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Eros & Mysticism
Are Mystical States of Consciousness Evolutionary Byproducts of Sexual Response?

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“We speak of God as love but are afraid to call God lover. But a God who relates to all that is, not distantly and bloodlessly, but intimately and passionately, is appropriately called lover.”

– Sallie McFague

FOREWORD

The original idea for this volume was born in 2002. I was then planning my bachelor’s thesis and happened to run across a poll conducted among Estonian high school students the goal of which was to investigate what existential questions they were most concerned with. It was found that by far the most frequently mentioned issues were those relating to love and sex (what a surprise!). Religious concerns, although also represented, came at the far end of the list.

I found these results somewhat strange, especially from the perspective of Christianity. After all, I thought, Christians understand God to be love. Hence, because the issue of love is so centrally important in the life of high school students (and not only high school students!), one would expect to find religious concerns occupying a much higher place in the list. In fact, one would expect Christian spirituality to be highly appealing and attractive to young people and to spread like wildfire among them.

This, clearly, is not the case. If one tries to give a prima facie reason as to why, then one arrives at the traditional Christian distinction made between *eros* and *agape*, that is, broadly speaking, at the distinction made between the somewhat “naughty”, earthly kinds of love and the “divine”, selfless type of love. We have two millennia of mainstream Christian theology strongly emphasizing that if even though God is love, one ought not to understand this as involving anything erotic. God is love in the sense of *agape*, whereas *eros*, the erotic love, is an obstacle rather than a blessed means of relating, especially to the divine realities.

I did not think well of such a distinction then, neither do I think well of it now. No matter how repulsive some people find Freud’s ideas to be – it can be shown on several and independent grounds that God-talk and sex-talk are interrelated. However, the bachelor’s thesis I planned on this topic remained unwritten. I was persuaded that to properly engage in the discussion over *eros* and *agape* I would unavoidably have to start from working my way through mountains of ancient Greek texts dealing with the question – a “mission impossible” at the time.

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In 2005 I defended my master’s thesis that was on the neurobiology of mystical experiences. And when I read Andrew Newberg and Eugene d’Aquili’s claim that mystical and sexual experiences share the same neural pathways it was like a heureka for me. For it meant that one can, after all, write on the relation of eros to agapic, Christian love without having to go through years of painstaking exegesis of Greek texts. It can be done on the level of neuropsychology.

So this is what the present volume is all about. There are many people to whom I am indebted for their contribution. First and foremost – my heart-felt thanks go to my wife Külli, my daughters Carolin and Katrina and my mother for putting up with me throughout the years that went into coming up with this thesis. Without their full support, this work would have remained unwritten.

Many thanks to professor dr. Anne Kull – my supervisor – for her encouragement and skilled instruction. I also want to sincerely thank my colleagues at the Theological Faculty for their support to a project that many theological faculties around the globe would likely have been quite hesitant about. The discussions below are not easy to “digest” theologically. The faculty’s support to my project directly reflects the high degree of academic freedom the theology students can enjoy in our university.

I am grateful to the Archimedes Foundation for their grant that allowed me to work at the Lutheran School of Theology at Chicago and the University of Chicago during the Fall semester of 2006 – the main lines of the thesis took shape there. Many thanks to Andrew B. Newberg, Carol Rausch Albright and Antje Jackelén for their invaluable advice and encouragement. There are many, many more people who have contributed to this project – I thank them all and hope that my work lives up to their expectations.

Finally, I am infinitely grateful to Him (or Her or It) who is behind all the spellbinding mysteries of this universe and who is the ultimate inspiration of all scholarly and religious strivings – under whichever name He/She/It would be known to one.
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INTRODUCTION

A. DELINEATION OF THE TOPIC AND THE AIM OF THE STUDY

“A young Roman Catholic woman of about twenty-two years – to the horror of her family – was suddenly refusing to go to holy Communion, and refused to give a reason. After she had spoken to a priest she came to see me. After a while she admitted to me that she could not go to Communion, because every time the Host touched her tongue she had an orgasm. This was for her utterly blasphemous, wicked and terrifying; because she regarded her body and its needs as wicked and terrifying whatever the cause.”

This intriguing case report by Vera von der Heydt, a noblewoman and a Jungian analyst, could effectively be used in place of an introduction to this thesis. Because it vividly characterizes and documents the existence of a link the present volume explores – the link between the mystico-spiritual states and orgasmic states of consciousness. It is a link the existence of which many an investigator has suspected but that has only become seriously researchable fairly recently – with the advent of modern brain-imaging technologies.

Stated in a matter-of-fact manner, the topic of the thesis is defined via the opinion expressed by Eugene G. d’Aquili, an American psychiatrist, and Andrew B. Newberg, a neuroscientist and a bestselling writer on spirituality, in their book Why God Won’t Go Away (hence referred to as WGA) that the human capacity for mystical states (and hence, at least partly, for religion generally) represents, on the level of neural functioning, an evolutionary by-product of the phenomenon of orgasm and that the processing of both types of states involves largely the same neural structures and pathways.

Such a position has obvious and hard-to-digest religious implications. In fact, the way I see it, from the perspective of Christian thought the statement represents a fundamental stumbling block. It cannot be ignored, one must deal with it somehow. The approach taken in this volume is intended to provide a starting point for “dealing with it”. I critically investigate the bases of Newberg and d’Aquili’s idea and outline its religious implications from the perspective of a religious believer.

1 Heydt, Vera von der. Religious Aspects in Jung’s Works. Website – www.gaps.co.uk/Religious_aspects.pdf (accessed 10/25/2006). My bold. Unfortunately, the website no longer exists. The text itself, as far as I could determine, was a reprint of Heydt’s study of the same title originally published in 1970s. However, I could not recover the original’s bibliographical data. But even so, the case report is so useful in outlining the topic of the thesis that I could not resist inserting it anyway.


3 WGA, 123–126.
Judging by its formal features, the analysis below belongs into the domain that Francisco Varela and colleagues refer to as the interdisciplinary matrix of cognitive science. Within cognitive science, my analysis could be described as a “wet school” type of thesis in consciousness studies. Practically, however, the thesis is better mapped vis-à-vis the field of religion and science because its emphasis is not so much on understanding the nature of either mystical or orgasmic states of consciousness per se as on what their link suggests.

The thesis can be defined as having three basic aims. These are as follows: (a) to evaluate Newberg and d’Aquili’s speculation in the light of recent neuroscientific and other relevant data (i.e., to map the links between mystical and orgasmic states), (b) to determine whether this speculation can be developed into the form of a testable scholarly hypothesis and (c) to map the implications of the exposed links (if they bear out) for a religious (especially Christian) world-view.

B. METHODOLOGY AND METHODS

For reasons extensively discussed in chapters I–III of the present volume both the methodological groundwork and the particular methods used require deeper justification and explanation than is possible to give in this introductory section. The reader will find my methodological rationale fully explicated in Part One of the thesis. Suffice it to say here that the methodological frame of the thesis is derived from Brenda Dervin’s so-called Sense-Making Methodology (SMM). For purposes of data acquisition, Barney Glaser and Anselm Strauss’ concept of theoretical sampling was put to use. Data analysis was performed on two levels – data collage and metaphorical association.

Since all of the mentioned concepts and methods are thoroughly discussed in chapters I–III, I shall use the present space to establish the basic nature of the analysis below instead. This is extremely important because the detailed methodology elaborated below and the method derived from it are only appropriate considering the basic nature of the project (e.g., if it were not for the fact that the thesis is exploratory, then the analytic strategy described below would certainly be unfit and a more rigorous method would be called for). Another reason for pointing at these – in many ways trivial – aspects is to form a horizon of expectation, that is, to orient the reader as to what to expect and what not to expect. And thus:

6 For the relevant argumentation and bibliography, please refer to chapters II and III.
• Firstly – this is a project of basic (vs. applied) research. It is aimed at coming up with a testable theoretical hypothesis on the neuropsychological link between mystical states and orgasm. It might be argued that the later parts of the thesis gain an applied “taste” (it will be asked towards the end of the volume what the meaning of the arguments given are for Christian theology) but that does not change the basic nature of the analysis.

• Secondly (and centrally) – this is a project of exploratory (vs. constructive and empirical) research. The latter is the type of research conducted when it is not known in advance how to appropriately analyze the problem at hand. It may be thought of in terms of an attempt to fill in the gaps that prevent the researcher from conceptualizing the issue under scrutiny rigorously enough to apply conventional and standard methods. Exploratory research is based on creative pattern-finding (facilitated by the researcher’s curiosity and intuition) and aimed at suggesting workable research designs, data collection methods etc. for more conventional future studies. Because of these characteristics, exploratory research cannot provide any final answers as to the problem under scrutiny. Rather, its point is to provide insight. In the case of analyzing the mystical-orgasmic link, at present there is no alternative but to take an exploratory approach. No-one really knows what the best or most appropriate strategy to analyze it could be. It is necessary to first chart what is and what is not known to then try coming up with hypotheses that could be tested in a conventional way.

• Thirdly (and methodically following from the foregoing) – this is a project of secondary (vs. field) research. If one defines primary research as being aimed at obtaining entirely new data and secondary research as consisting in “revisiting” existing data in order to discover new patterns, then – as what I am doing in the present thesis is trying to find a unifying pattern in the existing data – the status of the project in this respect seems clear.

C. CLARIFICATION OF TERMS

The present thesis is fundamentally multidisciplinary. Therefore, there are a myriad of terms that need explaining. Defining them all in advance would be awkward and tedious for the reader. I have thus opted to explain most of the less common terms within the main text – as they come up. However – there is one central term that needs not only defining but also at least a degree of clarification right away since ambiguity in its meaning can be seriously misleading in understanding the basic nature of the claims made below. It is the term mystical states of consciousness (MSCs).

Many empirical investigators of MSCs leave the term very loosely defined. For example, in their recent study on mystical states, Mario Beauregard and Vincent Paquette use a sweeping phrase, religious-spiritual-mystical experience.
experiences, to refer to MSCs, throwing all spiritual states into one “bucket”. To a certain extent, this is a good strategy. As Merlin Donald notes, empirical scientists are pragmatists and have always tolerated fuzzy categories. Keeping one’s categories open during preliminary empirical studies of a phenomenon is useful in that this way the investigator can avoid committing herself entirely to pre-existing theoretical frameworks that may or may not be adequate.

In the present case, one has to be a bit more precise, though. For example, it is one thing to state that MSCs are evolutionary byproducts of sexual response and another to claim all religious and spiritual states to be byproducts of human orgasmic capacity. There is a variety of religious and spiritual states of which MSCs are but one subtype. These have to be treated and studied separately. As Anne Runehov notes, the phrase religious experience may refer to states as diverse as feeling thankful towards God or Ultimate Reality, feeling guided, seeing God in nature, feeling ecstatic, experiencing pure consciousness or universal love, having visions and revelations etc. It is utterly unjustifiable to claim, on the basis that MSCs are neurally dependent on pathways involved in generating orgasm, that all religious phenomena ought to be explained vis-à-vis sexual urges.

D’Aquili and Newberg recognize six basic types of religious experiences, referring to a categorization first suggested by Frederick Streng: the numinous experience of the holy, the transformative experience of reorientation, the courage of facing suffering and death, the moral experience of obligation, the experience of order and creativity in the world and the mystical experience of unity. So what shall be said below is to be understood as only applying to the last one of these.

When it comes to the question of what the conditions are for a state to qualify as mystical, then here D’Aquili and Newberg use Robert Gimello’s

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11 A technical remark: my preference throughout this thesis is to use the term MSCs for the states under scrutiny. However, since the individual researchers on whose reports the below argumentation relies have used a variety of overlapping but nevertheless distinct terms to denote these states it proved to be impossible to stick with this one term everywhere (the same goes for the term erotic love that is in the following used interchangeably with eros and romantic love). Hence the occasional terminological inconsistencies. I plead the reader for patience in this regard. A thoroughgoing explanation of why in the case of the present project the terminology cannot and, in fact, should not be “normalized”, please consult chapters I and II.
characterization of MSCs. It is recognizably similar to Sir William James’s classical account\(^\text{12}\) but adds a couple of qualificatory elements: MSCs are described by (1) involving the feeling of oneness or unity, (2) leaving an impression of being revelatory of “the truth”, (3) being ineffable, (4) involving a cessation of normal intellectual operations in favor of intuition, (5) involving a perception of the coincidence of opposites (such as one’s perception that her self paradoxically coincides with the outside world) and (6) strong affective tone.\(^\text{13}\)

In WGA, Newberg and d’Aquili further explain that all mystical states are based upon the brain’s capacity to \textit{transcend its own sense of self}. Behind this poetic wording there is a straightforward concept – by \textit{self} they mean the brain’s representation of the body in its relation to cognized environment. \textit{Self transcendence}, then, simply means a brain state in which that self-image is altered in such a way that the boundary between the self and the outside world disappears and one suddenly has a profound sense of being a part of something larger than the self.\(^\text{14}\)

\section*{D. THE STATE-OF-ART OF RELEVANT RESEARCH}

To my knowledge, no one has so far systematically investigated the particular problem of the neural links between mystical and orgasmic states. However, there are investigators who have studied the neurological links between religion and sexuality \textit{in general}. When one looks for studies commensurate with the approach taken in this volume, then Rhawn Joseph’s arguments developed in his article \textit{Sex, Violence and Religious Experience}\(^\text{15}\) published in a controversial collection \textit{NeuroTheology: Brain, Science, Spirituality, Religious Experience} probably comes closest. Joseph expresses an opinion that religious feelings and sexual drives depend on the same neural structures, pointing especially at the hypothalamus and the amygdaloid-hippocampal complex. I find Joseph’s arguments to be a bit far-reaching and not structured enough. However, the

\bibitem{14} WGA, 100–107. An important implication of this specification is that MSCs need not necessarily be religious (in the strict sense of the word).
close match between his and my approach demands reviewing his ideas in more
detail than is possible here. The reader will find a representative overview of
Joseph’s account on the subject matter in the latter part of chapter VI.

Historically, the arguments developed in this volume are closely related to
Sigmund Freud’s ideas, especially to his widely known theory of sublimation. I
shall briefly touch on this topic in chapter IV. The general idea is that not only
religions but the whole of human culture “piggybacks” on the sexual drives.
Even though – just as in the case of Joseph’s theorizing – I think that the
Freudian approach is way too far-reaching, the general idea should not be cast
entirely aside. There are several contemporary interpretations of Freud that well
complement the claims made in this volume.16 However, in what follows, I shall
not engage in a dialogue with Freudian concepts. The psychoanalytic theory is a
research topic on its own and I do not have sufficient knowledge of the field to
be able to synthesize the ideas found there with my argumentation.

It might be proper to add here that the first pioneering “researchers” of the
topic of this thesis were really the mystics themselves. It is they who noticed a
link between MSCs and orgasm. The existence and persistence of ascetic
practices that emphasize the importance of abstinence are a living proof to this
claim. Whether put into words or not, the practitioners have always known that
the two types of experiences are somehow interrelated and that one can be
influenced via the other.

Be this as it may, when it comes to neuropsychological reasoning, then, apart
from a few controversial speculations by Rhawn Joseph and Newberg and
d’Aquili, the specific cluster of questions investigated in this volume is still
practically an untravelled and uncharted territory.

E. THE SOURCE TEXTS

The source texts for the present thesis can be provisionally divided into three
groups: (a) those that relate to the neuropsychology of MSCs; (b) those that
relate to the neuropsychology of sexual response; (c) those that investigate the
links between sexuality, mysticism, religion and spirituality on a non-neuro-
logical level.

The most important source texts in the first group are Newberg and
d’Aquili’s books *The Mystical Mind* and *Why God Won’t Go Away*.17 The first
of these is basically a synopsis of the authors’ religion- and mysticism-related
research papers that originally appeared in *Zygon: the Journal of Religion and
Science* between 1974 and 1999. During the preparation of the book the source
material has been harmonized and updated. However, the “tacking marks” still
show in the form of telling inconsistencies. Whenever possible, I have therefore

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16 For one such reconceptualization, see: Gay, Volney P. Freud on Sublimation: Re-
17 D’Aquili & Newberg 1999; WGA.
tracked the parallel readings in the original research papers when using material from *The Mystical Mind*. WGA represents a variation on the same basic ideas but is thoroughly rewritten to be accessible and readable to wider audiences. Compared to *The Mystical Mind*, WGA has updated neuroscience references. Perhaps the most characteristic difference of WGA from the authors’ other publications is its notable emphasis on evolutionary speculations. The rest of the materials in this group of source texts are mostly experimental reports and review articles by various authors and research groups.

The second group of source texts mostly consists of experimental accounts and their meta-analyses. As a “handbook” to interpret these accounts (and in explicating relevant background information) I have used Barry Komisaruk and colleagues’ magnificent *The Science of Orgasm* from 2006. The authors are the leading figures of one of the most renowned research groups in the field who also stand behind several of the experimental accounts included in this group of source texts. The book is especially valuable because the authors relate their research with consciousness studies – quite untypically for sexology investigators but usefully from the viewpoint of the present thesis. When it comes to the particular experimental reports in this set of source texts, I would specifically highlight the papers by Janniko Georgiadis, Gert Holstege and colleagues’ research group. Their two tomographic studies on orgasm form the backbone of some of my most central claims in this volume.

The third group of source texts is the most “variegated”. It consists of differing materials on the links between the bodily and the mystical, studies in sexual theology, papers on mystical practices etc. Perhaps the “weightiest” source text in this group is Jeffrey Kripal’s excellent *Roads of Excess, Palaces of Wisdom: Eroticism and Reflexivity in the Study of Mysticism*. The book is a deep-going analysis of the erotic connotations in the descriptions of MSCs. Also, Robert Goss’s painfully honest, semi-autobiographical analysis of the links between celibacy and homosexuality and John Portmann’s rich book on

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the Christian confusion in relation to sexuality\textsuperscript{22} (which is extremely useful in interpreting the neural links between sexual and mystical states theologically) ought to be singled out.

\textbf{F. DIFFICULTIES}

The main difficulty in proceeding with the present investigation consisted in the impediment that since the states to be compared are so different, it is tremendously difficult to bring the existing fragments of data and theory collected about them meaningfully together. For example, Newberg and d’Aquili’s experimental findings on MSCs are reported as part of a wider program of mapping the neural correlates of complex cognitive tasks. But orgasms are not (primarily) cognitive. So how would one connect the existing results on both types of states while retaining methodological credibility?

Even \textit{within} the field of the neuroscientific study of MSCs the language, concepts and terminology used and experimental results reported by investigators are often so different as to make it virtually impossible to arrive at a coherent synopsis. Not to even mention the fundamental methodological difficulties involved in relating neuroscientific findings to arguments and positions found in theology, religious anthropology, phenomenology, mystical practices and literary criticism. The terminologies used and data presented are largely incommensurable.

These difficulties are of a fundamental kind. They demand thorough discussion and a well argued solution. Such a solution is provided in Part One (chapters I–III) of the thesis in relation to devising a suitable methodological framework for the project.

\textbf{G. THE STRUCTURE OF THE THESIS}

The thesis is tripartite. The first part (chapters I-III) is wholly dedicated to developing a suitable methodological and methodical framework for the analysis. The second part (chapters IV–VIII) consists in a comparative analysis of mystical and orgasmic states – mainly in the light of neuroscientific data. It is both formally and content-wise the most weighty part of the thesis and comprises the solving of two out of the three research problems formulated in section H below. The third part of the thesis (chapters IX–XI) is concerned with the question how to interpret and understand the links exposed in Part Two and what do these links suggest spiritually. The discussions in Part Three do not amount to forming a stringent theological interpretation. Rather, they are about deciphering and developing of the exposed links via a meta-level analysis.

Chapter-wise, the contents of the thesis are as follows. In chapter I, I provide a detailed overview of the nature of the “methodological challenge” that the analysis of the links under scrutiny involves. Chapter II provides a methodological framework that is suitable for the task at hand but can also easily be modified for “handling” other topics of interest within the field of religion and science. Chapter III is aimed at arranging (on the basis of the provided methodological framework) a set of methodical tools to actually carry out the analysis. In this chapter, I define and describe in more detail the initial data for the thesis, the processes and principles of data acquisition and sampling and the strategies of data analysis.

In Chapter IV I review the neural correlates of MSCs as they have been described by Newberg and d’Aquili. In chapter V, the comparative analysis of orgasmic and mystical states begins. Under scrutiny are the parallels on the level of the autonomic nervous system. Chapter VI explores those parallels between MSCs and orgasm that can be discerned on the temporo-limbic level. Chapter VII introduces the results from functional brain imaging studies – both in the case of orgasm and MSCs. This allows for comparing the neocortical parallels. Chapter VIII is primarily dedicated to bringing the discovered links into an evolutionary framework. I here seek an answer to the question of to what extent can the exposed parallels between MSCs and orgasm be interpreted as confirming the idea that MSCs are an evolutionary byproduct of orgasm. The chapter ends with my raising a testable hypothesis on the relation between mystical and orgasmic states.

In chapter IX I begin with meta-level reflections on the exposed links, taking as a starting point an insight from the previous chapters – that the spiritual and the bodily are fundamentally continuous. In chapter X, I further analyze the continuity between the bodily and spiritual – with an emphasis on the differences between the female and male bodily experience and how these differences are reflected in mystical spirituality. Chapter XI represents, basically, a “pastoral homily”, the goal of which is to resolve (or soften) the uncomfortable tension the arguments presented pose for a representative of the Christian worldview (such as myself).

The structure of the thesis is largely dictated by the source material and research questions (see below). As already noted, the incommensurability and fragmentariness of the material demands that one squarely face the methodology issue. Hence the “logic” of the first three chapters. Then, investigating the “byproduct speculation” unavoidably presupposes a comparative analysis. Hence the “logic” of Part Two. The chapter division within Part Two is again directly dictated by the material. In comparing the reports on orgasmic and mystical states it quickly became clear that the most natural way to structure the discussion of them is drawing a provisional line between the autonomic, limbic and neocortical aspects. The “logic” of Part Three is dictated by the fact that engaging the non-neuroscientific analyses of the MSC-orgasm link (and especially reflecting on its spiritual consequences) proved to be impossible without introducing a meta-level.
H. WORKING HYPOTHESES

On the grounds to be explained below I shall not raise any particular working hypotheses at the moment. Since the present thesis is an exploratory one, raising hypotheses beforehand would be premature anyway – the goal of exploratory research is to arrive at hypotheses. I emphasize that the topic of the thesis is defined via a speculation that the mystical capacity is a byproduct of orgasm. This speculation cannot be treated as a hypothesis. Not even a working hypothesis. It makes more sense to proceed by formulating working questions.

