyzed by Constance Classen (2004). The Tzotzil inhabit a thermal cosmos in that everything in the Tzotzil universe is thought to contain a different quantity of heat-force. The ultimate source of heat is the sun, which is called “Our Father Heat.” Social statuses are distinguished in terms of heat (a person’s heat varies with age and gender), and so too are the cardinal directions and different times of day (e.g. East is “Rising Heat”). The media used in Tzotzil ancestral and other rituals, such as candles, tortillas and cane liquor, are all involved with heat, too. “Burning candles, called ‘tortillas for the gods,’ are offered to the deities, while corn tortillas and cane liquor, the ‘heat of the sun’ [in that it takes fire or heat to produce them] are consumed by the human population” (Classen, 2004: 151). Significantly, much of the visual and other symbolism employed by the Tzotzil contains thermal references; colors, food, and even speech are classified as hot or cold. Red, for example, is used to signify heat, and black, to signify coldness. Corn, one of the staples of the Tzotzil diet, is believed to possess a high degree of heat, while the potato, another staple is classified as cold. Ordinary language is said to be cold because it is disorderly and unbounded. Ritual language, on the other hand, is classified as hot because it is fixed, stylized and repetitious [bearing the accumulated heat of all the ages] ... This system of correspondences enables the basic thermal schema of Tzotzil cosmology to be reinforced through all of the senses (Classen, 2004: 150).

The above examples of intermodal associations (colour-temperature, tastetemperature, etc.) among the Tzotzil would probably be categorized as instances of “weak synaesthesia” by Marks because they are conditioned responses, not congenital. But does such a characterization do justice to their power when they are, in effect, constitutive of the cosmos and repeatedly enforced through ritual? I think not. And what of the neurological basis for these cross-linkages, such as Ramachandran would insist on uncovering if they are to count as “genuine” synaesthetic perceptions? Do these sensory alignments map onto Ramachandran’s model of the brain the way colour-grapheme synaesthesia does? It is difficult to see how. How then are they to be
explained? As metaphorical? Ramachandran would bristle at this; and rightly so, I would add, for there is a better explanation, as we shall see next, but it is an explanation in terms of practice, not neuroscience.

**INDIVIDUATION AND SENSATION**

Earlier, the question was raised of what produces the perception of synaesthesia as being an abnormal or unique condition. It was suggested that this perception might be a peculiarity of modern Western culture. To flesh out that suggestion, it helps to proceed relationally once again – that is, by considering a civilization in which synaesthesia is normal. The example of ancient Chinese civilization and cosmology presents an interesting case study, though we could equally well have chosen from a range of other societies and periods, including the premodern West (see Classen, 1998; 2004).

In the ancient Chinese “Theory of the Five Elements,” each of the principal elements of Wood, Fire, Earth, Metal and Water was associated with a different odour, taste, colour, musical tone, season and direction. Thus, the element of Fire was associated with a smoky scent, a bitter taste, a red colour, the musical tone chih, the season of summer and the direction of south; the element of Water was associated with a rotten smell, a salt taste, the colour black, the musical tone yu, the winter season and the direction north. At its most ritualistic, for example in the ceremonial life of the Emperor and his court, the application of such correspondences determined all aspects of daily life, such as diet, perfume, colour of dress and the orientation of living space for each month of the year. Traditional Chinese medicine (with its elaborate calculus of flavours) also made use of these correspondences in its treatment regimens for diverse maladies (Farquhar, 2002; Classen, Howes and Synnott; 1994: 119-21).

The cross-modal associations of ancient Chinese cosmology and court etiquette might appear “metaphorical,” but the fact that these associations were ritualized rendered them practical. That is, while the associations were “symbolic,” and therefore arbitrary, the way they were rendered sensible through being embedded in dress codes, perfume use, concerts, architecture, and so forth made them material to the constitution of the bodies and psyches of the courtiers. Some of these linkages may seem more “natural” than others, such as the association between fire, a smoky scent and the colour red, but the point is that it would have been abnormal for a subject not to experience all these cross-modal associations as given in the order of things, since they were all interrelated. Of course, there may have been synesthetes in ancient China for whom the prevailing associations were discordant with their own, private synaesthetic perceptions (e.g. a bitter taste would evoke a sensation of black, not red; the musical tone chih, would suggest a rotten smell, not a smoky one), but this would have had more to do with a failure of socialization than with the prevailing associations not being “genuine” (as Ramachandran would say).