As already briefly mentioned, for this thesis the research questions are defined as: (a) to what extent can d’Aquili and Newberg’s speculation be taken seriously in the light of contemporary neuroscientific and other relevant data; (b) can this speculation, on the basis of existing data, be developed into a testable scholarly hypothesis; (c) what are the implications of this speculation (or, if it can be developed into a hypothesis, then of that hypothesis) for Christian spirituality and theology.
PART ONE:  
MSCs, Sexual Response and Gappiness –  
Facing Up to the Methodological Challenge

CHAPTER I. ASTRAY IN BETWEEN RIVALING  
LANGUAGE GAMES

A. ENTER THE “BEAST”

Facing a research problem as complex, multi-layered and multi-disciplinary as the neuropsychological link between MSCs and human sexual response is in many ways like facing an untamable beast with countless heads and sharp teeth: if the “daring knight” is to survive the encounter, then the beast has to be harnessed somehow.

Within scholarly communities (the members of which are, as a rule, not in a good enough physical shape to handle a heavy sword with any ease) the latter is to be accomplished by applying a safe (preferably remote controlled) and pre-scribed method (in fact, scientific method has occasionally been even conceptualized via references to the notion of harnessing¹).

Alas, in the case of analyzing the multi-layered links between MSCs and sexual response these pre-scribed, widely accepted methods and protocols do not work very well, at least in their “canonical” forms. The main reason for this is that the “wide acceptance” of a method or a protocol is only wide within a particular discourse community. But in the case of the present research topic one stands pretty much outside of well developed discourse communities, or at the intersection of them. And where one has to combine theological, neurological, psychological etc. data, the standard methodological tools of those disciplinary communities cannot be uncritically pre-scribed.

Nevertheless, there still exists a pressing need to harness both the “beast” and one’s own curiosity as a researcher. Failing to harness one’s curiosity would in the present case lead one off in infinite directions at once and it would be impossible to come to any informative results.

I thus found that the best way to start would be to try to characterize the “battleground” as well as I could and then construct the particular “harness” for the particular “beast” ad hoc from the workable elements of the “widely accepted” methods, in the hope that it may later turn out to also be applicable for “handling” other problems of interest within the field of religion and science as well.

This means that God- and sex-talk will have to wait – the next three chapters will be dedicated to methodological sophistry. Fortunately, however, it is not

the boring sort of sophistry – thanks to the vivid and witty workable ideas of the authors whose work will be used to lay the methodological “keel” for the present thesis.

**B. HOW THE MUSES TORPEDOED MY RESPECTABLE INTENTIONS AND MADE ME CRAWL**

I started out with the present project four years ago with a straightforward goal to make sense out of and further elaborate on Andrew Newberg and Eugene d’Aquili’s above mentioned idea that MSCs and human sexual response use common neural pathways and that MSCs can thus be thought of as evolutionary byproducts (or spandrels) of human sexual development.

The work was to be based on available neurological data. My original strategy was simply to “read in” deep enough in both sexology and neurological analyses of MSCs to be able to recognize the emerging parallels. To a certain extent this worked, too – at the level of Newberg and d’Aquili’s supposed characteristic patterns of hypothalamic activity during both types of experiences. Perhaps the most intriguing aspect of these parallels had to do with a curious male homoerotic “bias” (described with excellence by Jeffrey Kripal) in the descriptions of MSCs.² I saw this bias as relating to Newberg and d’Aquili’s concept of hypothalamic “spillover”, a state of hypothalamic overexcitation supposedly at work during both MSCs and sexual orgasms.³ This scenario leads to a prediction that MSCs should be found to be gender-dimorphic both neurally and phenomenologically. If both MSCs and sexual orgasm are explained in terms of hypothalamic overexcitation and at the same time we know that male and female hypothalami are anatomically different (and that having an atypical hypothalamus may be related to one’s displaying patterns of behavior unusual for her gender⁴), then it follows that MSCs, too, should be found to be gender dimorphic. It could seem, thus, that my original strategy was a fruitful one since it resulted in an important and testable prediction.

However, it quickly became apparent that such a simplistic comparison-based heuristic is of very limited use when it comes to systematic theory-generation – developing a wider understanding of the link between MSCs and orgasmic states. This is illustrated by the fact that, except for the above-

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² For a discussion of this, see chapter X and: *Kripal* 2001.
mentioned suspected similarity in hypothalamic activity during MSCs and orgasm, no immediate neurological parallels seemed to be coming up. Even worse, close reading of up-to-date papers on sexuality revealed a rift between the current theories of orgasm (it is textbook sexology that maintains the importance of the hypothalamus in the generation of orgasms) and the experimental data obtained via functional brain-imaging. In contrast with accepted theories, the experimental results — although inconclusive — were not particularly supportive of the hypothalamic overexcitation concept.\(^5\)

I then tried another strategy for approaching the MSC-orgasm link. The “logic” behind it was that since the original strategy did not reveal enough clues to form a weighed hypothesis on the nature of the MSC-orgasm link I ought to systematically research Newberg and d’Aquili’s coauthored texts (because it was here that I originally found the hint on the neurological link between the two types of experience) in order to find out the origin and bases of the byproduct/spandrel account of MSCs and to find additional clues as to where to look for more parallels.

At first it seemed that the best way to proceed with such research would be hermeneutical analysis. Unfortunately, here, too, it quickly became clear that even though the hermeneutical approach allowed me to expose with clarity the importance of context when it comes to statements such as ‘MSCs are an evolutionary byproduct of human sexual development’ it left unanswered most of the central questions such as what, after all, is the decisive neurological link between MSCs and orgasm (provided that it exists).

Consider the following clarification by Donald Ratcliff: hermeneutical analysis is a way of making sense of a written text.\(^6\) Its goal is recovering the meaning of a text for people in situation, i.e. – not its “objective” meaning but meaning-in-context. This is done by bracketing out the researcher’s “self” during the analysis. The point is to try to tell the “story” the text itself is telling, not the researcher’s view of it. This involves different layers of interpretation and, above all, using the context – the time and place of writing – to understand. What was the text’s cultural situation and its historical context? What was the author’s intent/purpose?\(^7\)

Now, such an analysis is extremely important in order to understand what Newberg and d’Aquili intended to claim (as opposed to what one thinks their claims mean) and what the relevant context was. It can also reveal multiple new clues as to how to develop Newberg and d’Aquili’s claims from the status of mere speculation to that of a scholarly hypothesis. But it leaves one at a complete loss when – after having “cleared” the context and Newberg and

\(^5\) Komisaruk et al. 2006 vs. Holstege et al. 2003; Georgiadis et al. 2006. See chapter VII for a discussion on this issue.
\(^7\) Ratcliff, Donald (ed.). 15 Methods of Data Analysis in Qualitative Research. Website – qualitativeresearch.ratcliffs.net/15methods.pdf (accessed 09/22/2008). Pp. 3–4. This publication will below be referred to as: Ratcliff 2008a.
d’Aquili’s original intent – one asks where do I go from here or, more precisely – what analytic steps to take next. In other words, even though understanding Newberg and d’Aquili’s original intent is an important prerequisite on the way to devising a (scholarly) hypothesis on the nature of the neurological link between MSCs and orgasm, it tells one next to nothing as to how to actually get there. The broader goal of the project was not, after all, bringing out what the context-embedded meaning of Newberg and d’Aquili’s speculations is – it was forming a hypothesis based on a couple of their speculative claims.

The bottom line is – even though both of my original research strategies seemed to provide important and helpful insights as to the subject matter, they both had major shortcomings. To get a better fix at these, consider the following remark by Flemming Christiansen:

“Any research methodology must enable a research procedure that can actually be carried out. This means that it must describe a procedure that with existing resources can answer questions that are relevant within an existing scholarly debate. [Second, it must] guide and validate data collection: any research methodology must define procedures for how to collect valid research data and how to test their validity. [Third, it must] establish relationships between data, summarise these relationships and reveal general principles.”

If one analyzes my original research strategies in this light, then their major shortcomings are at once clear: (a) even though both approaches provided a procedure that could actually be carried out, neither was capable of answering the relevant questions given the existing resources; (b) neither could actually guide data collection; (c) neither was fit to get a fix on the intricate relationships between the existing data.

These were not the only strategies and methods I tried out. I also experimented with case study (since Newberg and d’Aquili’s texts can be viewed as an informative case on the MSC-orgasm link), which – in many ways like the above-discussed hermeneutical method – seemed to offer important insights as to the subject matter but also fell short of providing an operational research frame. The same goes for content analysis and the method of analytic induction – looking at data, forming a hypothesis about them and then checking if it fits other data of similar type (if it does not, the hypothesis is revised until it can account for all available relevant data). Barney Glaser and Anselm Strauss’ Grounded Theory Approach came closest to being operational but it, too – at the end of the day – did not meet the demands of the project.

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In short, no matter which well-developed and rigorous method I experimented with in relation to the MSC-orgasm link, none of them proved to be operational. In all cases, at a certain point it demanded an unjustifiable leap of imagination to fit the data to the analytical frame. It seemed, therefore, that a more “open” strategy is needed.

One such candidate was good old philosophical analysis. As there are no binding methodological “canons” in religion and science (except, arguably, for the general principles of dialogue and common sense), philosophical argumentation seemed to be just about the only workable tool for the “job” at hand. Unfortunately this, too, did not take me very far. Most of philosophy today is done according to the rules accepted by one or another school of philosophy but not by all philosophers. The problem is that the instant one adopts the rules of one or another school, the same difficulties arise as with the more stringent methods discussed above. The MSC-orgasm link could, for example, be investigated by applying conceptual analysis. But the rules of such philosophizing would then deny one access to many important layers of meanings and data involved.

Now – why discuss these failed attempts to format the thesis according to the rules of one or another widely accepted research strategy so thoroughly? The point is simple – to show that even though none of the discussed strategies worked well enough to ground the whole thesis into, they all still provided important insights – insights that, taken together, could form the backbone for a coherent hypothesis on the MSC-orgasm link but that, due to the lack of an appropriate unifying methodological frame, could not be engaged in creating such a hypothesis.

The question, thus, is – what type of an analytical frame should one possibly be looking for when it comes to problems like the MSC-orgasm link. It should be a frame that would allow one to integrate fundamentally different types of data originating in fundamentally different “language games” and provide them with a common denominator. Does such a frame exist? In asking this question we meet Jensine Andresen – a theologian who has fought the same sort of “battle” and come out of it alive (albeit, admittedly, a bit bruised).

C. JENSINE ANDRESEN AND MY ABHORRENCE OF (METHODOLOGICAL) VACUUM

§ 1. The four quarters of data

It may feel ennobling to think of oneself as facing a unique methodological impasse. But to be honest the impasse described above is far from being unique, let alone ennobling. In fact, admitting to be facing this type of difficulty is more like joining the Alcoholics Anonymous of people involved in the field of religion and science where the need for criss-crossing the disciplinary boundaries and tailoring methodological compromises between the partaking “parties” is routine business.
Unfortunately – as is the case with the Alcoholics Anonymous – one’s admittance of having a problem and talking to other people with similar problems does not “cure” the condition for good. An alcoholic will remain an alcoholic for the rest of her life even if she be sober for twenty years. Likewise, methodological “vacuum” is a permanent condition in interdisciplinary research.

This is so for a perfectly simple reason: the “language games” of the participating disciplines are often mutually untranslatable. Therefore, a research project standing at the intersection of the participating disciplines will unavoidably end up in methodological confusion, a stranger to all (this is why I titled the chapter at hand Astray in between rivaling language games).

Jensine Andresen – a theologian thoroughly versed in these questions – and Robert Forman explain that when it comes to researching MSCs, at least four fundamentally different discourse communities (and, consequently, four different research perspectives) “dig” at the field at once. MSCs can be investigated from “inside” (I-stories, phenomenology), “outside” (social sciences), “here” (the neuroscientific perspective) and “hereafter” (theology). They present the reader with the following schema:

11 One of the best examples of such untranslatability is the concept of energy. It is used in fields as different as physics and herbal healing but with completely different meanings. Attempts to overcome these differences usually end up in conceptual confusion. However, there are exceptions to this rule. A good example of “handling” the different layers of meaning of the concept of energy under a common denominator is found in: Gilkey, Langdon. Nature as the Image of God: Reflections on the Signs of the Sacred. – Zygon: the Journal of Religion and Science, Vol. 29, Issue 4, December 1994, 492ff.

12 Obviously, the title tips its hat to Ludwig Wittgenstein.


Andresen points out – with very similar results to my self-ironic confessions above – that each of these perspectives can generate important insights that broaden our understanding of MSCs. Also similarly to my arguments above, she claims that taken separately, none of them is capable of explaining the phenomenon under scrutiny satisfactorily. This leads her to the conclusion that if investigators are to make the most out of the bits and pieces of knowledge generated in each of these four “quarters of scholarship”, then there is a need for a new wide-based (methodological) amalgamation or synthesis:

“[This conclusion] underscores the importance of staying current with research in many fields as we continue to search for new ways to understand religion. Interdisciplinary collaborations of the past decade or so have demonstrated that methodologies from one single discipline often fail to capture the conceptual and lived nuances of complex phenomena. We therefore must remain flexible and fluid, adopting more rigorous forms of empirical study and staying attuned to more detailed expositions of phenomenological realities.”

Andresen’s appeal is, no doubt, quite reasonable. For example, when it comes to MSCs, people often forget that these are not a “private affair” of the lucky few who have experienced them. In many cultures around the globe people’s mystical encounters have borne significant social meaning. Now, when according to neuroscientists such as Michael Persinger MSCs are basically just brain dysfunction of the type of epilepsy and at the same time it is generally believed that pathology – as a rule – isolates a person from the society, then taking seriously the social dimension of MSCs clearly makes a difference. It reveals that even though Persinger might be correct in his proposed physiological dynamics for MSCs, he is likely wrong in the general explanatory conjecture around these dynamics. Thus, integrating what is known about the social dimensions of MSCs lessens the danger of artefacts (generated by the use of only one type of analytical tools) “sneaking” into one’s account on MSCs.

However, it is an entirely different matter how to actually apply such a multi-faceted approach in a methodologically coherent manner. One could assume that a well-balanced (in the sense of incorporating all of Andresen and Forman’s “quarters of data”) account of MSCs should graphically be positioned

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18 In the history of science it has often happened that experimental results “survive” several theories about them (e.g., experiments to prove the theories of the caloric fluid and phlogiston).
in the center of the above schema – at the intersection of theology, social sciences, neurology and I-stories. In other words, outside of any “normal” scientific or religious language games.

The latter – considering that language games are seldom mutually translatable – presents one with what Andresen and Forman call the methodological challenge in the study of MSCs.\footnote{Andresen & Forman 2002, 7. The core of the problem is well explained by Bruce Lee and Andrew Newberg: “Bridging the divide between health researchers and religion researchers can be challenging. While interdisciplinary fields have the benefits of bringing together people with diverse interests, experiences, perspectives, and abilities, they also must confront communication hurdles. Health researchers and religion researchers often are not familiar with important publications in each other’s specialty journals. Separate meetings, separate departments, different methodologies, and different lexicons have hindered collaboration.” (Lee, Bruce Y., Newberg, Andrew B. Religion and Health: a Review and Critical Analysis. – Zygon: the Journal of Religion and Science, Vol. 40, Issue 2, June 2005, 448–449.)} Since the analytical frame I shall be putting forward below (to save my thesis from being “sucked into a methodological Black Hole”) relies heavily on Andresen’s rationale, let me now briefly explain what she means by the notion of methodological challenge.

\section*{§ 2. The methodological challenge and the problem of private language}

In her review paper \textit{Meditation Meets Behavioural Medicine: the Story of Experimental Research on Meditation} Andresen argues: (1) despite the fact that meditation (and the accompanying MSCs) has by today been discussed in hundreds of neuropsychological studies there is almost no unanimity among researchers as to what its basic effects are; (2) the results are so poor because the meditative approaches, markers, technologies and methodologies picked for experimentation are so different from study to study as to make it virtually impossible to compare them in order to induce new knowledge and draw generalizations.\footnote{Andresen, Jensine. Meditation Meets Behavioural Medicine: the Story of Experimental Research on Meditation. – \textit{Cognitive Models and Spiritual Maps: Interdisciplinary Explorations of Religious Experience}. Edited by J. Andresen and R. K. C. Forman. Thorverton and Charlottesville, Imprint Academic, 2002. Pp. 17–53. Specifically, see pages 32, 36, 48.}

The situation can be described by analogy. Produced by the hundreds of studies on meditation we have a large number of bright-colored mosaic fragments (experimental results), each supposedly having a fitting place in the rebus (the “final”, satisfactory theory of MSCs) at hand. What we do not know is what, at the end of the day, is the “solved” rebus supposed to look like and what the assembly rules are. Also, we do not know how many pieces are missing or lost (the additional research needed plus the data that already exist
but the relevance of which has not been realized yet). A further complication is that there is every reason to believe that a portion of the pieces that we do have actually belong with other rebuses. It is, therefore, no wonder that the existing research on MSCs – when viewed together – sometimes leaves the impression of flailing at random.21

To a certain extent this fragmentariness is conditioned by historical circumstances. Religiosity and MSCs were for a long time viewed with deep suspicion or outright hostility by secular scholarship. On the other hand, there have always been individual scholars deeply intrigued by the so-called altered states of consciousness (of which MSCs are one subtype), psychic phenomena etc. The result: as soon as a new brain-imaging device enters the market, it will promptly be used by one or another enthusiastic researcher to see if it can provide new and dramatic insights into the “supernatural”. But as such projects revolve around particular scholars’ personal interest and are met with suspicion from the institutional side of science, they tend to die away without ever becoming parts of wider and well established research programs.22

A more fundamental reason for the fragmentariness of the existing data on MSCs, however, is that the techniques and technologies used to study MSCs are profoundly different (measuring different things in differing units). This makes it further difficult to see how the data from one study relate to the data from other studies. When in the case of comparing the results of an electroencephalographic (EEG) study to, say, a positron emission tomographic (PET) study, one at least has a rudimentary unifying analytical frame (the language game of neuropsychology), then how to relate the results of brain-imaging experiments to, say, findings in religious phenomenology? How, for example, to methodologically coherently argue that the specific patterns of neural activity in certain areas of a subject’s brain revealed by a PET-scan reflect something about the religious convictions of a tribe that the experimental subject is part of?

To make use of the language games metaphor once again – the existing data on MSCs are cast according to the canons and rules of widely differing language games and obtained by making use of incompatible methodologies. The challenge, then, is how to still weave these data together into a meaningful garland without ending up in private language and “mystical mumbo-jumbo”.23

When it comes to actually accepting the challenge, then Andresen herself is quite skeptical towards the possibility of integrating the already known empirical facts for she believes that in the case of the existing studies vital information on what exactly was it that was being measured and studied has gone

21 This analogy is developed in detail as a part of the broader research strategy for analyzing the MSC-orgasm link in chapter II of this volume.
22 I shall show below – largely based on Andresen’s observations – that this trend could be reversed if the scholars in religious studies and theology would take the initiative. Because it is here that one finds appropriate research programs and institutional support to incorporate such projects.
23 As it will become clear below, a certain amount of “mystical talk” is unavoidable when discussing MSCs and sexuality (see chapter II D on reflexivity).
unrecorded because the researchers have considered the religious background traditions of the experiences investigated irrelevant, concentrating too much on the physiological (or psychological) markers at the expense of demarcating the particular features of practices at hand.\footnote{Andresen 2002, 19–20; 49. In fact, Andresen proclaims most of the existing results on meditation and MSCs useless and wasteful by concluding that “the so-called meditation Western researchers have been studying is like Mary Shelley’s Frankenstein, an entity of our own creation.” (Andresen 2002, 52–53.)}

She does provide a future-oriented methodological solution, however. The idea is best explained on the example of meditation research. Meditation practices aimed at attaining to extraordinary phases of consciousness clearly have aspects researchable from all of the four quarters of interest mentioned above. They have social aspects (they are socially organized) and a doctrinal background (the practices are embedded in religious teachings). They are aimed at attaining to a particular type of experience (phenomenologically researchable I-stories) which, in turn, is doctrinally and communally prescribed. Last but not least – they are researchable neuroscientifically. Andresen’s appeal, then, is that when it comes to designing experiments, then, in order for the results to be compatible and comparable across the studies, all these aspects have to be given a fair treatment.\footnote{Andresen 2002, 47–49; 53.}

She explains: methodological “disease symptoms” or deficiencies are tracable in all technology-based studies of meditation, basically stemming from the fact that it is difficult to define what markers to choose for measuring, i.e., how to determine the features to be tested on and how to account for their choice. Her point is that quite likely the best selection criteria, in the case of MSCs, are found by researching the background religious traditions of the subjects. She quotes Daniel Brown:

> “One practical way to approach the questions concerning the operational definition of meditation variables and their relationship to one another is to research the important variables of meditation as defined by the classical meditation literature. [---] The terminology for the major variables in the meditative experience is quite precise. There are technical categories, reasonably comparable with the psychological categories of attention, thinking processes, perception, information-processing, physiological parameters, affect, and time.”\footnote{Brown, Daniel P. A Model for the Levels of Concentrative Meditation. – \textit{International Journal of Clinical and Experimental Hypnosis}, Vol. 25, No. 4, 1977, 237–238 (as quoted in: Andresen 2002, 48).}

She warns, “If scientific researchers do not take the time to learn about their subjects’ traditions in some depth, they simply will not be equipped to avoid reductionist pitfalls when it comes to understanding meditation.”\footnote{Andresen 2002, 47.} The point is clear enough: in the existing research one of the “quarters” of data – namely,
Andresen’s view is nice and tidy but impractical and, to some extent, biased. For example, the “solution” Andresen is offering clearly reflects the fact that she is a theologian. The basic accusation – as can be seen from the above – to the existing research on meditation is that it has not been attentive enough of theology and religious studies. But this is a small problem. There is a much more serious difficulty with the “solution”.

Andresen’s idea is that a satisfactory methodology for the study of MSCs has to interrelate as many as possible relevant discourses (strict sciences included). An acceptable methodology is one that is capable of effectively integrating the doctrinal, experiential, social and neural substrates of religious consciousness and behavior. And a methodology that forsakes even one of these aspects is necessarily too “tight” and generates systematic mistakes.28

My point is that the high standard of integration Andresen is demanding from investigators of meditation and MSCs generates an even more serious methodological “vacuum” than the one discussed above – the level of integration demanded may be humanly impossible to achieve. The proposed solution reflects the good old dream of the unity of sciences. But that is exactly what it is – a dream. In an ideal world I would gladly subscribe to Andresen’s program. But the reality in religion and science is almost the exact opposite of an ideal world – a mess of particular scholars pursuing their particular interests with no unifying agenda, limited by imperfect equipment and fragmentarity of initial data, the latter being spilled around in countless unrelated scholarly journals. It is impossible to stay current with all the relevant publications and fragments of data. And even if it were possible, there is still the problem of untranslatability of many relevant concepts and ideas between the language games involved.

By these somewhat skeptical thoughts I do not mean as if it should be totally impossible to integrate and interrelate the pieces of data originating in different disciplines at all. Rather, I am critiquing the high level of “seamless” integration Andresen is demanding. In an ideal world it would, indeed, be good if we could devise a unifying methodological agenda for the study of MSCs, thereby turning the project into a research program. But the reality is that today the scientific study of MSCs is still largely in the state of being a private “love-affair” of

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interested scientists and scholars, done outside of business hours and beside their main line of research, often unpaid. Discarding the existing results simply because they have not been collected and analyzed according to Andresen’s prescribed (unrealistic) standards and starting anew is, thus, not a serious option, however honorable the ideals behind Andresen’s suggestions may be.

I shall offer a less pretentious solution to the problem. I shall not agree that the existing data are almost useless in inducing new knowledge and that they cannot be brought under a common denominator. Not only do I think it can be done – it has been done by several talented researchers whose work must not be depreciated (as I think Andresen is doing).

Among the authors who have accepted the methodological challenge are, for example, Newberg and d’Aquili (integrating neuroscientific data with phenomenological findings and evolutionary theory), James Austin (integrating neuroscientific data with zen practices29), Carol Albright and James Ashbrook (interpreting neuroscientific data theoretically30). The authors accepting the methodological challenge have in common that they are trained scholars/scientists and at the same time interested and/or involved in religious practices. Therefore, they feel at home in several discourse communities (language games) and can thus act as “translators” between the language games.

Their “translations” and attempts of synthesis are often met with suspicion and they are accused of illegitimately mixing discourses (i.e., using private language) – at least in the scholarly circles.31 Sometimes with good reason. Yet they are the best pointers of direction we have at present when it comes to climbing out of the methodological Black Hole described above. Raymond Paloutzian has argued in a different context that at the moment – when it comes to studying MSCs – we do not that much need new observational and empirical data as innovative and courageous theoretical conjectures that would allow one to more deeply integrate and interpret the already existing data.32

In this idea echoes a heuristic advice – not to be afraid of speculation, scientifically or commonsensically. To measure for the sake of measuring is a waste of resources. It is via meaning-creating (explanatory) narratives (be they biblical, evolutionary, neuro-theological etc.) and constructing both scientific and spiritual “maps” that the data are integrated and “come alive”.

It is by no means impossible to take the fragments of data that we do have and try constructing meaning-creating narratives (hypotheses) to connect and

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integrate them. Creating stories to explain things is common to religion, science, arts etc. The only limit to what types of data can be woven into a meaningful, reality-modelling story is the story-teller’s imagination. ³³

Scientific and scholarly “stories” are special only in the sense that they ought to be falsifiable through experimentation. So this is what anyone trying to thread together the existing bits of data on MSCs has to keep in mind. But otherwise we are free to “shamelessly” test the limits of our creativity when constructing explanatory frames around the data. Within this context it is fitting to reiterate Niels Bohr’s famous saying, “We are all agreed that your theory is crazy. The question that divides us is whether it is crazy enough to have a chance of being correct.”³⁴

The central role of stories – reality-modelling frames – vis-à-vis any particular data is well reflected in Brian Lancaster’s insightful remark:

> “Whilst a defining hallmark of mysticism is the quest to experience a transcendent realm in whatever form the cultural canon allows, we find that probably the majority of mystical writings relate to the challenge of modelling whatever passes for reality, in both inner and outer aspects. [...] Whilst my psychological terminology may have the distinction of being more related to suggested causative brain processes than that used by [...] [the mystics], the central concern remains the same: namely, to generate explanatory models. We generally claim understanding of a process to the extent that we can effectively model it, and the terms of our model constitute the shared knowledge-base of our discipline.”³⁵

Thus, when it comes to accepting Andresen’s methodological challenge – instead of aiming right at the beginning for a seamless integration (which would naturally be the ideal but which is currently unachievable) – maybe we should start by investing more confidence in the extraordinary capacity of humans to find patterns and to construct meaning-creating stories out of those despite the fragmentarity of data. Language games are not closed systems. A systematic unifying metacognition over MSCs might not be achievable at present, but we can and should collect the “smaller stories” – in the hope of discovering a larger, unifying pattern in the data one day. This would free us from trying to

³³ A thought experiment to show how central narrative construction really is to human thinking: take three words – ‘car’, ‘night’, ‘blood’. Most people will have unwillingly constructed a story (however rudimentary) connecting these words at the instant the sequence is presented to them.


meticulously translate all the relevant concepts from one language game to another (which is an impossibility anyway) but still have a rudimentary analytical frame to handle topics of interdisciplinary interest.

So what if we cannot integrate all of the available bits of information on MSCs? Let us settle with less, then. And let us honestly admit the fragmentarity we are facing. There are ways to “sneak around” the gaps and still capture the “forest behind the trees”.

D. OUT OF THE BLACK HOLE AND INTO THE TREES

I have been discussing Andresen’s methodological challenge at such length for several reasons. First of all – based on Andresen’s thoughts it is crystal clear why no preset and ready-packed methods will ever work for coming up with a sound thesis on the MSC-sexuality link. After all, it has to be kept in mind that Andresen is talking only about the study of meditative states and the accompanying MSCs. If there are such huge methodological problems even within the study of MSCs, then it is difficult to even begin to imagine how to overcome the methodological challenge of comparing MSCs and orgasm.

A more important reason for discussing Andresen’s challenge here has, however, been to gain enough ground to be able to justify the analytical techniques I shall be putting forth below to overcome the methodological “vacuum”. As will become clear in the next chapter, I treat the fragmentariness of the existing data as an “incurable condition” when it comes to analyzing the MSC-orgasm link. However, I think that the fragmentarity may not at all be a “bad” thing. I plan to use the notion of fragmentarity as itself a heuristic device to face up to the methodological challenge of investigating the MSC-sexuality link.
CHAPTER II. TOWARDS AN OPERATIONAL METHODOLOGICAL FRAMEWORK

A. GAPPINESS

§ 1. “Laying the keel” – discontinuity and sense-making

My basic heuristic tool in facing up to the methodological challenge of investigating the MSC-orgasm link by making use of the already existing data is the concept of gappiness (or discontinuity). This might seem to be a strange statement. But it is perfectly workable.

Gappiness is the launching point of an approach called the Sense-Making Methodology (SMM). The approach has been under development, primarily by Brenda Dervin, since 1972. It originally grew out of Dervin’s work in communication research, but it has guided communicative approaches to research in various other disciplines, most notably information needs and uses.¹

While I shall not be explicitly discussing it in the following, it is still worthy of note that it is not entirely coincidental that an answer to Andresen’s challenge comes from communication research. After all, the fragmentarity of relevant data is rooted in the fact that there is little or no communication between the discourse communities involved.

In everyday life, sense-making is the process of orienting oneself in situations of high complexity, a motivated, continuous effort to understand connections (which can be among people, places, events etc.) in order to anticipate their trajectories and act effectively.² Gary Klein and colleagues explain that, basically, sense-making is a response to a recognized inadequacy or discontinuity of understanding and consists in the active two-way process of fitting available data into a frame (a hypothetical mental model of the situation at hand) and fitting a frame around the data. Neither the data nor the frames come first, the data evoke frames and frames select and connect data.³

Dervin’s SMM departs from the same "port" in seeing sense-making as a response to discontinuity – in this case conceptualized via the notion of gappiness. However, the role and meaning given to this response are somewhat

² Klein, Gary, Moon, Brian, Hoffman, Robert F. Making Sense of Sensemaking I: Alternative Perspectives. – IEEE Intelligent Systems, Vol. 21, No. 4, 2006, 70–73 (IEEE in the title of the publication refers to the Institute of Electrical and Electronics Engineers).
³ Klein, Gary, Moon, Brian, Hoffman, Robert F. Making Sense of Sensemaking II: a Macrocognitive Model. – IEEE Intelligent Systems, Vol. 21, No. 5, 2006, 88–92 (IEEE in the title of the publication refers to the Institute of Electrical and Electronics Engineers).
Dervin assumes gappiness (or discontinuity) to be an inherent challenge in human life-facing. Sense-making, then, is understood in terms of bridging these gaps (by habit, creative design etc.). The bridging of a gap, whether it sufficed or not, becomes embedded in the situational conditions for the bridging of another gap.4

There are two important leads to be taken up from this: (a) gappiness is a permanent element in human life-facing; (b) there are ways to bridge these gaps and make sense out of gappy situations. Therefore, Andresen’s complaint that the existing data on MSCs (and on the MSC-orgasm link) are fragmentary and deficient (or gappy) is, while true, almost uninformative since “working” with gappy information is a permanent condition in human life-facing and humans are very good at it. The interesting question is not whether the gappiness of the data can be overcome, it is what actual strategies could be used to bridge the gappiness, thereby coming up with a theoretical frame for the MSC-orgasm link.

In order to answer this question it is useful to first dig a little deeper into Brenda Dervin’s methodological considerations.

§ 2. An epistemology of uncertainty

Dervin’s SMM has been in constant development and reconstruction since its first publication in the 1970s. An overview book on its present state is a work in progress but Dervin has kindly provided a recent draft.5

Dervin starts from exposing a widespread implicit attitude among scholars that could be conceptualized in terms of methodological imperialism or even tyranny.6 This attitude is rooted in the fact that often a method (or a set of methods) becomes fixed and prescribed as “belonging” to a particular discourse community as the “right” way for research to be conducted within that community, or, even more rigidly, assumed to be “right” for “good science.”7

This, according to Dervin, leads to two outcomes: (a) the favored method becomes an unreasoned and hegemonic artefact; (b) there is no visible argumentation structure for addressing “method” differences dialogically (which in turn leads to unreasoned co-optation of methods between discourses).8

It is precisely the supposedly insurmountable differences in the data collection and analysis methods used in researching MSCs and sexual response that seem to lead one into an impasse when it comes to trying to synthesize the existing results. The impasse is actually produced not by the (admitted)

5 Dervin 2008.
6 My wording.
7 Dervin 2008, 2.
8 Dervin 2008, 2.
differences in methods – these can in principle be overcome via dialogue – but by the scholarly “power games” in which a method is uncritically prescribed as the warrant of “good science”, thereby turning it into a hegemonic artefact.

The point is clear enough – methods must not tyrannize research. A method for method’s sake is a dead end. Based on this recognition, Dervin sets out to find a more dialogical methodological path that would avoid the “imperialist” pitfalls. I am not sure if Dervin herself would agree but it seems that the epistemology that follows from her argumentation could be called an epistemology of uncertainty.

The latter could be summarized as follows: in our quest for a more dialogical, “imperialism”-free methodologies, we must move from ontological and epistemological assumptions based on principles of certainty to assumptions based on the ever-present movement between certainty and uncertainty.9 Given a changing reality and elusive interpretations of reality and experience, the ontological-epistemological relationship binds humans into an unending riddle. Communicating is what forges steps across this gap but in no absolute sense for the gap can never be absolutely bridged.10

In SMM these insights are taken into account. If in everyday human life-facing the bridging of the gap between certainty and uncertainty is done by communication (in the broadest thinkable sense), then why not in research? What about bringing the discourse communities into communication and dialogue? The SMM does just that. Dervin: the SMM has been developed as an inherently dialogic methodology.11 As a methodology, the SMM is intentionally multi-dialectical and “between the cracks”.12 It is informed by numerous research traditions and assumptions, many of which have been traditionally considered to be oppositional to each other.13

This is exactly what one needs when it comes to investigating the MSC-orgasm link and accepting Andresen’s challenge. The question, however, is – how does it work? Dervin’s idea is that one has to start from ordinary human beings as theorists, able to identify both the “nouns” of their worlds and the linkages between – the “verbs”. This is not, however, to posit any kind of “perfect” theorizing. On the one hand, all theorizing is at root interpretive and

9 Compare this position to John Henry Newman’s concept of illative sense (see sub-chapter B).
10 Dervin 2008, 8.
11 Dervin 2008, 7. A similar position has been defended by Andrew Newberg and Mark Waldman. They write: “We all must live between the extremes of absolute doubt and certainty, trusting that our beliefs bear some semblance to the nature of reality and truth. But, by acknowledging that our beliefs are, at most, a “best guess,” we can stay open to other opinions and views.” (Newberg, Andrew B., Waldman, Mark Robert. Why We Believe What We Believe: Uncovering our Biological Need for Meaning, Spirituality, and Truth. New York, Free Press, 2006. P. 38.)
12 Dervin 2008, 3.
has no direct access to the “real”.\(^\text{14}\) On the other hand, much of human “theorizing” is tacit, embodied\(^\text{15}\) and as yet unarticulated.\(^\text{16}\)

The imperfect nature of such theorizing is not a problem to be dealt with. Rather, it adequately reflects the permanent human condition which is that of uncertainty and gappiness. As was mentioned above – the gaps (and dialectical divides – when it comes to bringing diverse research traditions into communication) can never be bridged ontologically or epistemologically, gappiness and uncertainty will never “go away for good”. But provisional communicative bridges can still be constructed, however imperfect – in the process of the making of sense.\(^\text{17}\)

§ 3. The limits of applying the SMM to study the MSC-orgasm link

The metaphor of gappiness and gap-bridging is a tremendously useful tool when it comes to weaving together the diverse data one is faced with when analyzing the MSC-orgasm link. Also useful is the SMM’s positing of ordinary human beings as theorists. However, many of the more detailed components of Dervin’s methodological edifice are a no-fit. This is not surprising, given that the “standard” versions of the SMM are developed for dramatically different purposes (usually involving fieldwork) from the present one. Consequently, substantial parts of the edifice had to be dropped or reframed.

Considering the exploratory nature of the present project this would not be a problem if it were not for a specific warning given by Brenda Dervin to researchers interested in applying the SMM in their work. She complains that too often researchers co-opt bits and pieces of the SMM without comprehensive study of the methodological edifice.\(^\text{18}\)

Dervin’s concern is no doubt well grounded and understandable. However, given the level of specificity of the “canonical” forms of the SMM, the usage of

\(^\text{14}\) Newberg and d’Aquili offer a similar view as they argue in WGA, 171: “All knowledge, then, is metaphorical; even our most basic sensory perceptions of the world around us can be thought of as explanatory story, created by the brain.”

\(^\text{15}\) This, otherwise extremely cryptic idea becomes clearer if brought into connection with Lakoff and Johnson’s theory of cognitive linguistics. See subchapter C for a discussion of this.

\(^\text{16}\) Dervin 2008, 11. This argument is central in relation to the methodological strategy developed in the subsequent sections. Analyzing the MSC-orgasm link demands “literacy” in diverse fields, especially the neurosciences. If it were not for the arguments above, it would be very difficult to see on what grounds it is justified for a theologian as myself to even enter the discussion.

\(^\text{17}\) I emphasize that the dialectical divides are not bridged either ontologically or epistemologically. Thus, the described approach does not involve uncritically mixing discourses. The discourses are engaged into a dialogue but retain their basic and characteristic features.

\(^\text{18}\) Dervin 2008, 18.
only “bits and pieces” of the edifice is unavoidable when it comes to fields of interest very different from the SMM’s “home field” of communication research. Moreover, by restricting those interested in trying out parts of the SMM Dervin, too, becomes guilty of methodological imperialism. On these grounds I take the liberty of being quite selective with the SMM and using only the parts that are helpful as to the purposes of the thesis.

So, what are the parts that can be applied? First and foremost – the metaphor of gappiness. The initial research situation of the MSC-orgasm link is that of gappiness. There are bits and pieces of information found here and there but they are fragmentary, often completely unrelated and sometimes conflicting.

The bringing together of these bits and pieces of information, then, is an attempt to bridge the gaps involved, to make sense of the available fragments of data – by creating a cognitive model (on the scientific side of the project) and a spiritual map (on the interpretive, theological/religious side of the project) of the situation at hand.

The bridging of gaps can involve varying strategies. Dervin defines these as the ideas, thoughts, emotions, feelings, hunches, memories, values etc that the sense-maker turns to or constructs for gap-bridging. Note the openness of the list. According to Dervin, gap-bridging is seldom dependent solely on the intellectual capacities of the sense-maker. The bridge constructed or turned to is a “collage” of handy elements brought together to serve a particular purpose – bridging a gap.

In relation to studying the MSC-orgasm link, both the openness and purposefulness of the gap-bridging process are of major importance. They mean that the attempts to weave the existing data on the MSC-orgasm link together do not necessarily have to be limited to meticulous and air-tight argumentation. There is room for free associations, metaphorical-analogical reasoning and even emotions and values. Gap-bridging between diverse language games is, to a certain extent, unavoidably a work of art. A bridge relating the unrelated and fragmentary can be thought of in terms of a collage-like associative hypothesis, put together from diverse elements with a particular purpose in mind. That such a hypothesis is partly a work of art is not to be ashamed of. It is simply to be honestly accepted and taken into account. All the more so because discussing

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20 Dervin 2008, 18–19.

21 This link will be fully explored in subchapter B.

22 That in exploring mystical consciousness the “door” has to be left open for less stringent means of making associations is also affirmed by Andresen. She writes, “In the final analysis, it is only through metaphors and analogical reasoning that we are able to move between different modes and levels of analysis.” (Andresen 2001, 276.)
MSCs (and, indeed, love and sexuality) unavoidably carries spiritual and religious meanings and is therefore to a certain extent a spiritual enterprise.\textsuperscript{23}

In conclusion to this section: when it comes to gap-bridging in the case of the MSC-orgasm link there are several routes open. The particular strategies for bridging a particular gap will depend on the nature of the gap in question. No “right” way exists. Rather, the criteria are pragmatic – will the chosen strategy work, will it allow one to bridge the gap in question in a way that satisfies her (in this particular case – both scientifically and spiritually).

When it comes to a complex issue such as the gappy link between MSCs and sexual response, then if even a fraction of the complexity and layers of meanings involved are to be adequately addressed, one cannot hope for a particularly rigorous or straightforward strategy. It is fitting here to quote what Andresen and Forman have said about consciousness studies:

“That the field is so open-minded seems right and proper. After all, if there is one thing that is certain about consciousness studies, it is that we do not know the answers. We do not know how to think about consciousness, how it relates to the body, or how it might connect to anything beyond the body. We do not know if the final theory of consciousness will look like a formula, a brain diagram, a sentence, some combination of the three, or something entirely different. We do not even know the correct questions to ask.”\textsuperscript{24}

What Andresen is saying about consciousness studies, applies perfectly also to the problem of the MSC-orgasm link. Here, too, one has to keep an open mind and be attentive of potentially fruitful input from many fields, including arts. It is precisely with this latter idea that I shall proceed in the next subchapter.

B. JOHN HENRY NEWMAN, HIS ILLATIVE SENSE AND DATA COLLAGE

§ 1. Collage as a gap-bridging method

In subchapter A I provided an operational methodological framework that justifies the attempt to weave together diverse fragments of data and pieces of theory originating in unrelated language games – an attempt often criticized by philosophers. I now come to the question how to actually do it. That is – how to

\textsuperscript{23} I shall outline this argument in some detail in subchapter D. Based on the rationale given there I am convinced that any (scholarly) writing on the spiritual and mystical is itself a spiritual/mystical writing and can as such evoke (or dampen) spiritual insights. Therefore, one should think twice before performing sweeping intellectual reductions at the expense of the feelings of actual religious people: writings on MSCs are not just cognitive models, they are also spiritual maps.

\textsuperscript{24} Andresen & Forman 2002, 9.
select relevant pieces of data and how to bring them into connection. This is the topic of the subchapter at hand and subchapter C.

My solution to this problem is derived from a technique used in fine arts – collage. A collage (French coller ‘to glue’) is a work of formal art made from an assemblage of different forms, thus creating a new whole. An artistic collage may include newspaper clippings, bits of colored papers, portions of other artwork, photographs etc., glued onto canvas.

But a collage need not necessarily be an artistic one. One could, for example, think about the diverse fragments of data and pieces of theory originating in different language games as analogical to the diverse materials an artist may use in creating a collage. In artistic collages the diversity and incompatibility of the materials used is – far from being a problem – precisely what provides the artist the channel for creative expression. Maybe, then, one could use the metaphor of collage to describe the process of bringing the diverse fragments of data concerning the MSC-orgasm link together to create a new whole that carries meanings that the original components did not?25

The advantage of this view is that by thinking of the existing data on the MSC-orgasm link as materials for a collage the methodological difficulty with connecting them is at once overcome. The data need not be “normalized” in order to be fit into an emerging “composition”. The specificities of the data and pieces of theory are completely preserved, no “translations” are needed (these would be impossible to provide anyway). The only purpose is to create a new meaningful whole out of them – something that could be thought of as a “data collage”.

In thinking along these lines I am not alone. The idea has strong resemblances to the rationale behind John Henry Newman’s concept of illative sense (put forward in his Grammar of Assent [1870]).26 But there is a closer and more recent parallel by the artist and art scholar Madelyn Kim Starbuck – found in her doctoral thesis.27

In outlaying her methodological strategies Starbuck urges the reader to note certain typological similarities between the artistic technique of collage and Glaser and Strauss’ grounded theory approach. She says:

25 In fact, I think that most research conducted in the field of religion and science involves making use of a collage-like technique. Because the “materials” used are profoundly diverse and “seamless” integration is not possible. Moreover, Andresen’s proposed four-partite division of data accompanied by the appeal to integrate them can also be thought of in terms of collage.

26 Illative sense: the capacity of human mind to bridge logic gaps (compare to sense-making, above). The point is that in real life no conclusion follows from the premisses with logical certainty, one only has converging probabilities. To close the gap between converging probabilities and certainty, one needs illative sense.

“[Grounded theory can be thought of] as a method of data collage. Collage combines diverse components that the artist brings together. For a collage artist such as myself, grounded theory combines the creative attraction of collage with my academic training in observation, data collection, appreciation of tacit knowledge, data coding and analysis, and contributing to knowledge. I use grounded theory to build up a picture, or theory, from diverse meaningful fragments.”