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7 The idea of a “failure of socialization” being responsible for the cognitive-sensuous dissonance of the lonely synesthete in ancient China is inspired by Gananath Obeyesereke’s theory of “the work of culture” in “Depression, Buddhism and the Work of Culture in Sri Lanka.” Obeyeserke (1985) argues that the free-floating dysphoric affects which Western psychiatrists perceive and classify as “major depression” have existential meaning and significance in Buddhist culture and undergo “symbolic transformation” or “cultural crystallization” to the point where being depressed is actually seen as the
The attention paid to the relations *between* the senses in ancient Chinese culture was of a piece with the importance attached to the relations between persons. Indeed, it remains the case that Confucianism (the ancient doctrine that in certain key respects continues to supply the unwritten constitution of Chinese society) is distinguished by its “refusal to conceptualize individuals in any way other than relational – as children, parents, lovers, youngsters, oldsters, employees, employers and on and on” (Glenn, 2000: 297). In other words, it is the relationships in which a person stands to others that are constitutive of his or her identity: the person is a bundle of roles, a nexus of relations. This contrasts with the strongly individualistic conception of the person in modern Western culture – that is, the notion of the person as atom, and of society as derivative of a compact among individuals. Significantly, modern Western culture is also one which is distinguished by an insistence on the separation of the senses (Crary, 1990; Jones, 2005). It could be hypothesized on this basis that there is a connection between individualism and sensory isolationism on the one hand (as exemplified by the modern West), and between a relational view of the person and multisensory integration on the other (as exemplified by ancient China, or the Desana). This hypothesis, which may be referred to as the “sensory-social topological hypothesis,” goes a considerable way toward explaining why synaesthesia is considered to be a rare condition, most common among artists and other marginal individuals, in Western culture, whereas it is the nonsynaesthetic individual who would have stood out in ancient China (or among the Desana).

Regarding the suggested connection between individualism and sensory isolationism, consider the following facts. “Individual” (from the Latin *individuum*) originally meant “indivisible” (as in “the individual Trinity”). It acquired its modern, atomistic sense in the seventeenth century when, as exemplified by Social Contract Theory, “society” came to be conceptualized as made up of individuals, instead of being divisible into individuals – that is, when society lost its wholeness (see Williams, 1973). The most prominent exponent of Social Contract theory and the political philosophy of individualism was John Locke (see Macpherson, 1973). Locke was also the author of *An Essay Concerning Human Understanding* ([1700] 1975). The latter work seems to follow Aristotle’s *De sensu* in the way it distinguishes between ideas which “come into our minds by one Sense only,” such as colours through the eyes, or sounds through the ears, and ideas that “convey themselves into the mind by more Senses than one,” such as figure, motion, rest and number (see Locke, 1975: 121). The latter are what Aristotle called the “common sensibles” because they can be perceived by sight and touch at once. However, according to Aristotelian doctrine, it is “the common sense” (*koinē aesthēsis* in Greek, *sensus communis* in Latin) that apprehends the common

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8 This hypothesis is more in the nature of a heuristic. It is expressed at the most general level possible. Typically, there is a lot more nuancing involved in tracing the relationship between social order and sensory order (see e.g. Howes, 2003; Classen, 2004)
 sensible and that is responsible for unifying, distinguishing, and coordinating the deliverances of the special senses (i.e. sight, hearing, touch, etc.) as well as for the sense of sensing (Heller-Roazen, 2007: 35), whereas in Locke there is no mention of any common sense, only of a mind which operates by the “association of ideas.” This absence is remarkable when one considers the expansive role of “the common sense” and the senses generally (outer and inner) in the mental life of the Middle Ages and Renaissance (Heller-Roazen, 2008; Howes, 2009: 16-20). By the seventeenth century, however, “the common sense” had disappeared, and the sensorium lost its wholeness. Put another way, the five senses lost their interface with the demise of “the common sense” just as birth stopped being the guarantor of social status it once was with the demise of feudal “society.” (I need hardly point out that capitalism requires a mobile, unattached work force and its rise is commonly seen as precipitating the dissolution of the bonds of kinship and the dependencies of feudalism.)

It is ironic that Lockean empiricism should be regarded as a species of sensationalism, since no philosopher did more to render the senses discrete and docile than Locke. Unfortunately, the substantiation of this statement will have to await another paper.9

While the modern (liberal) conception of the individual may be traced back to the seventeenth century, the consolidation of individualism is commonly seen as having occurred in the nineteenth century with the invention of various techniques of observation, such as the Panopticon, for “making” subjects (Foucault, 1979). The individuation of the senses also progressed significantly during the nineteenth century, with the “discovery” of kinaesthesia, for example, and of separate receptors for pain, pressure, temperature, balance, and so forth (Wade, 2009; Howes, 2009: 23). The nineteenth century was above all a period of extraordinary productivity as regards the invention of apparatuses and protocols for gauging sensory thresholds. These apparatuses included Haken’s E and Lovibund’s tintometer (for testing visual acuity), Politzer’s Hörmesser (for measuring auditory sensitivity), Zwaardemaker’s olfactometer, and the algometer (formerly a torture device) for measuring pain thresholds, to mention but a few (see Richards, 1998). Inspired by Müller’s “doctrine of specific nerve energies” and Fechner’s Law regarding the functional relation between sensation and stimulus, attention came to focus on the “just noticeable difference” – that is, “the magnitude of the stimulus needed to generate the very least noticeable sensation over and above the stimulus that is unnoticed by the human sensorium” (Crary, 1990: 146).