Starbuck explains that a collage emerges as the artist builds up layers of juxtaposed elements by adjusting many parts until the composition is complete and then shows how the same can be said about grounded theory approach:

“In both grounded theory and collage techniques there are a number of things happening simultaneously. Pieces of the whole are moved around and put next to each other and moved away from each other to find their final relationship in terms of the composition. [...] Both grounded theory and collage are open processes but each produces a final product that is a multifaceted picture or theories of a situation.”

She concludes the argument by claiming that both collage and grounded theory provide a structure to navigate through many diverse sources of information, underlining the role of creativity, free associations, flashes of insight and sudden hunches in both cases.

The specificities of Starbuck’s research topic – correspondence art network – make it impossible to view her offered methodology as a template for the purposes of my analysis. In addition, I am not entirely convinced that the way she understands the Glaser and Strauss approach does justice to the methodology. But there is an important point to take from her argument: the use of collage technique is definitely not limited to fine arts – it can serve well in interdisciplinary research in which the relations of the available data are not clear and there is a need for “open” strategies. The fact that the final product of a scholarly (or data) collage is described in terms of composition rather than particular results is highly appropriate considering the exploratory nature of the thesis at hand.

Metaphorically speaking, one could think of the data from the brain-imaging studies on MSCs as, say, newspaper clippings of a collage artist; the phenomenological descriptions of MSCs could be likened to portions of previous artworks to be used in the collage; theories on, say, the physiological substrates of orgasm might be thought of as artefacts to also be glued onto the canvas etc. And as an end result, one would have a composition carrying a new meaning.

Naturally, a scholarly collage would have to meet certain standards. It would have to be coherent, have explanatory power and provide predictions (in this

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28 Starbuck 2003, 18.
30 Starbuck 2003, 26–27.
sense resembling to a scientific theory). It would also have to be open for testing. But it would still be a composition rather than a theory.

Another reason why I consider the collage technique to be appropriate for the present purpose is the above mentioned imperative that when it comes to analyzing the MSC-orgasm link there is always a spiritual/theological dimension involved. In other words, a hypothesis concerning a link between sexuality and MSCs may have a bearing on particular religious persons’ lives. Therefore, in addition to a cognitive model of the link a spiritual map has to be devised. The technique of collage provides ways to integrate these (and other) dimensions.

I hope the above discussion is sufficient to make it clear how even dramatically diverse data can be purposefully brought together to gain a bearing on each other. The next question, then, is how to decide what data to take and what to leave. In addressing this question, Starbuck’s ideas once again come in handy.

§ 2. The problem of sampling

If the technique to be used for analyzing the MSC-orgasm link is something like a scholarly collage, then the problem of sampling develops into a real nightmare. In an artistic collage this is simply a matter of an artist’s creativity. But in a scholarly collage the “data pool” has to be constrained. Flemming Christiansen warns: the way one selects and handles data must follow procedures that can be described and explained rationally. Which are the criteria for including and excluding material from the research? It depends on the particular research project. But the criteria must be explicit and they must appear relevant to other researchers. \(^\text{32}\)

Now, there is almost no solid data specifically concerning the MSC-orgasm link. Therefore, one is forced to enlarge the data pool to obtain enough “material” for the “composition”. This is “tricky business”. There are well over 400 studies concerning the neuropsychological correlates of meditation alone. Add to that the writings of the great mystics themselves, sexology literature and research into the psychological and physiological aspects of love and sexuality and one is already hopelessly astray. But considering that the present project is exploratory, a lot of additional, non-scholarly material should probably be included in the data pool as well.

Christiansen offers the following list to describe the types of material one should consider as potential data: documents, newsmedia texts, sound and images, letters, interviews, literary texts, field notes etc. His point is that it is the research topic that determines which of these types of data are relevant and how they should be treated. \(^\text{33}\) Unfortunately, this only works in the case of fairly well developed areas of research, not in the case of an exploratory data collage.

\(^{32}\) Christiansen 2008, 3.

\(^{33}\) Christiansen 2008, 2.
It is clear that the data pool has to be constrained somehow. But at the same time this cannot be done on a priori grounds because by deciding in advance what materials to engage and what not there is a danger of perhaps leaving out the most significant fragments of information – by the choice of an inappropriate prior “filter”.

It is for this reason that I think Starbuck’s surprising mixture of collage technique with grounded theory may not be simply a matter of taste or coincidence. Rather, it is a matter of simple practical necessity. I already mentioned that I find Starbuck’s interpretation of grounded theory in terms of collage somewhat irritating. But the appeal to grounded theory may be unavoidable when it comes to the question of data sampling in the case of an exploratory, collage-based research project such as the present one. For it is in Glaser and Strauss’ approach that a workable sampling strategy is found.

Starbuck points out that grounded theory research is guided by theoretical sampling. Theoretical sampling is an active process in which discoveries (made during data gathering, observation and literature review) direct the researcher to her next area of inquiry or potential data source.34 Or, to use Glaser and Strauss’ own words:

“Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges. This process of data collection is controlled by the emerging theory.”35

This strategy avoids the need to decide on a priori grounds what types of data to look for – the decision on what additional “materials” to use in the collage is made en route according to the purposes of the emerging composition. Theoretical sampling, therefore – to use Starbuck’s words once more – provides a means to carve a path through the data, to include or exclude facts, stories etc.36

In other respects beside the concept of theoretical sampling I see no need to appeal to the grounded theory approach (and will retain my skepticism towards Starbuck’s use of it). For the purposes of the present research project grounded theory is too “happily married” to social sciences. Moreover, as will become clear in the next chapter, the data grounded theory requires as input are of an unsuitable type and therefore – as was explained briefly in chapter I A – it would take an unjustifiable leap in reasoning to try to use the otherwise good methodology throughout my analysis. The use of theoretical sampling, on the other hand, is not limited to particular types of research and its co-optation within the present context seems to be more or less a practical necessity.

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34 Starbuck 2003, 21–22.
36 Starbuck 2003, 22.
What one arrives at, then, is a methodology that frankly admits the gappiness and fragmentarity of our understanding of complex phenomena but that nevertheless offers ways to provisionally bridge these gaps by constructing cognitive and spiritual models and maps via scholarly collage, collecting and selecting pieces of information as they become relevant to the emerging composition. While this methodology is not as rigorous as it maybe ought to be, it has the advantages of, first, being operational and, second, being adequate to handle the fragmentarity of relevant material.

C. METAPHORICAL ANALYSIS

There are two more methodological loci that need to be covered before we can move from methodology to outlining the particular method used in developing the later chapters of the thesis. The first of them – discussed in this subchapter – is that even though a data collage, as a composition, carries its own inherent message, there is a need to synthesize some of the elements in the collage to create further meanings. In other words, even though data collage allows one to legitimately bring otherwise unrelated fragments of relevant data into connection, it does not provide means to interpret the connections made (since part of the project is elaboration on the spiritual meanings of the created links, this is especially important). In conventional research language – we still lack a methodological basis for data analysis.

One tool that I think is consistent both with the above described gappiness/sense-making approach and the concept of scholarly collage is the so-called metaphorical analysis. The technique of collage – as is clear from the above – is based upon creating associations. Since metaphorical analysis, too, aims at creating associations (sometimes very far-reaching and surprising ones) and bridging gaps, it seems to fit naturally with the previously developed strategy.

Metaphorical analysis is a technique usually used in later stages of research and is developed by Michael Patton and Nick Smith. Its basic idea, according to Donald Ratcliff, is to interpret what is observed by trying to find fitting metaphors and analogies. For example, a hallway at a large school during a break hour can be thought of in terms of a busy highway: there is heavy traffic, at the intersections stand teachers as police etc. As such, metaphors can “translate” between diverse discourses and further help one deal with the methodological vacuum described above. Or, to use the collage analogy again, metaphorical analysis may be likened to the “glue” with which the different elements are fit and connected into the collage.

Ratcliff contends that the creation of and elaboration on metaphors is arguably the most enjoyable method of analysis offered by qualitative research.

38 Ratcliff 2008a, 2–3.
The researcher tries to find parallels between an aspect of what was observed and another, substantively unrelated phenomenon. Metaphors, similes, and analogies can produce powerful, creative linkages. One may “try on” several possible metaphors to examine how well they fit what has been observed in the research.39

The advantages of such an analytical tool are obvious within the present context. But perhaps the most fundamental rationale for co-opting metaphorical analysis for the purposes of the present project are theological/religious. Ratcliff notes that the technique is widely used in the Judaeo-Christian Scriptures. The first chapter of Lamentations, for example, offers ten different metaphors in quick succession, there are many metaphors in the book of Proverbs etc.40 Sallie McFague has even come up with a concept of metaphorical theology.41 This is not surprising considering the cognitively ineffable nature of who/what some people call God, others Brahma and still others a sick delusion. Religious language always has been and always will be metaphorical. Therefore, in a research project a substantial part of which involves theological/religious reflection, metaphorical analysis is a natural fit.

Metaphorical analysis – as it is used in the following – should not be confused with the analysis of metaphors which has sometimes also been called metaphor(ical) analysis and which goes back to George P. Lakoff and Mark Johnson’s seminal work.42 While the above described form of metaphorical analysis is simply an associative tool, the analysis of metaphors is a field of research in its own right. Still, a couple of remarks concerning Lakoff and Johnson’s approach are in place here since their work justifies the extensive use of metaphors in my thesis and helps to connect metaphorical analysis to the concept of gappiness.

First: Rudolf Schmitt has explicitly pointed out that one of the central advantages of Lakoff and Johnson’s approach is its potential for bridging the gaps between diverse scholarly disciplines by analyzing the metaphors used.43 Even though I shall not in the following be explicitly discussing the involved concept of cognitive linguistics, I do admit that by using metaphors for making associations between ideas rooted in different language games I implicitly rely on it.

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40 Ratcliff 2008b, 178.
Second: it is only thanks to Lakoff and Johnson’s ideas that it is justified to think of scholarly conjectures in terms of metaphors. As will become clear in Part Two of the thesis, to a certain extent the confusion surrounding the MSC-orgasm link has to do with the question which one of the metaphors on the “market” describes the link best. In this sense, again, my analysis implicitly relies on Lakoff and Johnson’s ideas.

Third: Lakoff and Johnson’s approach is also reflected in my work in the fact that I have based my whole methodological strategy upon a concept that is openly and explicitly a metaphor – gappiness. According to Schmitt, any research implicitly depends on metaphors. He even paraphrases Lakoff and Johnson’s famous title *Metaphors we live by* as *Metaphors we research by* to illustrate the claim. I therefore consider it better to “drag” these metaphors honestly out into daylight to avoid confusion in this respect.

But there is one more aspect that needs to be dragged out into daylight when it comes to devising an operational methodological basis to handle the MSC-orgasm link. It is the reflexive element any writing on MSCs or sexual response always carries.

**D. THE REFLECTION-REFLEXION AXIS IN ANALYZING MSCs, LOVE AND SEXUALITY**

As was explained in subchapter C, a substantial part of the present work involves theological/religious reflection and interpretation. In the case of trying to methodologically “harness” the MSC-orgasm “beast” this fact hides a “hook” in it. The problem, as Jeffrey J. Kripal has convincingly shown, is that every reflection (including scientific writings) on mysticism (and, consequently, MSCs) is itself also a mystical text. Kripal uses Evelyn Underhill’s classical account on mysticism as an example to drive this point home. The same is, no doubt, true about writings on sexuality and love: any writing on eroticism is itself also erotic. We thus face a curious methodological Möbius strip when it comes to reflecting on the nature of MSCs, sexual response and the relation between the two.

One of the main reasons of why writing on mysticism unavoidably results in yet another mystical writing is that no matter how hard one tries to remain detached and “objective”, the text unavoidably acquires a reflexive dimension. This is clearly true of mystical and eroticism-related writings and probably true of all writings analyzing experiential qualities.

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44 See chapter VIII – both the concept of byproducts and exaptations that I shall be discussing are, in fact, metaphors.
47 Kripal 2001, 72.
For this reason it seems appropriate to speak of a reflection-reflexion axis when it comes to analyzing MSCs and eroticism. Any writing on either topic will unavoidably have reflexive elements. The difference between a “scientific” writing on, say, MSCs and a mystic’s writing on her own experiences, then, being the degree to which reflexion “rules” over (detached) reflection.

Methodologically speaking, the reflexive element should not be thought of as a hindrance to be dealt with. Rather, it is a facet of the analysis to be honestly admitted and brought to daylight. Reflexivity does not necessarily “hurt” the scholarly rigour or quality of the analyses of MSCs, eroticism and their link. In fact, as will become clear in the final part of this thesis, detachment is actually non-advisable when it comes to writing on topics such as love, sexuality or mysticism. Jonathan Lear has convincingly shown this while discussing the Freudian psychoanalysis and the doctrine of libido.48

Without a certain amount of personal engagement and introspection, at least in these fields of interest, there is a very real danger of completely missing the target. For example, there are scholarly writings on zen in English written by people who have not themselves had any kensho’s or satori’s that the actual zen masters claim to have nothing whatsoever to do with zen. And what to think of a sexology scholar who has never engaged in sexual activities? However, in order for a writing on mysticism or sexuality to retain its scholarly rigour, the reflexive element has to be kept in check.

The reflection-reflexion axis enters the analysis of the MSC-orgasm link on yet another level. In investigating this link the analyst is bound by her own experiential history – with no way out. One finds oneself as a researcher already engaged in a particular research situation and there is no simple way to step out (Greek ek-stasis – compare to the mystical ecstatic states described in chapter IV) of the “game” and then start taking “objective” notes.49 To paraphrase Otto Neurath’s famous and often-cited sentence – the analyst’s situation can be likened to that of a sailor who has to rebuild the ship at sea while staying afloat in it.50 The ship, within the present context, is the analyst’s experiential history, from “aboard” which she interacts with the world. There is no way to simply discard it. There is no way to cut the analyst’s own experiences out of the analysis.

Again, this is not a problem to solve, this is something one has to be aware of when discussing the MSC-orgasm link. Constructing universal and detached metacognitive schemata on this subject would demand one’s stepping out of history to get a God’s eye view. That simply cannot be done. For the time

being, one has to settle with less. The strategy of trying to find the appropriate places for the diverse fragments of data and bits of theory (in terms of a collage composition) is, I think, a perfectly acceptable methodology for the analysis below. Especially considering the ever-present gappiness and the incompatibility of relevant language games when it comes to the MSC-orgasm link.
CHAPTER III. HARNESSING THE “BEAST” – FROM METHODOLOGY TO METHOD

A. ANOTHER GAP!

Dervin comments that as research stands today, methodology is usually reduced in quantitative studies to mere method and in qualitative studies to philosophical explication. She points out that in both cases there are yawning gaps that remain between the (methodological) assumptions and the hows of methods.¹

I have noticed the trend, too, and am definitely “guilty” of neglecting this gap when it comes to my previous research papers. So what I shall do in this chapter is describing the “hows” and actual steps taken during the preparation of the below analysis while at the same time showing how these steps follow from or relate to the general methodological framework provided above.

It must be pointed out right away, though, that the following description of the research procedure does not reflect the actual temporal sequence of the steps taken. It is so organized for the sake of maximum structural clarity. In real life, the research phases intermingled to a considerable extent. Ratcliff has rightly pointed out that in qualitative research the phases of data collection and data analysis often merge – emerging theoretical insights will lead back to data collection and the newly discovered data will, in turn, lead to new theoretical insights.² Therefore, the following is to be read as a reflective report, a simplifying reconstruction of a complex and integrated process through which I tried to overcome the gappiness involved in making sense out of the MSC-orgasm link while staying coherent both methodically and methodologically.

B. PROCEDURE

§ 1. Defining the initial data

Whatever method one uses in her research, the first step is always unambiguously defining the starting point. In the present case, this was done by simply referring to a text passage (pp. 123–126) by Newberg and d’Aquili in WGA. The only reason for defining the starting point this way is that it was in this passage that I first encountered the hint on there being a close neural link between the human capacities for entering mystical states and for experiencing orgasms.

To justify the choice of the starting point this way may seem naïve. But it is perfectly reasonable when thought of in terms of the methodology described above, especially considering its links to the grounded theory approach. In grounded theory (as in sense-making) one starts from a particular research

¹ Dervin 2008, 4.
² Ratcliff 2008b, 163–165.
situation she finds herself in and then works from that. In this case, the WGA 123–126 text passage functioned as the initial research situation I found myself in. And I then worked from that.

The WGA 123–126 text block presents a more or less monolithic narrative on the origin of religion that is based on the MSC-orgasm link. The first procedural problem, therefore, was how to get from the level of “story” in WGA 123–126 to the data and conceptual structures behind it.

The method of theoretical sampling implied by my methodological strategy requires as input at least rudimentary theoretical insights. These are gained by closely observing “what is going on” – after a while one starts to notice patterns and will then know what to sample for. In the present case this meant “observing” Newberg and d’Aquili’s co-authored texts until the patterns of thought and data relating to the MSC-orgasm link started to repeat themselves and no new information was forthcoming.³

At that point I closed the initial dataset by excluding the texts that had no relevance to the repeating patterns associated with the MSC-orgasm link. As to the included material, also the external reference texts mentioned in the relevant passages were incorporated as potential data.

Besides providing enough interpretive context to evaluate Newberg and d’Aquili’s specific claims in relation to the MSC-orgasm link and the means to define the initial dataset for the thesis, the procedure resulted in enough theoretical insights to code the WGA 123–126 passage.

§ 2. Coding

Coding is a procedure widely used in qualitative research. The basic idea is simple. According to Ratcliff – based on your own expertise: (1) look at your source document; (2) locate the indicators of the relevant categories; (3) code them by giving them a name; (4) mark them on the document.⁴ Basically, then, coding is about devising key words or key phrases to describe significant links.

My coding of the WGA 123–126 passage, however, was done keeping in mind the basic purpose of locating relevant data elsewhere. The codes were – considering the purposes of locating more data by running them through a search engine (see § 3 on this) – designed so as to be sensitive to data elsewhere that might have a bearing on the question of the MSC-orgasm link.

It is important to note here that one’s coding is directly dependent on one’s theoretical understanding of the phenomenon under scrutiny. Therefore, in some cases it may be be possible that extensive pre-existing knowledge about the phenomenon under scrutiny “contaminates” one’s coding. This is why scholars

³ The criterion of ‘no new information forthcoming’ or saturation is generally accepted in qualitative research as an indicator that the boundaries of a phenomenon have been tapped and that the particular research dimension is adequately covered.

⁴ Ratcliff 2008a, 1.
using grounded theory engage in reading secondary literature only after it becomes necessitated in terms of their emerging theoretical insights on a subject and not before.

In the present case there was no such danger. The need for going through as many Newberg and d’Aquili’s texts as possible at once was rooted in the fact that there was not enough information in WGA 123–126 alone to enable adequate coding.

§ 3. Acquisition of additional data

Except for the initial source texts that were already implied by the way the research topic and initial data were delineated, all data were acquired by theoretical sampling. As the use of theoretical sampling is directly mandated in the methodological strategy described in chapter II, there is no need to justify its choice here.

The data were located by two means: (a) following the references found in the source texts; (b) keyword search, using as keywords the codes resulting from coding the initial data (source texts) described above. The data were then theoretically sampled (according to relevance to the emerging theoretical conjecture).

Except for the initial source texts, the keyword search was performed by feeding the keywords into a standard Google World Wide Web search engine. The rationale behind this was that since in the case of the MSC-orgasm link the most relevant data are likely to be found in scholarly journals and since most major scholarly journals have electronic versions that can be content searched, one can this way obtain a list of materials most closely relating to the research problem as defined via the initial source texts.5

As a control to determine how reliable this procedure was in bringing up relevant data was how successful it was in locating Newberg and d’Aquili’s own research papers that were included as the initial source texts. Since I had previously already gone through these texts, I also knew in which ones the keywords would be found. The reliability of the search method could thus be indirectly estimated by how successful it was in locating the correct texts by Newberg and d’Aquili.

The materials thus located were then included or excluded – as data – according to the principles of theoretical sampling. In many ways – as shown in chapter II – the use of theoretical sampling is a matter of practical necessity when it comes to using search engines to locate one’s data. As anyone who has

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5 Since my research topic is so multi-disciplinary, it is difficult to imagine how to pinpoint the relevant material without making use of search engines. It would be physically impossible to locate these materials by sifting through the journals of all the relating scholarly fields or stay current enough in all of them in order to devise a rational strategy to limit the search.
ever used the Google engines will be able to testify, there are thousands of hits to searching for almost any keyword. The devastating diversity of the results is greatly reduced by applying formal restrictive criteria such as including only the “hits” that refer to texts in academic publications as potential data. But even so decisions need to be made as to which of the materials to actually include for further analysis. And – to use Madelyn Starbuck’s words (in addressing a similar dilemma) – it is in theoretical sampling that we find a suitable system to “carve a path” through the data, a system that invests confidence in the researcher’s competence in evaluating the search results based on her knowledge of the field of study and the relevance of the new information to the research questions.

The term ‘theoretical sampling’ was coined by Barney Glaser and Anselm Strauss in 1967 to describe the process of choosing new research materials to compare with those that have already been studied. Theoretical sampling can be viewed as a technique of data triangulation – using independent pieces of information to get a better fix on something that is only partially known or understood. Thus, the technique is well fit both in terms of the MSC-orgasm link studied and the overall methodological approach described above.

However, there is a “hook” about the technique that needs to be exposed in order to avoid misunderstandings. It hides in the similarity of theoretical sampling to selective/purposeful sampling. Imelda T. Coyne describes the problem as follows: selective/purposeful sampling is a practical necessity that is shaped by the time the researcher has available to her, by her framework, by her starting and developing interests and by any restrictions placed upon her observations by her hosts. The logic and power of selective/purposeful sampling lies in picking out information-rich cases for study in depth. Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research. As the study progresses, new categories may be discovered which lead the researcher to more sampling in that particular dimension.

6 Not a particularly reasonable restriction in the case of investigating the MSC-orgasm link. The most information-rich materials may include intimate postings by mystical practitioners, esoteric literature, statements by scholars that would never be offered for publication in scientific journals etc. Also, constraining the data pool by such a criterion would violate the principle of openness following from the methodological strategy described in chapter II.

7 Starbuck 2003, 22. Note how such “investing of confidence” fits with the positing of ordinary people as theorists discussed in the methodology sections above.


Coyne continues by pointing out that this further sampling in a particular dimension based on an emergent theoretical category sounds similar to what happens in theoretical sampling. However, even though in both selective/purposeful and theoretical sampling a calculated decision is made to sample for only certain specific types of material, the crucial difference is that in selective/purposeful sampling the decision is made according to a *preconceived and reasonable initial set of dimensions which are worked out in advance for a study*. In theoretical sampling, however, the analyst cannot know in advance precisely what to sample for and where it will lead her. The decisions on this are made according to the demand and purposes of the *emerging theoretical conjecture.*

It is because of this latter aspect that my sampling technique should be conceived of as theoretical rather than selective or purposeful. At first glance it may seem that my thesis is a hypothesis-driven one and that therefore theoretical sampling (which is defined in terms of emergent theory) cannot be used for its purposes. This is not true. Even though Newberg and d’Aquili’s claims about MSCs being evolutionary byproducts of human sexual development look like a hypothesis, they really are not (as explained in the main introduction to this volume). Within the present context, they are to be viewed simply as a starting point and not as a hypothesis to be refuted or confirmed by the end of the volume. In terms of grounded theory they can be thought of as representing the initial research situation the investigator finds herself in and to which she turns in the initial stages of her work to form the first elements of the emerging theory with the end goal being providing an emergent, research-based account on the intersections between human sexual response and MSCs.

There is one more aspect to data acquisition that needs to be covered – the issue of required sample size. In theoretical sampling it is usually determined by making use of the concept of redundancy (or saturation) – the amount of materials in a particular research dimension that need to be studied before new information no longer comes up (indicating that the boundaries of the phenomenon under investigation in that particular dimension have been reached). In the case of this project the criterion of redundancy could not be used because the available data were too sparse to lead to saturation in any dimension. Therefore, the sample had to be left open. This was in good accordance with the epistemology of uncertainty discussed in chapter II and the exploratory nature of the thesis. The final sample of data formed step by step, continuously and as necessitated by the demand of the emerging “composition”. It is represented by the bibliography list of the thesis.

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10 *Coyne* 1997, 624. The explanation of the distinction is based on: *Glaser, B. G. Theoretical Sensitivity*. Mill Valley (California), Sociology Press, 1978. P. 37. It is because of this distinction that one cannot view the concept of theoretical sampling as completely independent of the grounded theory methodology.
§ 4. Data analysis

As already mentioned (and as is typical of research conducted using theoretical sampling), the phases of data collection and analysis cannot be clearly distinguished in the case of the present project. Rather, one is to think of what Ratcliff has called the qualitative research circle, a circle in which analytical insights lead to additional data collection/sampling and the new data provide new analytical insights.\(^{11}\) Therefore, the description of the used analytical technique this section provides is not to be understood as if there had been a specific phase in the preparation of the thesis during which I no longer sampled for data and only analyzed them. The only reason for drawing a line between the procedures of data collection and analysis is structural clarity.

In very broad terms – data analysis progressed on two interrelated and simultaneous planes: (a) scholarly debate, (b) religious reflection. The provisional distinction between these two planes is represented in the finished thesis by the division made between Part Two and Part Three. Metaphorically speaking, Part Two could be characterized as being a cognitive model of the MSC-orgasm link, whereas Part Three is more of a spiritual map.\(^{12}\)

To a limited extent this distinction also holds on the level of the analytical techniques used. The overall methodological strategy described in chapter II directly mandates the use of data collage and metaphorical analysis as analytical tools. Consistently with this, both techniques were used throughout the data analysis. However, metaphorical analysis had a far greater role in Part Three than in Part Two. It is one thing to link the elements in the dataset in order to arrive at a satisfactory theoretical “composition” (in terms of collage) or cognitive model and another to interpret the formed links in terms of a spiritual map.\(^{13}\)

Technically speaking, the analysis progressed in three major steps. The first of these consisted in coding the initial source material\(^{14}\) and working through the related texts by Newberg and d’Aquili. This “working through” was guided by the keywords obtained via coding and done by applying the traditional scholarly techniques of source and textual criticism. This allowed for a preliminary evaluation of Newberg and d’Aquili’s core statements concerning the MSC-orgasm link and provided a background context of immediately related research to be engaged in the analysis. The set of thus “weighed” elements of theory were then brought together (in terms of a collage) to obtain a rudimentary theoretical conjecture on the MSC-orgasm link to be used for further data sampling.

\(^{11}\) Ratcliff 2008b, 163–165.

\(^{12}\) Again, these phrases refer to the title of: Andresen & Forman (eds.) 2002.

\(^{13}\) I would like to emphasize that such distinguishing between two levels of analysis is deeply provisional as the gap-bridging done by ordinary people as theorists (the process upon which the analytical technique used in this thesis is based [see chapter II]) is always purpose-oriented and ad hoc.

\(^{14}\) See § 2 above for reference.
The second major step of analysis consisted in reviewing, critiquing, modifying and synthesizing the material obtained as a result of additional sampling that was guided by the theoretical conjecture arrived at during step one of the analysis. The gappiness involved in bringing together the often unrelated pieces of data was overcome according to the principles described in chapter II. The links thus created were then pasted into the original theoretical conjecture. The resulting collage, presented in Part Two of the thesis, provides a hypothetical cognitive model of the MSC-sexuality link. It is testable and offers several leads and predictions for future, more specified research into the subject matter. As such, I think it passes the conditions for being considered a research-based scholarly hypothesis on the the MSC-orgasm link.

The third major step of analysis – presented in the third part of the thesis – consisted in a religious/theological reflection on the devised cognitive model. The harsh (sometimes reductive) claims made in the exposition of the model have direct implications for faith and spirituality. Besides, to claim anything about there being an inherent link between religiosity and sexuality is spiritually a very strong statement. Anyone making it should responsibly weigh the implications.\textsuperscript{15} Hence the need for a spiritual map to complement the model. The analytical technique (and its methodological rationale) for devising the map was the same as in the second step above, the only difference being the somewhat more central role of associative and metaphorical reasoning in bringing the collage together.

\section*{C. IN CONCLUSION OF PART ONE}

\textbf{§ 1. An apology concerning the insufficient rigour of the method}

It might be claimed that in some respects my methodology and method are unscientific because they lack in strictness and rigour. I do not wish to engage in a thorough debate over this but a short apology is still in place. I would urge the potential critic to consider the general situation (in respect to operational methodologies) in the field of religion and science. Imagine a neurologist criticizing, say, a literary critic’s interpretation of a poem as being unscientific since the standards of strictness of the interpretive methods used are nowhere near those common in neurology. This would be quite absurd. The standards for something to count as scientific knowledge are very different in these fields and the results in one area cannot be evaluated by appeals to the scientific standards

\textsuperscript{15} Detached perspectives are limited and dangerous for several reasons. For a discussion of this in relation to the MSC-orgasm link, see chapter II. Based on those considerations I think that even though on the scientific plane of the thesis theologically interpreting the connections discovered might well seem premature, it is not premature on the spiritual plane.
of the other. This results in the untranslatability, gappiness and methodological vacuum between the two “language games”.

In the field of religion and science one has no other option but to try to deal with this gappiness and untranslatability somehow. There are not many working gap-bridging strategies available here, and none is strict and rigorous – the fragments of knowledge originating in different language games are simply too different.

The basic gap-bridging method in religion and science has been a communicative one – genuine dialogue. My collage technique can be viewed as an elaboration on this method – bringing various data fragments together into a collage is a way of engaging the otherwise unrelated pieces of knowledge in “talking to each other”. Unavoidably, the bridges thus created are provisional. But so are all other dialogically formed links and, indeed, all links in religion and science.

What I am aiming at is that the question whether my method is rigorous enough or not cannot be addressed by appealing to the standards of strictness common in any of the scholarly disciplines from which the data and concepts used in my thesis are taken. It must be addressed from the religion and science perspective which is one that values dialogue and communication (both on the level of individuals and ideas). My collage method provides fairly elaborate ways to promote the cohesion of ideas and dialogue. It provides a way to at the same time: (a) honestly admit the incurable gappiness involved in trying to bring ideas originating in different fields into communication – without having to forcefully “convert” one type of knowledge into another and honoring the different standards common in different disciplines; (b) clear enough common ground for meaningful debate and dialogue to be possible.

I thus think that, judged from the perspective of religion and science, both my overall methodological strategy and the particular methods used meet the presumed quality standards.

§ 2. A final vignette

Looking back at the process of arriving at the above methodology and method – at one point I realized that in fact they, too, are derived through a process very similar to collage. This is not surprising, given that I was trying to construct a method to fit the nature of the data and given how multi-faceted and fragmentary the data were.

Once I realized this, I quickly also noticed other similar convergences. For example – the set of source materials used for the “methodological collage” is derived clearly by theoretical sampling. Also, the bringing of together of the usable bits and pieces of existing methods and their further interpretation in
order to connect (or make sense out of) them involves gap-bridging, largely via associative and metaphorical reasoning.\textsuperscript{16}

I do not think this is a vicious circle. Rather, as said above, the peculiar circularity (resembling a Möbius strip) in this case is the result of the fact that the methodology was developed to fit the nature of the data, meaning that there was no way to decide on \textit{a priori} grounds in favor of one or another ready-made tool.

This said, I think I can now turn back to the opening metaphor of Part One and conclude: I think I have harnessed the “beast”.

\textsuperscript{16} It is on these grounds that I have taken the liberty of using a lot of metaphors, analogies and similes in the part of a thesis that would normally be the most rigorous and grave one – the methodology/method part. Their use is mandated by an appeal to methodological consistency – if the methodology described is itself devised via a process similar to what it presents as justified, then why not use all of its elements in its explication?
PART TWO:  
The Mystical and the Sexual as Evolutionary Bedfellows – a Cognitive Model

“Here in this well-concealed spot, almost to be covered with a thumbnail, lies the very mainspring of primitive existence – vegetative, emotional, reproductive – on which, with more or less success, man has come to superimpose a cortex of inhibitions.”

– Harvey Cushing, 1869–1939

CHAPTER IV. AN OVERVIEW OF NEWBERG AND D’AQUILI’S NEUROPSYCHOLOGICAL APPROACH TO MSCs

A. THE SPANDREL ORIGIN OF MSCs ACCOUNT

The idea of there being something remarkably similar in mystical and sexual experiences – whether expressed in the form of vague hunches or elaborate theories – is, of course, not at all new. Since times immemorial (remember the rites of hieros gamos, say, in Ishtar’s cult of ancient Babylonia), people involved with religion and mysticism have perceived that the two are somehow correlated (either positively – as in the case of some tantric practices that use sexual activities to elicit spiritual experiences, or negatively – as in the case of various practices of mortification of the flesh in which carnal desire is seen as the main skandalon or stumbling block on the way to experiencing the spiritual).

Take, for example, the notorious Sigmund Freud. Not only did he assume there was a link between sexual desire and and religious behavior – he put forward a sweeping hypothesis that the whole of human culture is fundamentally fueled by the sublimation of sexual (libidinal) drives. The general idea is that since the “energy” that cultures and societies rely on to keep running is originally given as the libidinal drives of the individuals, societies need to “tax” (or control) these drives. As a result of the enforcement of control, the original sexual desires of an individual are lived out via socially acceptable nonsexual

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activities (e.g., painting) – they are sublimated. Therefore, almost any cultural activity will necessarily have sexual connotations. Religious, spiritual and mystical practices are no exception.

Freud’s theories are currently out of favor (to the relief of most theologians), yet there are trains of thought emerging in the cognitive neuroscience of religion that point in the direction of there being at least a degree of truth in some of his central concepts. To my knowledge, these trains of thought are nowhere more clearly or more openly represented than in the speculative argument by Newberg and d’Aquili referred to in the previous chapters as the initial source text for the present thesis – that is, in the section titled Absolute Unitary Being, Evolution, and Self of WGA. As already mentioned, this text presents a more or less monolithic narrative on the evolutionary origins of MSCs that is based on the idea that the mind’s “machinery of transcendence” originally evolved for mating and sexual experience. In other words, MSCs are an evolutionary byproduct or spandrel of orgasm, this, then, explaining the curious links between the mystical and sexual that many people have noticed. This account is central from the perspective of the argumentation below. Therefore, allow me to now recap it in more detail.

In WGA, the section on the evolutionary origins of MSCs is located right after the presentation of the likely neurological mechanism underlying the human capacity for such states. The logic of this positioning is that once one has shown that there is a complex and intricate pattern of brain activity that is characteristic specifically of mystical states, a nagging question arises: why would the human brain, which – according to Newberg and d’Aquili – evolved for the pragmatic purpose of helping us survive, possess such an apparently impractical talent? What evolutionary advantage would a mystically “gifted” brain/mind provide? Newberg and d’Aquili do not hesitate to ask these questions and answer them. They argue that the mind’s ability to enter MSCs did not evolve specifically for the purpose of spiritual transcendence: evolution is pragmatically short-sighted, favoring adaptations that provide effective survival advantages in the practical here and now. Adaptations that increase an organism’s chances of survival are genetically passed along, those that do not are ruthlessly winnowed out. And since it is difficult to see what immediate survival advantages the capacity for MSCs would provide, it is likely that the ability has “piggybacked” on one or another simpler neurological process that evolved to address basic survival needs.

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2 Compare this view with Gould and Lewontin’s concept of spandrel (chapter VIII) and the related idea that many of the higher functions of human mind represent secondary utilizations of structures that have evolved to address more basic survival needs. The Freudian project is in accordance with these views.

3 The overview is based on: Gay 1992, 7–8; 36.

4 WGA, 123–127.

5 WGA, 125.

6 WGA, 123–125.
To identify the particular “simpler process” Newberg and d’Aquili then point at the often obviously erotic language used in mystical writings as suggestive of a neural link with reproductive behaviors and orgasm. In an evolutionary perspective, this makes the capacity for MSCs a byproduct since the neural structures and pathways involved in the generation of MSCs, according to Newberg and d’Aquili, primarily evolved to link sexual climax to the powerful sensations of orgasm. In backing up their argument, they point out, for example, that the “mechanism” of orgasm is activated by repetitive, rhythmic stimulation and that orgasm requires simultaneous discharges from both the sympathetic and parasympathetic nervous systems (a rather unusual neural state). This is significant, since according to the theoretical model of MSCs presented elsewhere in WGA (and in several other publications by d’Aquili and Newberg) such simultaneous activation is one of the most decisive components in the generation of MSCs, too. Newberg and d’Aquili thus contend that the neurobiological mechanism associated with MSCs arose from the mechanism of sexual response. Thus, MSCs can be viewed, from an evolutionary standpoint, as accidental by-products or spandrels of the human orgasmic capacity.7

In conclusion of their argument, Newberg and d’Aquili explain that the “byproduct origin” of MSCs does not diminish their meaning or “truth”. Many of the brain’s most sublime and sophisticated functions evolved from humbler neurological processes. The complex cognitive abilities that enable one to appreciate music or create works of art, for example, developed from simpler neural structures that evolved to address mundane survival needs but this does not diminish the beauty or the “truth” of music or art.8

What the argument really amounts to is an evolutionary biological account on the origin of religion. It is, for that matter, an account that is in excellent accordance with Freudian views. Paradoxically, it also “rings a bell” in Christian theology, since God is supposed to be love and love, in turn, is closely related to sexuality. But what should one think of the argument? Can it withstand any degree of serious critique? Can it be developed – from the level of an educated narrative (the authors themselves call it a speculation) to that of a scholarly hypothesis? And, provided that such a hypothesis can be devised, what would it imply religiously?

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7 WGA, 125.
8 WGA, 126.
B. A SOMEWHAT HISTORICAL PERSPECTIVE ON THE IDEAS INVOLVED

§ 1. Ad fontes!

In order to understand what the grounds are, on which Newberg and d’Aquili argue for there existing a neuro-evolutionary link between the mystical and sexual, it is necessary to have an understanding of not only their MSC model (and the theoretical considerations behind it) but also of how the relevant ideas developed over time. The latter is especially important since the claims made in WGA on MSCs being evolutionary byproducts of sexual response are in many ways inaccessible unless related to the relevant argumentation structures found in the earlier versions of the model.

According to Carol Albright, “Eugene d’Aquili was a visionary, a pioneer, and a stubborn soul, who followed his religious and intellectual calling along a path that was largely untraveled.” The initial phases of the “journey” were “bumpy”. In an endnote to Why We Believe What We Believe Newberg explains that the project finally got under way largely thanks to Zygon: the Journal of Religion and Science. Other early explorers in the field were Roger Sperry, Colwyn Trevarthen, Solomon Katz, Herbert Benson, Victor Turner, Laurence McKinney and James Ashbrook. It was Ashbrook who first used the term neurotheology (in 1984) to describe their general line of research. Newberg joined d’Aquili in 1991 and took over in leading the project after d’Aquili’s death in 1998.

The basic parts of the philosophical and methodological groundwork for the model (as it stands today) were worked out in 1974 when Eugene d’Aquili and Charles Laughlin published their Biogenetic Structuralism. Even though the more recent versions of the model (as presented, say, in WGA or Why We Believe What We Believe cannot be said to linearly depend on the theory of biogenetic structuralism, there is still strong kinship.

The basic tenets of the model itself have been developing gradually since 1975 – when d’Aquili and Laughlin published The Biopsychological Deter-

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13 Newberg & Waldman 2006.
The goal behind the model, according to Newberg, was not merely to develop a detailed theory but also to explore its implications for theology, philosophy and the sciences since it is important to find a method to integrate the religious and scientific perspectives of reality, in order to uncover the true nature of our universe and how we relate to it. Given the more than 30-year history of some of the below ideas and the giant technological advances in the neurosciences during this period, it is rather surprising how well the model has “held up” and how “fresh” it still is.

Schematically, Newberg and d’Aquili’s central idea is that MSCs – regardless of their particular type and the means through which they are attained – are characterized by a distinct pattern of interaction between:

(a) the autonomic nervous system (ANS),
(b) temporo-limbic structures,
(c) the posterior superior parietal lobule (PSPL) and
(d) the prefrontal cortex (PFC).

This pattern of interaction, in turn, depends on the phenomena of:

(e) functional deafferentation and
(f) hypothalamic “spillover”.

To approach these cryptic statements from a historical point of view – d’Aquili first set out on his quest for the physiological substrates of religious and mystical experiences with only elements (a) and (f) of the above schema by adopting a pioneering model of mystical states put forward in 1972 by Ernst Gellhorn and William F. Kiely. (By the way, the latter model has pretty much become a classic and continues to be used by many researchers investigating the neural substrates of altered states of consciousness.) Gellhorn and Kiely’s point was that altered states of consciousness – mystical or not – can be best explained by unusual functioning of the ANS, ‘unusual’ in this case meaning simultaneous discharges of the parasympathetic and sympathetic subsystems of the ANS that usually act “antagonistically” (an increase in one’s activity leads

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17 Gellhorn & Kiely 1972, 399–405. To be precise, d’Aquili did use – from the very beginning – bits and pieces of material in his theorizing that came from the then relatively new split-brain research and that were later used in formulating the doctrine of PSPL deafferentation (elements [c] and [e] of the schema).
to a decrease in the other’s activity).\textsuperscript{18} It is this \textit{simultaneous discharge} that Newberg and d’Aquili refer to when they write about hypothalamic “spillover”.

As I shall point out in the next chapters, the “spillover” concept plays a key role when it comes to Newberg and d’Aquili’s linking of the generation of the MSCs to sexual orgasm. It is therefore useful to look into it a little deeper.

\section*{§ 2. The “spillover” concept}

At first glance, explaining altered states of consciousness via activity – however peculiar – in the ANS does not seem to make much sense. How could a part of the nervous system that has a basically \textit{vegetative} function be held to be responsible for eliciting extraordinary states of \textit{consciousness}? Here, both Gellhorn and Kiely and Newberg and d’Aquili turn to an idea that was first put forward by the Nobel Prize winning Swiss physiologist Walter Rudolf Hess (1881–1973) in 1925\textsuperscript{19} – the influence of the parasympathetic and sympathetic branches of the ANS is not confined to visceral targets but alters somatic functions as well, including the skeletal muscles and the cerebral cortex.\textsuperscript{20} This idea lead to devising the terms ‘ergotropic system’ and ‘trophotropic system’.\textsuperscript{21} The first denotes the sympathetic system along with its extensions to higher brain structures and the latter the parasympathetic system with its extensions to the brain.

In fact, in his more daring papers d’Aquili did not stop at simply making the relatively reasonable statement that the \textit{symphaticus} and \textit{parasymphaticus} can be viewed as extending up high into the brain.\textsuperscript{22} For example, in 1983 he went as far as identifying the ergotropic system with the \textit{whole of the dominant hemisphere} and the trophotropic system with the nondominant hemisphere:

\begin{itemize}
  \item \textsuperscript{18} Gellhorn & Kiely 1972, 402.
  \item Hess, Walter Rudolf. On the Relations Between Psychic and Vegetative Functions. Zürich, Schwabe, 1925.
  \item Gellhorn & Kiely 1972, 399.
  \item In their more recent publications, however, Newberg and d’Aquili have substituted these two terms for another pair that is more readily accessible for wider audiences. Thus, what in the older papers is called the ergotropic system, is in the later publications referred to as the arousal system; what the older papers call the trophotropic system, is later referred to as the quiescent system. The general concept behind the terms, though, has not changed.
  \item For example, there is some evidence that the amygdala – a part of the brain’s limbic system – has primarily a sympathetic/ergotropic function. Newberg and d’Aquili (with a reference to: Joseph, R. Neuropsychology, Neuropsychiatry, and Behavioral Neurology. New York, Plenum Press, 1990) explain that the outer region of the amygdala receives nerve connections from the outer edge of the hypothalamus which, in turn, is connected to the sympathetic system (d’Aquili & Newberg 1999, 39). For related arguments on the hippocampus, thalamus and the reticular activating system, see: d’Aquili & Newberg 1999, 40–41.
\end{itemize}
“Thus, the ergotropic-trophotropic model represents an extension to the central nervous system of sympathetic-parasympathetic peripheral nervous functioning. Further extending this model, we can identify the minor or nondominant hemisphere with the trophotropic or baseline energy state system and the dominant or major hemisphere, which governs analytical verbal and causal thinking, with the ergotropic or energy-expending system.”23

This schema was then elaborated on (for example, by Barbara Lex) to come up with the idea that the difference in the “cognitive styles” between the dominant and nondominant hemispheres may parallel the duality of autonomic functioning.24

While the hypothesized parallel between the ergotropic/trophotropic functioning and the way the dominant and nondominant hemispheres interrelate may sound esoteric, it is instructive in the sense that it helps one understand how ANS states could influence the states of consciousness at all. I shall come back to this charming and sweeping hypothesis shortly, because it seems that the grounds on which d’Aquili came to view the parietal lobe of the nondominant hemisphere (very roughly, element [c] of the main schema in § 1 above) as fundamental to the generation of MSCs are related to it. For now, I have a more urgent matter to attend to: the idea that a simultaneous discharge of the sympathetic/ergotropic and parasympathetic/trophotropic systems is to be viewed as basic to the generation of MSCs (in fact, all alternate phases of consciousness).