The delimitation of the bounds of each of the senses by experimental means, such as the apparatuses mentioned above, was complemented by the observation of persons with brain injuries and the use of dissection to localize the terminus of each of the senses in the brain (Dias, 2004). The individuation

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9 Suffice it to say that the distinction Locke draws between “primary” and “secondary qualities” appears to correspond to the distinction between “common sensibles” (number, motion) and “proper sensibles” (colour, sound) in Aristotle, but in point of fact Locke introduces an ontological split between these two sorts of qualities (as the terms primary and secondary suggest) which is nowhere to be found in Aristotle, and goes on to speak of the “insensible parts” of matter being the root cause of our perceptions (Locke, 1975: 135). This is hardly very empirical! This split occurs in Hobbes as well. The finest source I know on this topic is Jaquet (2009).
of the senses and the individuation of the subject thus went hand in hand in bourgeois society.

While the scientists were involved in delimiting and localizing the senses, some leading artists, reacting against the materialist and scientific rationality of the day, took to invoking the senses in ways that emulated the sensory cosmologies of earlier times – particularly the Middle Ages (Classen, 1998). Scientific thinkers, like the outspoken German physician Max Nordau, saw this reaction and the art it produced as perverse.

Max Nordau categorically rejected the Gesamtkunstwerk of Richard Wagner, the synthetic artworks of the Pre-Raphaelites, and the famous poetic evocations of synaesthesia in Baudelaire’s ‘Correspondences’ and Rimbaud’s ‘Les Voyelles.’ There were all symptoms of degeneracy and cultural decline, an aesthetic effort to valorize a reversal of the progressive specialization of the human senses to the most basic level of undifferentiated perception (Latham, 2000: 9)

As Nordau wrote in Degeneration,

[It] is an evidence of diseased and debilitated brain activity, if consciousness relinquishes the advantage of the differentiated perceptions of phenomena, and carelessly confounds the reports conveyed by the particular senses. It is a retrogression to the very beginning of organic development. It is a descent from the height of human perfection to the low level of the mollusc. To raise the combination, transposition and confusion of perception to the rank of a principle of art, to see futurity in this principle, is to designate as progress the return from the consciousness of man to that of the oyster (Nordau, 1895: 142)

Michael Latham comments further:

For Nordau, the border transgressions and categorical mixings of synaesthesia lead to so great an atavistic reduction of perception that it can no longer be set in human terms. In the context of cultural decline, synesthesia figures not only as a transgression of the borders of normativity, but a transgression of the very borders of what is human (Latham, 2000: 9)

According to the dominant perceptual paradigm of the late nineteenth century, therefore, synaesthesia denoted transgression, not civilization, and pathology, not normalcy. This is a side of synaesthesia we have not seen before: instead of symbolizing the unity of meaning and society, it augured atavism and dissolution. Little wonder that it was stigmatized and suppressed, and did not (re)emerge as a proper object of study until well into the twentieth century.  

Nordau’s statements seem excessive to us now. It is hard to comprehend his disgust and anxiety at the thought of synaesthesia. Why is this so? The sensory-social topological hypothesis would suggest that this is because connection has taken the place of separation in the relations between the senses as between selves, and this has created a more receptive climate for synesthesia. The evidence for this shift is fairly extensive. As noted previously, multisensory integration has recently supplanted sensory isolationism as the

10 The history of research on synaesthesia parallels the history of research on smell in this respect (see Classen, Howes and Synnott, 1994; Howes, 2003: ch. 7).
dominant paradigm in neuroscience (Calvert, Spence and Stein, 2004). Meanwhile, in the arts, modernist segmentation of the senses as theorized most forcefully by Clement Greenberg in the 1950s and ‘60s (Jones, 2005) has given way to the dramatic multisensory mixes and transpositions of contemporary art practice (Jones, 2006). Synaesthesia has even become a common marketing and advertising gimmick (Howes, 2004: ch. 16). As synaesthesia goes, so goes the self, according to our hypothesis. And, in point of fact, individuals are more connected to each other through “social networking” media now than ever before. The connections are not those of kinship (as in premodern society) but rather friendship and taste, but “being connected” is the order of the day. Nothing symbolizes connectivity better than synaesthesia, hence its increasingly public life in late modernity.

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