As was already mentioned, the idea was adopted by d’Aquili from Gellhorn and Kiely’s research.25 The rationale behind it is as follows. In a human being (as in animals), normally either the sympathetic or parasympathetic system predominates, and the excitation of one generally inhibits the other.26 According to a biology textbook – the “logic” behind this dynamic (as well as the general functions of the sympathicus and parasympathicus) becomes clear if one views the overall state of an animal’s body relative to its surroundings. When an animal is not receiving much outside stimulation, parasympathetic nerve action tends to slow down overall body activity and divert energy to basic “housekeeping” tasks, such as digestion. During times of heightened awareness, excitement or danger, sympathetic nerve action tends to slow down housekeeping tasks and, simultaneously, to increase overall body activities that prepare the animal to fight or flight (or frolic intensely, as in play and sexual

26 D’Aquili 1983, 262.
behavior). Hence, then, the use of the terms ‘trophotropic’ or energy-conserving and ‘ergotropic’ or energy-expending or ‘quiescent’ and ‘arousal’ (as these systems became to be called in Newberg and d’Aquili’s later papers) for the “extended versions” of the parasymphaticus and sympaticus, respectively.

However, there are exceptions to this ‘normal’ dynamic – according to Gellhorn and Kiely’s seminal paper referred to above. D’Aquili explains: when one considers the evidence taken from the literature on animal studies together with the limited studies that have been done on humans, one can infer that under proper conditions – such as prolonged exposition to repetitive rhythmical stimuli – an unusual neural state is possible in which both of the autonomic subsystems discharge simultaneously. He continues:

“[T]hree stages of tuning of the sympathetic-parasympathetic subsystems are recognized. In the first stage, reactivity in one system increases while at the same time it decreases in the other system. If augmented reactivity of the sensitized system continues, the second stage of tuning is reached after stimuli exceed a certain threshold; at this point not only is inhibition of the nonsensitized system complete, but also stimuli which usually elicit a response in the nonsensitized system instead evoke a response in the sensitized system. Behaviors resulting from this second stage of tuning are termed reversal phenomena. If stimulation continues beyond this stage, increased sensitization can lead to a third stage in which the reciprocal relationship fails and simultaneous discharges in both systems result.”

One can see, thus, that d’Aquili explains the states that involve simultaneous discharges in both autonomic subsystems via the overexcitation of either of them, an overexcitation that d’Aquili elsewhere describes as resulting in a “spillover” of neural activity from one system to the other. And such “spillover”, it is claimed, will result in various ecstatic and other altered states of consciousness.

Now, if a “spillover” from one branch of the ANS to the other is to be possible, then the hypothalamus is at once implied as a key structure. It is located near the upper end of the brain stem and is a major mediator between the ANS

29 E.g., in WGA.
32 For example, see: d’Aquili & Newberg 1999, 112.
33 D’Aquili 1983, 263.
and higher brain structures. Newberg and d’Aquili have metaphorically called the hypothalamus the “master controller” of the ANS.34

Simplifying the matter a bit, Newberg and d’Aquili explain that the hypothalamus can be thought of as having two basic sections: the inner section through which the brain is connected to the parasympathetic system and that is involved in generating calming, relaxing emotions, and the outer edge through which the brain is connected to the sympathetic system and that is involved in generating such basic emotions as rage and terror, but also positive states such as ecstasy. It is via the hypothalamus that the brain can instruct the ANS to regulate body functions; and it is also the gateway via which autonomic impulses can be relayed to higher brain parts and consciousness.35 Thus, if a 3rd stage simultaneous discharge in both arms of the ANS is to take place, it will be mediated via the hypothalamus. Hence the expression hypothalamic “spillover”.

Significantly for the present discussion – as a prime example of states involving a “spillover” d’Aquili routinely uses orgasm. In the above referred 1983 paper, for instance, orgasm is said to be the simplest paradigm to describe a 3rd stage ANS state. An almost identical argument is found in the 1985 paper.36 To what extent this paradigm “works” is the main topic of chapter V.

§ 3. The Right Brain is the Mystic:37 split-brain research, gestalt perception and the holistic operator

I now come to the question how the doctrine of PSPL deafferentation (elements [c] and [e] of the main schema in § 1 above) ended up in Newberg and d’Aquili’s theory of MSCs. I shall argue that it is a “baby” of d’Aquili’s long-time, even erotic fascination with the nondominant hemisphere and that it stems from the notion that we all walk around with two potentially independent consciousnesses dwelling in our skulls. He – the dominant hemisphere – is a rational, math-and-logic-oriented, power-exerting Alpha Male, She – the nondominant hemisphere – is an emotional, day-dreaming, gestalt-oriented nymph.38

This, rather non-scholarly, introduction is meant to convey my impression that the second main feature of Newberg and d’Aquili’s MSC model – the idea that during mystical states the PSPL becomes deafferented (cut off from input) – has a vivid personal history and that it has had a “bumpy ride”.

34  WGA, 43–44.
35  WGA, 43–44.
38  The allusion to old-fashioned patriarchal gender stereotypes is deliberate and is not meant as a (sexist) characterization of what each gender is or should be like. See chapter IX for a detailed discussion of this allusion.
Elements of it run through all of d’Aquili’s writings (starting from the very first *Zygon* papers), but have undergone several metamorphoses. It has been conceptualized in various (sometimes incompatible) ways and its traces are occasionally even difficult to recognize. Yet whatever forms the idea has taken, it always comes down to d’Aquili’s preoccupation and fascination with the somewhat mystical and otherworldly, ghostly “second consciousness” that, under proper circumstances, can take *absolute* control. Phrases such as ‘holistic operator’, ‘trophotropic tuning’, ‘absolute functioning’, ‘functional commissurotomy’ and even ‘nondominant hemisphere’ (without any qualifiers) – all point to that preoccupation. In essence, the elaborate concept of PSPL deafferentation is another (albeit highly sophisticated) modification of this theme.

The idea of a “second consciousness” is not, in fact, as esoteric as it sounds. Looking back at his early work, d’Aquili explains that when he first came out with his general concepts in 1975, the main goal was to try and explain the attainment of MSCs by developing the Gellhorn and Kiely model via integrating it with the then relatively new split-brain research which was coming out of Roger Sperry’s laboratory. The results of split-brain research seemed to support the view that there are two separate consciousnesses dwelling within one skull. In 1982, d’Aquili writes:

“What is startling from all this research is that not only the left and right hemispheres seem to be somewhat specialized for different tasks but also the highly probable conclusion that we are dealing with two separate consciousnesses within the same head. [---] The presence of this gestalt oriented and emotionally integrating consciousness side by side with our rational and analytic selves located primarily in the left hemisphere has tremendous implications for senses of reality and religious intuition.”

Two complementary consciousnesses in one head... Well, that certainly is something to make one wonder. In answer to how to understand the dynamics underlying this “duality of mind” d’Aquili proposed that the duality of patterning within the central nervous system *parallels autonomic duality*. Hence, then, the sweeping hypothesis mentioned in § 2 above that I promised to return to and that states that the ergotropic system can be identified with the dominant and the trophotropic with the nondominant hemisphere.

The hypothesis seemed to make sense, since it became increasingly clear from split-brain research that cerebral hemispheres – just like the branches of the ANS – have differential functions. By today it is common knowledge that the right brain is relatively more responsible for “emotional intelligence” and

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artistic ability, functioning in a more holistic (gestalt-based) manner. The dominant left hemisphere, on the other hand, is more responsible for causal and rational thinking, math, logic, verbal abilities and functions in a more analytical manner. Thus, thinking of two consciousnesses working in concert analogously to the way the sympathetic and parasympathetic system “play each other out” was a powerful explanatory tool. It also provided a bridge between split-brain research and Gellhorn and Kiely’s modelling of MSCs.

As to the generation of MSCs within such a framework, d’Aquili writes: if one identifies the dominant hemisphere as an extension of the ergotropic system and the nondominant hemisphere as an extension of the trophotropic system, then – analogously with what happens in the ANS during 3rd stage states – by overexcitating either system there would occur a “spillover”. During such a state not only would there be maximum discharge from the holistic operator and other neural structures on the nondominant side generating a sense of absolute wholeness, but there would be an intense firing of structures on the left side as well, associating the feeling of wholeness with an intense consciousness of the reflexive ego. MSCs, therefore, involve an extreme state of functioning of the holistic operator. In contrast to ordinary perceptions that reflect a balance between left-hemispheric and right-hemispheric (gestalt) perception, during MSCs there is, thus, a tilting of the balance towards an increased perception of wholeness. Depending on its intensity, the “right hemispheric tilt” can be experienced as beauty, numinosity, religious exaltation or as MSCs.42

This passage from 1986 – ambivalent as it is – vividly documents both the power and vulnerability of d’Aquili’s early argumentation. It also allows one a freeze-frame of the PSPL deafferentation doctrine in the making. There are three aspects here that I would like to draw the reader’s attention to.

First, the notion of a holistic “operator” residing in the nondominant hemisphere. ‘Operator’, within this context, is understood as a brain structure responsible for enabling one or another cognitive function (remember, d’Aquili’s early work is structuralist). In this case, it is the ability to see “a forest in the trees”. It is significant that, from very early on, d’Aquili linked the holistic operator to the parietal lobe on the nondominant side.43 Clearly, the later linking of MSCs to the unusual functioning of the PSPL derives from the same train of thought. This is confirmed in another paper by d’Aquili and Newberg: the holistic operator is located in the parieto-occipital region of the non-dominant hemisphere involved in creating the sense of wholeness.44 The link is made explicit by Jensine Andresen: “[Newberg and d’Aquili] believe that the “holistic operator,” localized to the posterior superior parietal lobule [---] in the non-dominant hemisphere, is significant for religious experience, since it permits reality to be viewed as a gestalt.”45 Keeping this in mind, it is rather

43 For example, see: d’Aquili 1983, 251–252.
45 Andresen 2001, 262.
surprising that critics have sometimes described the concept of operators as peripheral to Newberg and d’Aquili’s later MSC model. The PSPL on the nondominant side is very far from being peripheral in any version of the model. However, it is true that Newberg and d’Aquili have, to my knowledge, nowhere clearly explained the connection between the holistic operator and the PSPL deafferentation doctrine.

Second, the notion of extreme (or absolute) functioning – in this case of the holistic operator. It is not immediately clear from d’Aquili’s above passage, but the notion relates directly to split-brain research. D’Aquili interpreted split-brain data as pointing at the existence of two independent consciousnesses in one head. In other words, brain parts can function “absolutely”. Now, this becomes evident when one cuts a brain’s commissures (commissurotomy). In such a framework, the notions of ‘cutting’ and ‘independent functioning’ are dependent on each other. What I am getting at is that the conceptual structure ‘cut’ + ‘independent functioning’ + ‘holistic operator’ provides a direct basis for the doctrine of PSPL deafferentation since deafferentation means cutting away from afferents (incoming neural “traffic”) and would, in the case of PSPL, result in its independent functioning.

Third, the notion of right hemispheric “tilting” in relation to MSCs. Close reading of d’Aquili’s above passage reveals a telling contradiction: the reader is told that during MSCs there is a maximal simultaneous discharge from both ergotropic and trophotropic systems. Yet at the same time MSCs are explained via a right hemispheric “tilt”. This reveals a rift between the “spillover” theory and the split-brain research based theorizing on MSCs. Clearly, d’Aquili is trying to sail two boats at once. The “spillover” scenario enforces the notion of maximal discharges from both systems but d’Aquili cannot help ascribing MSCs to the fascinating and alluring “second consciousness” dwelling in the nondominant hemisphere by maintaining a right brain “tilt” (more on this in chapter IX).

Not surprisingly, then, the heavy-handed identification of hemispheres as extensions of the ergotropic and trophotropic systems was dropped from the fully elaborated theoretical model of MSCs first put forward by Newberg and d’Aquili in 1993 (elements of it are still traceable there, but the 1993 version is very clear in that both hemispheres have both ergotropic and trophotropic “controls”). However, when it comes to understanding how d’Aquili came to view the PSPL and its deafferentation as the second main characteristic feature of MSCs, the hypothesis still provides a helpful aid for analysis.

46 For example, see: Rausch Albright 2001, 486–487; 489–491.
48 See subchapter C below for a review of the 1993 version of the model.
C. THE MODEL

§ 1. The 1993 theoretical schema

In assessing Newberg and d’Aquili’s idea that MSCs might, from an evolutionary standpoint, be by-products of human sexual response (as proposed in WGA), the historical “twists” in its development described above are, in fact, more informative than the actual neuroscientific model (in its fully elaborated form) itself. However, for the purpose of establishing grounds of comparison with the studies reviewed in the next chapters, a description of it is still necessary.

I feel that such a description is best given on the basis of the first full-fledged version of the model that appeared in Zygon in 1993\(^4\), despite the fact that Newberg and his associates have recently considerably refined the concept,\(^5\) that several details have been added\(^6\) and that it only describes MSCs as attained via meditation. The reason (apart from the scholarly advice to work with the “original” whenever possible) is the structural and terminological\(^7\) clarity provided by the 1993 version.

The goal of the model is to bring the elements discussed above together by providing a hypothetical account on how meditative practices could bring about both a functional deafferentation of the PSPL and a hypothalamic “spillover” (the combination supposedly resulting in MSCs). Newberg and d’Aquili start from asserting that the meditation process begins in the right PFC – as, say, the will to clear the mind of all thoughts (a form of “passive” approach) or the will to concentrate on a mental image (“active” approach).\(^8\)

The effectuation of the intent formed in the right PFC would (on the level of brain activity) consist in the PFC’s either partially deafferenting the right PSPL by blocking “thought input” to it (passive meditation) or, if the subject is con-

\(^6\) For example, it has become increasingly clear that the thalamus plays an important role in the generation of MSCs (for a comprehensive discussion on the subject, see: Newberg & Waldman 2006, 178–180).
\(^7\) The 1993 version (unlike most other versions) describes the brain structures relevant to the model in terms of their corresponding Brodmann’s areas (brain areas are routinely categorized according to a cerebral map that was first developed by Korbinian Brodmann; hence the term ‘Brodmann’s area’ [d’Aquili & Newberg 1999, 31]). The Brodmann map (see Appendix) is focused on the structural differences in the neurons throughout the cortex, charting regions according to patterns of organization (McGraw, John J. Brain and Belief: an Exploration of the Human Soul. Del Mar [California], Aegis Press, 2004. P. 153). This is useful when it comes to comparing Newberg and d’Aquili’s research to the research on the neural substrates of sexual response since the maze of more specific terminology involved in each case can become quite perplexing.
\(^8\) D’Aquili & Newberg 1993, 186; 191.
centrating on a mental image (active meditation), then sending facilitatory impulses to the right PSPL to fix the image and attend to it in a steady, highly focused manner.54

The PFC-controlled “filtering” of input to the PSPL (whether it is inhibitory as in passive approach or facilitatory as in active approach) also affects the right hippocampus since these structures have very rich interconnections. If, in addition, there is simultaneous direct stimulation of the right hippocampus from the PFC, then the activity in the hippocampus “turns on” the right amygdala. After the stimulation of the right amygdala reaches a certain threshold, the hypothalamus – along with its controlled ANS – is finally engaged in “action”. In the case of passive meditation, this “action” would first affect its trophotropic/ventromedial centers, resulting in the activation of parasympathetic peripheral system and the accompanying subjective sensation of deep relaxation and quiescence. In the case of active meditation the hypothalamus would be affected via its ergotropic/lateral portion, resulting in the activation of the sympathetic system and mildly pleasant sensations.55

The general sense of well-being thus created closes what might be called a “reverberating” feedback loop since it motivates the meditator to concentrate even more. In terms of the model, this loop would be formed by the impulses originating in the right PFC running to the right PSPL, on via the right hippocampus and amygdala, to either the trophotropic/ventromedial (passive meditation) or ergotropic/lateral (active meditation) structures of the hypothalamus, and then back through the right amygdala and hippocampus – to the right PFC.56

Impulses go around and around this circuit, recruiting greater electrical activity. The system is accelerated by ever greater members of impulses originating in the right PFC by continued meditation. This results in a progressive increase in the intensity of neural discharge until extreme levels are reached in either the trophotropic/parasympathetic (in the case of passive approach) or ergotropic/sympathetic (in the case of active approach) section of the hypothalamus. When that happens, a “spillover” occurs, resulting in an almost instantaneous extreme stimulation of the opposite system. Such extreme simultaneous stimulation of both systems generates intense ecstatic and blissful feelings via the hypothalamus itself and the stimulation of the medial forebrain bundle.57

At the same time, there is an extremely intense feedback stimulation from the hypothalamus (via the right and left amygdalae and hippocampi – both adding emotional nuances to the overall ecstasy and bliss) to the right and left PFCs. Extreme stimulation of both prefrontal cortices, given the way the PFC

54 D’Aquili & Newberg 1993, 186–187; 191. According to the model, the “thought input” is seen as originating in the inferior parietal lobe and the mental image (in the case of active approach) as originating in the right inferior temporal lobe.
and PSPL interact during meditation, should almost instantly result in nearly total deafferentation of both the left and right PSPL.\(^{58}\)

As the right PSPL is involved with generating a sense of space and spatial coordinates in which to orient incoming stimuli, its deafferentation probably results in an absolute subjective sensation of pure space. But space has no conventional meaning except as a matrix in which to relate objects. It is likely, therefore, that a sensation of pure space arising from the deafferentation of the right PSPL is subjectively experienced as absolute unity or wholeness. The left PSPL is involved with the maintenance of the self-other dichotomy. Its deafferentation, thus, should result in the obliteration of the self-other dichotomy, at precisely the same moment that the deafferented right PSPL generates a sense of absolute transcendent wholeness. The overall state thus generated would be one of rapturous transcendence and absolute wholeness which carries such overwhelming power and strength with it that the subject has the sense of experiencing absolute reality, be that later described as God, Nirvana or simply the Higher Plane of Existence.\(^{59}\)

How would the foregoing “translate” into traditional religious-mystical language? Well, let us see. In WGA, for example, Newberg and d’Aquili ask: what would happen if the PSPL had no information upon which to work? Would it continue to search for the limits of the self? With no information flowing in from the senses, the PSPL would not be able to find any boundaries. What would the brain make of that? Would the PSPL interpret its failure to find the borderline between the self and the outside world to mean that such a distinction does not exist? In that case, the brain would have no choice but to perceive that the self is endless and intimately interwoven with everyone and everything the mind senses. And the perception would feel utterly and unquestionably real.\(^{60}\)

In other words, since the function of the PSPL is to maintain a continuous sense of self in relation to everything else, its deafferentation would mean that the brain has no “landmarks” to sort the representation of the self out of the perceptions of the surrounding world. Such a state would result in a sensation of

\(^{58}\) D’Aquili & Newberg 1993, 189. In the case of active approach, however, before both sides of the PSPL are deafferented, there is an interim stage during which only the left PSPL is deafferented. See next footnote for a comment.

\(^{59}\) In the case of active approach, though, the situation on the right side is more complex. Although from the moment of “spillover” there is also powerful limbic stimulation of the right prefrontal inhibitory system, there is already an ongoing and powerful facilitatory (not deafferenting) “traffic” from the right PFC to the right PSPL. It is continually reinforced by the subject’s focusing on the meditation object, even after the moment of “spillover” and even in the presence of ecstatic feelings generated by the limbic system. At the same time the left PSPL is almost totally deafferented, meaning that the self-other dichotomy is obliterated. Thus, for a period of time during which the chosen mental image still remains the focus of meditation, the subject feels absorbed into or “becomes one” with the object (d’Aquili & Newberg 1993, 193).

\(^{60}\) WGA, 6.
either that one is everything and/or that everything is a no-thing – a sensation of
the intimate interwovenness of the individual self with everything in existence.
And the experience would feel just as real as any ordinary sensory perception,
for it would be “made real” for the brain in exactly the same way as are “ordi-
nary” perceptions.

While still highly abstract, this description is much more clear about what
the issue at stake really is. It is the issue of “annihilating” one’s sense of self, or,
at least, radically transforming it. It sheds some light on what must happen in a
brain, if experiences resulting in statements like “the Father and I are one”
(John 10:30) or “I have been crucified with Christ; and it is no longer I who
live, but it is Christ who lives in me” (Galatians 2:19–20) are to be possible. It
is all about transceding or emptying one’s self, “tricking” the “alpha-male”
dominant hemispheric ego out of control, thus that a more “feminine”, inte-
grative and holistic perspective can take lead, this resulting in a sense of felt,
loving union with each and every thing in existence.

In showing that this latter is, indeed, the case, Newberg and d’Aquili often
cite Richard Bucke and refer to his concept of Cosmic Consciousness. For
example:

“[I] saw and knew that the cosmos is not dead matter but a living Presence, that
the soul of man is immortal, that the universe is so ordered that without any
preadventure all things work together for the good of each and all, that the
foundation principle of the world is what we call love and that the happiness of
every one in the long run is absolutely certain.”

The key notions here are those of love and unity of everything. The dichotomies
of self and other, joy and fear, here and there etc. are overcome in a loving
coincidentia oppositorum (reflecting a “spillover”, a coactivation of the
“antagonistic” ergo- and trophotropic drives as well as PSPL deafferentation).
Hence, then, the paradoxical statements made by people who have undergone
intense MSCs – being paralyzed by fear and overwhelmed by joy at the same
time (as in religious awe and in Otto’s famous mysterium tremendum et
fascinans), being extremely excited yet at the same time relaxed (excitement
pointing at sympathetic and relaxation at parasympathetic activity).

§ 2. Testing the theoretical claims

What empirical support does the above model have? Newberg and colleagues
have conducted several neuroimaging studies to test the theoretical schema. At
the time the above model was published only one study existed that could be
directly viewed as supporting the model in particular (naturally, there were

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61 Newberg & Waldman 2006, 168. The authors cite Bucke from: Bucke, R. Cosmic
Consciousness: a Study in the Evolution of the Human Mind. New York, Dutton,
plenty of data to substantiate the more general claims, such as the functions of this or that brain area but only one in direct support of the specific ANS-PSPL-PFC schema: an EEG study by James Corby and colleagues from 1978 conducted on tantric yoga meditation. In this study, a subject underwent an unusually intense MSC while “hooked up” to the EEG equipment. The electroencephalographic correlates of the experience were – significantly for Newberg and d’Aquili’s model – theta activity over the PFC and parietal regions interpreted by the authors as relating to ANS interactions.\(^{62}\)

Already in the 1993 publication itself, Newberg and d’Aquili discuss possible testing techniques for the model. Specifically, they consider PET and magnetic resonance imaging (MRI) as suitable techniques for the purpose.\(^{63}\) Their final solution, though, was single photon emission computed tomography (SPECT), a modification of PET that, despite its somewhat worse spatial resolution, has advantages over PET for the particularities of studying MSCs in that it does not force a subject to perform the experimental task in the brain scanner.

In the first phase of testing, Newberg and colleagues collected imaging data from eight (4 male, 4 female) practitioners of Tibetan Buddhist meditation. The particular form of meditation involves the practitioners’ focusing their attention on a visualized image and maintaining that focus with increasing intensity. The “peak” experience of this type of meditation is often described as a sense of absorption into the visualized image and a loss of sense of space and time – a near-perfect match to the state the 1993 model predicts and therefore well suited for testing the model. The SPECT imaging technique used in the study measures regional cerebral blood flow (rCBF), which correlates closely with cerebral activity. Thus, the technique allowed for a comparison between rCBF at baseline and during meditation.\(^{64}\)

20 minutes prior to a baseline scan an intravenous cannula was placed in the subjects’ one arm. They were instructed to rest with their eyes closed for 5–10 minutes at which time they were injected through the cannula with a radiotracer (\(^{99}\)mTc-HMPAO – hexamethyl propyleneamine oxime). The subjects were then scanned in a gamma camera. The resulting SPECT images were reconstructed in the transaxial, coronal, and sagittal planes giving a slice thickness of 4 mm with a spatial resolution of 8–10 mm.\(^{65}\)


\(^{65}\) Newberg et al. 2001, 115.
Following the baseline scan, the subjects were lead to a separate room for meditation. Each subject was given about one hour to meditate. The subjects were instructed to provide a signal when they were to begin the most intense part of the meditation. Following this signal, the subject was again injected with the radiotracer through the cannula (from outside the meditation room). 30 minutes after this injection the subject was rescanned (the “meditation” scan) using the same imaging parameters as for the baseline study.66

The resulting images were analyzed by Newberg and colleagues using two techniques – the so-called regions of interest (ROI) analysis and statistical parametric mapping (SPM).67

The results of the ROI analysis were as follows:68

<table>
<thead>
<tr>
<th>Part of the brain</th>
<th>Baseline mean</th>
<th>Meditation mean</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior cingulate cortex</td>
<td>1.25</td>
<td>1.34</td>
<td>7.2</td>
</tr>
<tr>
<td>Cingulate body</td>
<td>0.91</td>
<td>1.14</td>
<td>25.3</td>
</tr>
<tr>
<td>Dorsolateral PFC</td>
<td>1.31</td>
<td>1.45</td>
<td>10.7</td>
</tr>
<tr>
<td>Inferior frontal cortex</td>
<td>1.25</td>
<td>1.36</td>
<td>8.8</td>
</tr>
<tr>
<td>Midbrain</td>
<td>1.16</td>
<td>1.29</td>
<td>11.2</td>
</tr>
<tr>
<td>Orbital frontal cortex</td>
<td>0.97</td>
<td>1.22</td>
<td>25.8</td>
</tr>
<tr>
<td>Posterior cingulate cortex</td>
<td>1.19</td>
<td>1.29</td>
<td>8.4</td>
</tr>
<tr>
<td>Sensorimotor cortex</td>
<td>1.19</td>
<td>1.26</td>
<td>5.9</td>
</tr>
<tr>
<td>Thalamus</td>
<td>1.40</td>
<td>1.60</td>
<td>14.3</td>
</tr>
<tr>
<td>Dorsomedial cortex</td>
<td>1.26</td>
<td>1.31</td>
<td>4.0</td>
</tr>
<tr>
<td>Superior parietal cortex</td>
<td>1.18</td>
<td>1.12</td>
<td>–5.0</td>
</tr>
<tr>
<td>Caudate</td>
<td>1.29</td>
<td>1.32</td>
<td>2.3</td>
</tr>
<tr>
<td>Cerebellum</td>
<td>1.23</td>
<td>1.25</td>
<td>1.6</td>
</tr>
<tr>
<td>Inferior temporal cortex</td>
<td>1.29</td>
<td>1.34</td>
<td>3.9</td>
</tr>
<tr>
<td>Superior frontal cortex</td>
<td>1.18</td>
<td>1.17</td>
<td>–0.9</td>
</tr>
</tbody>
</table>

In addition, Newberg and colleagues performed an additional SPM analysis, which is a standard tool in activation studies. For this, the images were spatially normalized to standard stereotactic space based on the Talairach atlas.69 Concerning the results of the SPM analysis, Newberg and colleagues write:

“Increases were only found in the right thalamus and decreases in the superior parietal lobe, the right lateral temporal and the [l]eft inferior temporal lobes. While these findings corroborate some of the ROI results, other areas observed to

68 The table is based on: Newberg et al. 2001, 117.
be increased on the ROI analysis were not observed to be significantly different on the SPM analysis. This may be due to the overconservative nature of SPM and the relatively small changes we were observing in the meditation state.”

Presented in numbers, the results of the SPM analysis were as follows:

<table>
<thead>
<tr>
<th>Location of significant increases in rCBF during meditation</th>
<th>Talairach coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>x</td>
</tr>
<tr>
<td>Right thalamus</td>
<td>4</td>
</tr>
<tr>
<td>Right thalamus</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location of significant decreases in rCBF during meditation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
</tr>
<tr>
<td>Right superior parietal</td>
</tr>
<tr>
<td>Left superior parietal</td>
</tr>
<tr>
<td>Right lateral temporal</td>
</tr>
<tr>
<td>Left inferior temporal</td>
</tr>
</tbody>
</table>

Overall, these results support the main theoretical ideas put forward in the 1993 schema quite strongly. Especially important is the deactivation found in the superior parietal areas. Since the theoretical model predicts the deafferentation of the PSPL as one of the main characteristics of MSCs, the observed deactivations make sense – the observed decrease of rCBF in these areas of the brain likely reflects their deafferentation. The increases in rCBF in the frontal areas revealed by the ROI analysis are predictable from theory and consistent with the results on many meditation studies, probably reflecting the concentration necessary for meditating successfully. Self-guided meditation is a volitional act and concentration of attention is the main function of the prefrontal area. The thalamic activations, however, are more difficult to interpret in relation to the 1993 theoretical model.

In a follow-up study, Newberg and colleagues applied the same experimental protocol to study MSCs generated via the so-called centering prayer. The main facts of this study were as follows: three white female Franciscan nuns experienced at centering prayer were injected at rest with the same, above mentioned HMPAO radiotracer and scanned on a SPECT camera. Then the subjects meditated for ca. 40 minutes, at which time they were again injected with HMPAO. Meditation then continued for 10 more minutes, followed by another scanning session. In this study, only ROI analysis of rCBF was performed. Compared to baseline, the scans showed increased rCBF in the PFC (7.1 %), inferior parietal lobe (6.8 %) and inferior frontal lobes (9.0 %). There was a

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70 Newberg et al. 2001, 118.
71 The table is based on tables 2 and 3 in: Newberg et al. 2001, 118. For an explanation concerning the concept of stereotactic coordinates, see chapter VII.
72 For a review of the results of other meditation studies in relation to the prefrontal aspect, see: Andresen 2002, 17–73.
strong inverse correlation between the blood flow change in the PFC and the ipsilateral superior parietal lobe.\textsuperscript{73}

These results are in good accordance with the results from the study of Buddhists, supporting the 1993 model. Moreover, they provide empirical evidence that there is a culture and tradition independent universal pattern of brain activity associated with MSCs. The Buddhists experimented on in the first study do not affirm a personal God. But the Franciscan nuns certainly do. The fact that the brain scans of the two groups of subjects brought up highly similar results, then, point at there being an underlying universal neural substrate to MSCs attained through meditative practices that is fairly independent of the particular religious traditions in which the practices are embedded. This is confirmed even further in an experiment recently conducted by Newberg and Waldman on a subject who maintains being a secular atheist but nevertheless practices meditation and had a strong MSC (described in terms of a spiritual, not religious experience this time) in Newberg’s lab. The neural correlates of this subject’s MSC were very similar to those revealed by the above two studies (decreased rCBF in the superior parietal regions).\textsuperscript{74}

One could say, thus, that the 1993 model has, at least to a certain extent, been empirically confirmed. The brain acts (during performing the task under scrutiny) the way the theoretical model predicts. However, the tests run so far are preliminary and much more experimental research is needed to say something conclusive (the more so because – as will become clear in the next chapters – there are a couple of other neuroimaging studies that present results somewhat different from those of Newberg and colleagues). Nevertheless, Newberg and d’Aquili’s central claims – that during MSCs the sympathetic and parasympathetic systems would activate simultaneously and that there would be changes in a subject’s sense of self (a PSPL-related function) – seem quite reasonable. Whether these characteristics of MSCs can be regarded as universal is for the future studies to be determined.

\textit{§ 3. Some critical remarks}

Naturally, Newberg and d’Aquili’s ideas have not gone uncriticized. Things are more clear about the experimental results. In her recent book, \textit{Sacred or Neural}\textsuperscript{75}, Anne L. C. Runehov – a philosopher of religion at the University of Copenhagen – evaluates the above experimental work from a methodological point of view. Her main conclusions are as follows.


\textsuperscript{74} For the description and results of this one-subject experiment, see: Newberg \& Waldman 2006, 226–241.

\textsuperscript{75} Runehov 2007.
(1) The choice to use meditative states to study MSCs is methodologically justified. Spontaneous MSCs are difficult to investigate since it is not known what triggers them while meditative MSCs are repeatable and testable in a scientifically acceptable way and the practices used to lead to them can be performed in lab settings. Thus, the experimental work satisfies the basic standards of clinical neuroscience. The used methods and equipment were optimal for the purpose. Albeit the experimental studies did not confirm the theoretical models fully, instructive correlations were confirmed.  

(2) Nevertheless, there are several issues that should have been given more attention. First, it is not entirely clear whether the sample used by Newberg and colleagues can be considered representative of the relevant population. Given that the first SPECT study was performed on proficient practitioners of Tibetan Buddhist (non-theistic) meditation and the follow-up study on Franciscan nuns practising meditative prayer Newberg and colleagues drew conclusions as to the general nature of MSCs as experienced by the representatives of both theistic and non-theistic traditions. But it is questionable whether this sample does, indeed, allow for generalizations concerning the neural substrates of MSCs attained via different meditation techniques used in theistic and non-theistic traditions. It is entirely possible that the results had been quite different if Newberg and colleagues had also included subjects from, say, Muslim or Hindu traditions (who also undoubtedly belong to the relevant population) in the sample. Another issue is the age and gender distribution within the sample. Runehov rightly notes that while Newberg and colleagues’ 2001 sample does contain both men and women, the authors do not provide a gender specific analysis in presenting the results. Also, the age range of the subjects should have been broader. All members of the sample were between ages 38–52 which is not an optimal representative subset of the population of meditators. Surely there are advanced meditators who are younger than 38 or older than 52. Runehov also points out that the sample may have been too small and that this might endanger the validity of Newberg and colleagues’ experiments as well as the reliability of the results.

76 Runehov 2007, 174; 198–199.
77 Newberg et al. 2001.
78 Newberg et al. 2003.
79 Runehov 2007, 174. This, however, is not a fundamental deficit. As Runehov notes, including practitioners from other religions in the sample may not have significantly improved its representativeness. The relevant population is composed of advanced meditators from theistic and non-theistic backgrounds. From this perspective, Newberg and colleagues’ sample does reflect a proper subset of the population (Runehov 2007, 174).
80 Runehov 2007, 174–175. As to the last remark, it must be said that Newberg and colleagues’ sample size is quite typical to studies aimed at mapping the neural correlates of complex cognitive tasks. Hence, if one were to declare Newberg and colleagues’ studies invalid and their results unreliable on the basis of insufficient sample size, then
The most serious deficit of the experimental design is that no control task was employed to provide a comparison with the experimental task (i.e., meditation). While Newberg and colleagues did compare the baseline scans of the meditators against those obtained from a non-meditating control group, there were no controls for the meditation condition. As Runehov aptly points out, it would not have been difficult to have a control group to perform some other, typologically similar complex cognitive task (say, intensely concentrating on and mentally repeating a poem). This would have significantly improved the quality of the experimental studies and provided interesting insights as to the neural correlates specifically characteristic of meditative MSCs.81 This said, Runehov’s final conclusion as to Newberg and colleagues’ experiments is that despite the above flaws they should be regarded as scientifically valid.82

This conclusion seems to be shared by the majority of critics as usually it is not the experimental part of Newberg and d’Aquili’s work that “heats up” the critics. More often the debates revolve around theoretical and interpretive issues such as how to define MSCs, are Newberg and d’Aquili really even discussing the neurobiological roots of MSCs or are they actually trying to “save” religion (from the “dirty” hands of reductionists such as Richard Dawkins) by an appeal to brain architecture.83 Since analyzing the proposed link between MSCs and orgasm depends mostly on the neuroscientific data – the part of Newberg and d’Aquili’s studies that has not come under serious attacks – and less on the debated interpretive aspects in their research, I shall not be attempting to give a representative overview of the theoretical debates here. However, some points do deserve to be mentioned.

The most symptomatic of these concern the rifts and discontinuities between the discussed experimental results and theoretical models. To start from a simple, side-note-type issue – as Runehov rightly notes, in presenting their experimental results Newberg et al. are not explicit enough as to whether the type of meditation used by the subjects was active or passive (in the sense of the 1993 model) and it remains unclear which theoretical schema the results should be correlated with (recall that the two are different in significant details).84 The passive/active dilemma itself is quite unambiguously resolved by close reading of the experimental reports and the 1993 theoretical account – both experimental studies relate to active meditation.85 The real problem is that one would also have to discard a large proportion of other existing functional imaging reports.

81 Runehov 2007, 175–176.
82 Runehov 2007, 198–199.
84 Runehov 2007, 176–177.
85 In the 2001 report on Buddhists, Newberg et al. explain that the studied form of meditation consists in the practitioner’s focusing her attention on a visualized image and...
in the 1993 model the “default” schema is that of passive meditation. Active meditation is presented as a “special case”. Why, then, conduct both of the basic experimental studies on active meditation? This is all the more strange given that several of Newberg and d’Aquili’s publications (such as WGA) leave the impression that experiments were conducted on both types of meditation.

Another, much more serious problem is that Newberg and colleagues seem to be conflating deafferentation with deactivation. As Michael Spezio aptly notes, Newberg and d’Aquili’s interpretation of their experimental findings as supporting the theoretical model relies on associating a decrease in rCBF in the PSPL with a decrease in neural input to this area. He suggests caution towards this interpretation. In Spezio’s wording, the question is whether the recorded decreases in rCBF imply a shutting down or a cutting off of the area. Even if the decrease in rCBF accurately reflects an overall decrease in neural activity in the PSPL, it could be due to the shutting down and not cutting off of the area. The shutting down of neural activity is known as inhibition and inhibition of a brain area may well result in decreased rCBF. But the presented MSC model appears to require that the PSPL remain active while cut off from normal neural input.86

In addition, there is also the closely related problem of total versus partial – be it a “shut-down” or a “cut-off”. Runehov points out that according to Newberg and d’Aquili’s theoretical framework intense MSCs should be characterized by a near-total deprivation of the PSPL of incoming stimuli. But the moderately minor decreases in rCBF reported in the experimental accounts are quite far from implying the PSPL’s complete cut-off from input. At best, she says, the SPECT scans can be interpreted as pointing at a tendency towards deafferentation.87

Both of these points are highly important and both are aimed at revealing considerable discontinuities between Newberg and d’Aquili’s theoretical modelling of MSCs and their experimental results. It is true that the presented experimental results per se say nothing much about the deafferentation of the PSPL – they only reveal moderate deactivations in the PSPL region. Deactivation does not equal deafferentation: the latter means severing from afferents, i.e., incoming neural stimuli (and is, as Runehov correctly notes, usually a

that the resulting “peak” experience is described as a sense of absorption into the visualized image (Newberg et al. 2001, 114). Since in the 1993 theoretical model active meditation is defined via the notion of absorption and “the subject’s willing […] to focus either on a mental image or on an external physical object” (d’Aquili & Newberg 1993, 191), there is no doubt that the 2001 experimental account concerns active meditation. The 2003 report on Franciscan nuns is also quite clear in this respect. Here, the subjects practised centering prayer which consists in the subject’s focusing her attention on a phrase from the Bible or prayer over a period of time. It is similar to the type of meditation used in the 2001 report (attention is focused), but centering prayer is verbal while the Buddhist meditation is visual (Newberg et al. 2003, 626).

86 Spezio 2001, 482.
87 Runehov 2007, 158; 179–180.
pathological condition\textsuperscript{88}) while the former denotes decreased activity in a part of the brain. Deafferentation does not necessarily correlate with deactivation.

Moreover, whether and to which degree the deafferentation of the PSPL occurs during MSCs cannot be measured by SPECT. HMPAO-SPECT registers rCBF changes that correlate with activations and deactivations in neural structures. A registered drop in rCBF to the PSPL may be the consequence of the PSPL having “cut off” from its normal input (i.e., deafferented) but it also may not. There are no direct correlations between degrees of deafferentation and degrees of deactivation. In fact, it is not even clear whether a structure’s being deafferented would show up on a functional scan as an activation or a deactivation because, as Runehov rightly notes, deafferentation does not equal deafferentation – deafferented structures can still give output.\textsuperscript{89} Giving output (and Newberg and d’Aquili’s model demands that the PSPL give output while remaining deafferented) demands metabolic resources. And it is the use of metabolic resources that rCBF reflects. Hence, it is, for example, entirely possible that rCBF to a structure shows no change (or even increases) while that structure is deafferented (partially or totally).\textsuperscript{90}

\textsuperscript{88} Runehov 2007, 179. Runehov explains that patients in whom brain damage prevents sensory input from reaching the PSPL are seriously handicapped – they lack bodily perception, do not recognize objects that are placed in their hands etc. This is very different from what one sees in proficient meditators (Runehov 2007, 179). This is, no doubt, an appropriate remark. However, I think that Newberg and d’Aquili’s idea should be viewed somewhat less technically. One might, for example, distinguish between proper and functional deafferentation. The first of these would be a permanent condition that results either from brain damage (the incoming pathways to a structure are destroyed) or from surgical intervention (sometimes the pathways leading into a structure are cut in order to prevent epileptic activity from spreading). The second is a normal and functional (vs. dysfunctional) condition that might be thought of in terms of one’s trying to read a book in a noisy café. Most of the incoming stimuli are “gated out” from consciousness in order to allow for concentrating on the book. Clearly, this is not a pathological condition.

\textsuperscript{89} Runehov 2007, 180.

\textsuperscript{90} By the way, this is why I find Runehov’s claim as if despite Newberg and colleagues’ failure to experimentally account for the deafferentation of the PSPL they had still been able to confirm a tendency towards that direction (Runehov 2007, 158) to be somewhat misleading. The SPECT-recorded deactivations do not confirm a tendency towards deafferentation any more than they confirm a total deafferentation. That the moderate deactivations found in the PSPL during deep meditative states may be suggestive of a partial deafferentation (which is what I think Runehov has in mind) is a reasonable interpretation in the light of the 1993 theoretical model. However, it is still just that – an interpretation. Because SPECT per se can say nothing about deafferentation – be it total or in the form of a “tendency”. I do agree with Runehov, though, in that the notion of a total deafferentation of the PSPL – since it is unsupported by experimental results and more or less unnecessary from the viewpoint of the model – should simply be dropped (this is why I avoided any emphasis on the completeness of deafferentation in my own presentation of the 1993 model above).
In the present case, the concept of deafferentation functions as a theoretical explanation of the deactivations showing up on the scans of the mystics’ brains. It is only within the context of the theoretical, explanatory model that the experimentally recorded decreases in rCBF can be interpreted as reflecting the deafferentation of the PSPL. In other words – relating the experimentally confirmed decreases in rCBF to deafferentation is a matter of interpretation (which may or may not be adequate), not experimental results.

In the final analysis, however, it may not be of fundamental importance whether the PSPL simply deactivates or is (functionally) deafferented. In both cases the end result would be an alteration in one’s sense of self and space. In terms of explaining the nature of MSCs this is enough. And it is also enough in relation to the argumentation in the following chapters of the present volume.

Just to indicate what other types of reactions Newberg and d’Aquili’s approach has earned – several reviewers have criticized the approach by calling into question the authors’ scholarly competence in one or another relevant field. A representative example comes from Jensine Andresen. She critiques Newberg and d’Aquili on the basis that their model of MSCs (specifically, its embedded doctrine of cognitive operators) remains unrelated to the concept of “modularity” routinely used in cognitive sciences (the concept referring to “cognitive modules” identified by function rather than brain structures involved). This type of critique leaves one at a loss. Why would one have to automatically prefer cognitive modules to cognitive operators? The fact that the former are more widely accepted in the school of cognitivism Andresen feels at home with is no proof that the operators concept is defective (by the way, at the same time I happen to agree with Andresen in that the operators doctrine is unsatisfactory).

Another line of critique is theologically based. Massimo Pigliucci, for example, points out that Newberg and d’Aquili’s approach fails in the sense that their analysis of MSCs says nothing about what is truly mystical in MSCs, i.e., God (or His equivalent). This is a strange accusation since Newberg and d’Aquili are explicit about neuroscience being unable in principle to say anything about God in Him-/Her-/Itself since it is constrained to studying human beings. As to the last point, though, there are also thinkers who are more optimistic. For example, Ilia Delio, reviewing Newberg and d’Aquili’s research from a theological point of view, contends that while “it is true that neuroscience cannot answer questions of purposeful design, it can certainly ask questions of purpose and design.”

Generally, however, Newberg and d’Aquili’s ideas have been received with considerable appreciation. Critical remarks seem to have more to do with interpretive nuances than the general concept and experimental data. And, as

91 Andresen 2001, 265.
92 Pigliucci 2003, 269.
Newberg notes, no part of the model has yet been proven to be fundamentally wrong.  

D. THE NEXT STEP

To summarize, then, according to Newberg and d’Aquili the following brain structures and phenomena are to be considered central to the generation of MSCs: the ANS, the limbic system (especially the hypothalamus), the PFC and PSPL, the hypothalamic “spillover” and the phenomenon of (functional) deafferentation.

On this basis, if one is to evaluate and/or develop the speculation that MSCs are evolutionary byproducts of sexual response and, specifically, orgasm, one might proceed by asking – is there any evidence that the neural substrate of orgasm overlaps with the described substrate for MSCs. Also, it would be useful to look into other neurocognitive analyses of MSCs in order to establish with more confidence the validity of Newberg and d’Aquili’s results.

With the foregoing functioning as a background context and a frame of reference – this is precisely what will be done in the next four chapters.

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94 Newberg 2001, 504.
CHAPTER V. MSCs AND ORGASM:
AUTONOMIC LEVEL INTERSECTIONS

A. TOWARDS AN INTEGRATED APPROACH

§ 1. Defining orgasm

The current understanding of what happens in the brain when people have
orgasms seems to largely be in a similar state to that in the research into the
neural correlates of MSCs. There is a lot of debate and nothing is “for sure”.
Analogously to the research situation in the field of MSCs, the bits and pieces
of data originate in studies using often incomparable techniques and fragments
of theory are sometimes incompatible with each other.

Similarly, again, to research into MSCs the main difficulty lies not with the
data themselves but with how to interpret them. Luckily, however, Francesco
Bianchi-Demicheli and Stephanie Ortigue have recently published a well-
documented overview of the current positions,¹ putting the existing results in a
badly needed perspective. Although their metastudy mostly concentrates on the
female orgasm, the parallel findings for males are also reported to be set against
the findings on females.

Bianchi-Demicheli and Ortigue assert that while the origin and function of
the female orgasm remains controversial, the current models of sexual function
acknowledge a combined role of central (spinal and cerebral) and peripheral
processes during the orgasm experience. However, they state, the cerebral “side
of the equation” has not been extensively investigated and important gaps in
knowledge remain. They thus set their goal at reviewing the clinical and experi-
mental findings on the cortico-subcortical pathways associated with orgasm and
at defining the specific brain areas that sustain the assumed higher-order
representation of orgasm.² Such an approach is perfectly suited for my purposes
in this volume. And, as will become clear below, it does reveal several
important “meeting points” between MSCs and orgasm.

Before going further into Bianchi-Demicheli and Ortigue’s and other
analyses, though, it is necessary to define what is meant by orgasm. At first
glance, it might seem to be a term that is unambiguous enough without any
further explanation. Not so. It is becoming increasingly clear that having or-
gasms does not fundamentally depend on genital stimulation. In a sense, geni-
talia are “merely tools” – orgasm “happens” in the brain, not in the genitalia. As
early as in 1960 John Money offered evidence for what he termed to be phantom orgasms – experiences of sexual climax without any genital involvement at

¹ Bianchi-Demicheli, Francesco, Ortigue, Stephanie. Toward an Understanding of
the Cerebral Substrates of Woman’s Orgasm. – Neuropsychologia, Vol. 45, Issue 12,
2007, 2645–2659.

² Bianchi-Demicheli & Ortigue 2007, 2645.
all (he worked with patients who had spinal cord injury and no genital sensation).³

More recently, Barry Komisaruk and Beverly Whipple have measured blood pressure, heart rate and pupil diameter in women who claimed that they could produce orgasm without mechanically stimulating any part of their body. Indeed, in those women, there were significant increases in, e.g., systolic blood pressure (from a resting level of around 126 mmHg to around 210 mmHg at “orgasm”), heart rate and pain thresholds (a characteristic feature of orgasm) when the women generated what they claimed were “thought orgasms”. Quite surprisingly, these increases were well comparable with those observed in women who experienced orgasms in the laboratory via genital self-stimulation. From these considerations, Komisaruk and Whipple arrive at positing the whole of human body as a potentially erotic organ: there can be back-of-the-neck orgasms, palm-of-the-hand orgasms etc.⁴ They conclude, “Just as pain is not restricted to any one part of the body, neither is pleasure.”⁵

The problem is that if one accepts the “merely tools” or “it is all in your mind” approach suggested by the data of the above type, then it becomes almost impossible to unambiguously define what an orgasm is. If one cannot employ markers such as ejaculation (in males) or involuntary rhythmic contractions of the circumvaginal muscles (in females) as “crutches” for a definition, then orgasm becomes a hazy, experiential term very much like ‘love’ and ‘happiness’: everybody talks about it but no-one really knows how to define it. Bianchi-Demicheli and Ortigue, too, recognize the problem, saying that a major issue in defining orgasm is the discrepancy between subjective descriptions and objective physiological signs, forcing most researchers to describe only the observed physical changes.⁶

To get around this problem, Bianchi-Demicheli and Ortigue adopt an elegant definition by Cindy Meston and colleagues: (female) orgasm is a variable transient peak sensation of intense pleasure, creating an altered state of consciousness, usually accompanied by involuntary, rhythmic contractions of the pelvic striated circumvaginal musculature, often with concomitant uterine and anal contractions and myotonia that resolves the sexually-induced vasocongestion, usually with an induction of well-being and contentment.⁷

⁵ Komisaruk & Whipple 1998, 937.
⁶ Bianchi-Demicheli & Ortigue 2007, 2646.
Obviously, this definition is gender-specific. However, it can easily be modified to apply to males, too. Its elegance (and use, within the present context) lies in the fact that it makes it unambiguously clear – orgasm is an altered state of consciousness. Note that the physiological signs of orgasm are – in this definition – carefully kept apart from the experience itself by the phrase ‘usually accompanied by’. On the one hand, such a definition allows one to incorporate the above described atypical orgasms into the same model. On the other hand (and more importantly for the present discussion), it provides a near-perfect reference point to directly compare orgasms to what is known about MSCs.

§ 2. Re-engaging the “rivaling” ANS twins

Both orgasms and MSCs, thus, can be viewed as somewhat unusual states of consciousness. The question, within the present context, though, is – to what extent and in what sense are they unusual in the same way. James Austin, a renowned zen scholar and neuroscientist, has noted – while discussing the suspected neural link between orgasms and MSCs – that orgasm is sometimes referred to as “the little death” (French le petit mort). He relates this idiom to MSCs (known in zen as kensho’s and satori’s) which are sometimes characterized as “the great death”. Austin argues that the notion of death stands, in both cases, for a loss of the sense of self involved. ‘Little’ and ‘great’, then, describing the “amount” of the loss of ego-centered awareness.8

This is an intriguing way of looking at the matter. Remember that Newberg and d’Aquili ascribe the loss of self-awareness during MSCs to the deafferentation-deactivation of the PSPL. If this theory is correct, then, based on Austin’s idiom, one would expect to find comparable changes in the functioning of the PSPL during orgasms as well. Methodologically, this would suggest directly comparing the brain scans of subjects having MSCs and those of people having orgasms in order to decide whether the MSC-orgasm link can be backed up. Such a strategy would be in good accordance with Bianchi-Demicheli and Ortigue’s position that orgasms are to be thought of as primarily a brain phenomenon and that too much effort has gone into analyzing the objective physiological signs involved.

I shall undertake just such a task in chapter VII. For now, though, despite Bianchi-Demicheli and Ortigue’s position, I consider it necessary to engage in the “mundane” task of comparing the ANS-related “objective physiological signs” (as Bianchi-Demicheli and Ortigue call them) of orgasms to the ANS-based data on MSCs. I have several reasons for this. First of all, in Newberg and d’Aquili’s model the idea of PSPL deafferentation does not stand alone. The PSPL is deafferentated as a result of the taking of effect of a complex pattern of brain activity that involves a delicately orchestrated, integrated response from the ANS, the hypothalamus, several other limbic structures and multiple cortical

8 Austin 2006, 93.
areas. The deafferentation is directly dependent on the hypothalamic “spillover”. Therefore, it seems useful – prior to going into looking for similarities in the functioning of the PSPL during orgasms and MSCs – to see if anything like a neural “spillover” from one branch of the ANS to the other can be seen in action during orgasms, too and where do the hypothalamus and other limbic structures fit in.

Furthermore, with one significant exception to be discussed in chapter VII, Newberg and d’Aquili – in relating MSCs to orgasm – always appeal to the “spillover” in the ANS (and not the PSPL deafferentation) as the main parallel between orgasm and MSCs. They do discuss changes in the sense of self during states that are related to sexuality (such as romantic love⁹) but do not directly link the loss of self with orgasm. Again, then, this suggests looking into the ANS parallels first. The more so because, according to Newberg and Lee, in research into MSCs, the ANS activity based approaches continue to be by far the most common¹⁰ and because ANS activity cannot be analyzed via brain-scanning.

On these considerations I shall begin the comparative analysis from first establishing whether there is, actually, enough evidence to argue for the existence of 3rd stage (or “spillover”) autonomic states (for example, it may easily be that what appears to be a simultaneous activation [coactivation] of the ANS branches is simply a well-orchestrated alteration between sympathetically and parasympathetically dominated states with no “third stage” involved). I shall then be looking for independent data for the involvement of the 3rd stage states in both orgasm and MSCs.

B. AUTONOMIC INTERACTIONS AND THE DUAL PHYSIOLOGICAL CHARACTER OF MSCs AND ORGASM

§ 1. Evidence for 3rd stage states and their involvement in orgasm

The ANS is responsible for regulating fundamental functions such as heart rate, blood pressure, body temperature and digestion. At the same time, because of its connections to higher brain structures, it also has a significant role to play in mediating many higher functions, including the generation of emotions.¹¹ For example, Sue Carter notes that the involvement of the ANS in mediating

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¹¹ WGA, 38.
emotion is evident from how emotional feelings tend to be associated with visceral sensations. Think, for example, of concepts such as love sickness and heartaches or folk sayings such as the way to a man’s heart is through his stomach.  

I emphasize the link between the ANS, the heart and the viscera for a reason. When it comes to 3rd stage ANS states – states that involve a coactivation of the sympathetic and parasympathetic system, then a routine data search on PubMed reveals that the issue is most often discussed in relation to cardiac function, usually within the context of pathologies such as bradycardia, tachycardia and malignant arrhythmias.  

Thus, 3rd stage states are discussed and thought to occur. But there is a problem. As Newberg and d’Aquili, too, admit (in an endnote to WGA) – there is actually very little specific evidence for the involvement of 3rd stage states in MSCs. This is due to the fact that the differential activity in the ANS is difficult to measure directly. Typically, ANS-dependent variables such as heart rate or blood pressure are employed. The problem emerges in interpreting the changes in these measures. Increased heart rate, for example, can be seen either as an increase in sympathetic activity or a decrease in parasympathetic activity. How would one, then, measure when both arms of the ANS “fire” at once? In other words – assuming that 3rd stage states do occur, what would signal their presence?  

In this regard, there is an excellent study by Kiyomi Koizumi and colleagues from 1982 that Newberg and d’Aquili also occasionally refer to. Basically, it consists in experimentally testing the hypothesis that ANS states are possible in which the reciprocity or “antagonism” of the sympathetic and parasympathetic nerve action is overruled. The study was performed on dogs, with the main conclusion that 3rd stage ANS states are possible and that they result in – nota bene – an even more augmented increase in total cardiac output than in the case of sympathetic stimulation only.

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15 WGA, 192–193.  
Significantly for my present purpose, Koizumi and colleagues argue that – when it comes to heart function – while reciprocity between the sympathetic and vagal (parasympathetic) “controls” seems to be a general rule, both reciprocal and nonreciprocal reactions can be evoked – by stimulating different areas of the hypothalamus. They then elegantly show how such nonreciprocal ANS states can be beneficial in terms of heart function.17

These classical findings are strongly supported by a recent data review by Julian Paton and colleagues. These authors, too, emphasize that the coactivation of sympathetic and vagal/parasympathetic heart controls results in even greater total cardiac output than in the case of sympathetic stimulation alone. Curiously, Paton and colleagues further argue that when it comes to heart function, the “usual”, reciprocal (or “antagonistic”) relationship between the ANS branches may, in fact, be an exception rather than the rule.18

Be that as it may, it seems that the possibility and significance of non-reciprocal ANS states is by today more or less generally acknowledged. Gary Berntson and colleagues have argued that the modes of autonomic control do not lie along a single continuum extending from parasympathetic to sympathetic dominance but rather distribute within a two-dimensional space, suggesting that nonreciprocal ANS states may be much more common than previously thought.19

While such considerations do not resolve the issue of how precisely to decide whether observed changes in, say, heart rate or blood pressure signal a 3rd stage state or not, they do provide enough basis to maintain that (1) 3rd stage states are possible, (2) they are not (necessarily) dysfunctional and (3) they can be elicited via stimulating certain areas of the hypothalamus.

Now, what about the involvement of 3rd stage ANS states in orgasm? Is there any evidence of it? In The Mystical Mind – while discussing sympathetic/ergotropic functions – Newberg and d’Aquili list ejaculation as being a specifically sympathetic function.20 (The sympathetic-orgasm link is also made in a comparable passage of WGA.21) As to the specifically parasympathetic/trophotropic functions, The Mystical Mind lists penile erection.22 (In a comparable passage in WGA, however, no link is made with sexual behavior.23) Since from the perspective of successful reproduction erection and ejaculation have to occur at results of this study are in excellent accordance with Stephen Porges’s polyvagal theory (Porges 1998) discussed in chapter VIII in order to reframe the MSC-orgasm link.

17 Koizumi et al. 1982, 2116; 2120.
18 Paton et al. 2006, 1245.
21 WGA, 38.
the same time, a reasonable inference is that during orgasm the sympathetic and parasympathetic systems must coactivate.

As it turns out, independent evidence in support of this view is not hard to find at all. Particular terms and concepts differ but the basic idea that orgasm (and sexual response generally) presupposes simultaneous sympathetic and parasympathetic nerve action keeps surfacing.

In Bianchi-Demicheli and Ortigue’s 2007 metastudy, for example, one finds the following argument: human sexual response can be viewed as consisting of three basic phases – desire, arousal and orgasm. The phases are mediated by separate and interconnected neurophysiological mechanisms: desire is generated by limbic activation, whereas arousal and orgasm are mostly connected with the stimulation of reflex pathways in the spinal cord. The orgasmic stage happens when excitement seems to go over the edge.\(^{24}\)

I shall discuss the limbic system connection in this train of thought in the next chapter. For now, note that the metaphor of excitement “going over the edge” is highly reminiscent of the “spillover” metaphor. Taken together with Bianchi-Demicheli and Ortigue’s above reviewed position that orgasms should be considered an altered state of consciousness, one has an argumentation structure that is obviously parallel to and commensurate with those of Newberg and d’Aquili.

What in Bianchi-Demicheli and Ortigue’s case is a mere similarity of metaphors becomes an explicit discussion in Ion Motofei and David Rowland’s analysis of orgasm and sexual arousal. They write, “[S]exual arousal requires simultaneous activation at the cerebral level of both the parasympathetic and sympathetic autonomic systems, systems traditionally viewed as antagonistic rather than complementary systems.”\(^ {25}\) Motofei and Rowland also defend the view that (the male) orgasm – even if only the ejaculatory phase is considered – is, physiologically, a “dual” process in which seminal emission is sympathetically and expulsion parasympathetically controlled.\(^ {26}\)

Apparently, Motofei and Rowland find the idea of simultaneous sympathetic and parasympathetic nerve action puzzling (this indicating how deeply the notion of “antagonism” between the ANS branches is rooted) because they have constructed a detailed hypothesis to explain how, on the cerebral level, might both sympathetic and parasympathetic activity increase at the same time. Their answer is intriguing. Motofei and Rowland propose that sexual intercourse presupposes the concomitant stimulation of two different types of genital


\(^{26}\) Motofei & Rowland 2005a, 1335. For a detailed discussion of the topic, see: Komisaruk et al. 2006, 16–30.
receptors. The nerve supply serving the glans penis/clitoral gland differs from that of the erogenous zones of the penile shaft/clitoral hood (along with the labia minora). If one then views each type of receptors as associated with one of the autonomic branches, it becomes clear how sexual activities can result in a simultaneous stimulation of both the sympathetic and parasympathetic systems.27

Recently, drawing on the same basic ideas, Motofei has published a model of male sexual response that is almost entirely based on such “duality”. In fact, the title of the paper is A Dual Physiological Character for Sexual Function.28 In this model, the dual character of sexual function is, again, represented by the above two distinct and opposite autonomic “complexes” but the schema is further refined by subdividing the ejaculatory process into a sympathetically controlled phase of emission and a parasympathetically controlled phase of expulsion.29 Also, two additional pairs of opposing “characters” are integrated – one relating to sex hormones and the other to serotonergic modulation of sexual function. The basic idea is that male sexual response can best be analyzed in terms of the opposing members of the interrelated dual pairs becoming simultaneously (but not necessarily equally) active.30

Komisaruk and colleagues, while discussing how the orgasmic response is mediated on the autonomic level, also emphasize that both arms of the ANS are “engaged”.31 It seems, thus, that there is a consensus among researchers that orgasm does involve a state during which there is a coactivation of the sympathetic and parasympathetic systems. None of the authors mentioned explicitly uses either the concept of 3rd stage states or that of hypothalamic “spillover” but the general idea of the coactivation of the opposing branches of the ANS is strongly present in all of them. Therefore, to the extent that one is ready to “buy” Newberg and d’Aquili in that 3rd stage states are also involved in MSCs, the proposed orgasm-MSC parallel seems to bear out on the autonomic level.

§ 2. 3rd stage states and MSCs – the problem of evidence

But should one, really, “buy” Newberg and d’Aquili’s claim? What is the evidence they have provided to substantiate it? In the case of orgasm research

29 ‘Emission’ refers to the phase during which the ejaculatory ducts fill up, ‘expulsion’ to the discharge phase. These phases repeat several times in rapid succession (Komisaruk et al. 2006, 24–25).
30 Motofei 2008, 531.
31 Komisaruk et al. 2006, 16–18; 26–27.
one has specific physiological outputs from which to infer the underlying autonomic substrates (although these outputs should not be conflated with the experience of orgasm). But in research into MSCs – on the ANS level – all the investigator has are unspecific data such as changes in blood pressure, cardiac and respiratory rate. As pointed out above, these measures are notoriously difficult to interpret – especially when it comes to 3rd stage ANS states.

These interpretive difficulties show up at once when one takes a look at how Newberg and d’Aquili justify the claim of MSCs involving 3rd stage ANS states. In WGA, for example, one finds the following passage:

“Studies have shown that participating in spiritual behaviors [...] can lower blood pressure, decrease heart rate, lower rates of respiration, reduce levels of the hormone cortisol, and create positive changes in immune system functions. [...] Since all these functions are regulated by the hypothalamus and autonomic system, the effect of ritual upon autonomic states seems clear.”

The same idea is found in the 2001 report: “Meditation has frequently been associated with alterations in autonomic nervous system activity. Studies of meditating subjects have often reported decreases in blood pressure, heart rate, and changes in galvanic skin responses [...] And then, right after this, Newberg and colleagues state, “We and others have proposed that both sympathetic and parasympathetic activity may be increased during the meditation process [...].”

The latter argumentation structure seems strange in the light of Koizumi and other investigators’ above mentioned arguments on sympathetic and parasympathetic coactivation leading to even higher total cardiac output than in the case of sympathetic stimulation only. Even if one goes with Berntson and colleagues’ idea that the modes of autonomic control do not lie along a single parasympathetic-to-sympathetic axis but distribute within a two-dimensional

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space, this, then, allowing for other coactivation states not necessarily correlated with an increase in total cardiac output, it is still remarkable how Newberg and d’Aquili again and again turn to one single research paper to substantiate the claim of sympathetic and parasympathetic coactivation during MSCs. It is C. K. Peng and colleagues’ study *Exaggerated heart rate oscillations during two meditation techniques* from 1999.

In WGA, one finds this reference in the following form: “[The sympathetic and parasympathetic coactivation] has recently been demonstrated in a study of heart rates during meditation in which there was an increase in the oscillation between heart rates during the meditation period [reference to Peng *et al.* 1999]. This suggested that the autonomic activity is highly variable during such states [---].” In 2003, Newberg and Iversen write, “A recent study corroborated the notion of mutual activation of parasympathetic and sympathetic systems by demonstrating an increase in the variability of heart rate during meditation [the Peng *et al.* reference]. The increased variation in heart rate was hypothesized to reflect activation of both arms of the autonomic nervous system.” The same idea, in an almost identical wording, is also found in a recent, 2005 paper by Newberg and Lee, except that this time the authors add – the idea that the sympathetic and parasympathetic systems can be activated simultaneously is consistent with recent developments in the study of autonomic interactions.

With the above, I am not trying to undermine Newberg and colleagues’ theorizing or Peng and associates’ results. Peng *et al.* did find prominent heart rate oscillations during Chi and Kundalini meditation. The heart rate dynamics did show highly complicated fluctuations rather than a steady, parasympathetically dominated (“hypometabolic”) state as is assumed to be the case in many studies on meditation. What I am getting at is that affirming sympathetic and parasympathetic coactivation on the basis of heart rate (or other ANS-dependent) fluctuations is a “long shot”, especially if the dataset to refer to is small.

It is, indeed, quite small. Just to give an idea of what the other members of this “set” are – Benson and colleagues present case reports on three Tibetan Buddhist monks, examining the extent to which advanced meditative practices

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37 WGA, 192–193.
might alter body metabolism and the electroencephalogram. They found that during different meditative practices, resting metabolism could be both raised (up to 61%) and lowered (down to 64%). Their conclusion: advanced meditative practices may yield different alterations in metabolism and the increases/decreases in metabolism can be striking.\textsuperscript{41} What is important here is not Benson and colleagues’ results (which are clearly compatible with those of Peng and colleagues). The point is that these results represent \textit{unspecific measures} taken on \textit{three individuals}. Again, this is not to say that the study is invalid. It is to say that, differently from orgasm research where positing the sympathetic and parasympathetic coactivation is based on tracing the particular neural pathways involved, arguing for the involvement of 3\textsuperscript{rd} stage states in MSCs on the basis of fluctuations in ANS measures is a “messy business” that involves imaginative interpretation and daring generalization.

Should one, then, conclude that the involvement of 3\textsuperscript{rd} stage states in MSCs is weakly documented? Yes and no. The case for a ‘yes’ can easily be made. In addition to the foregoing – both in positing MSCs as 3\textsuperscript{rd} state phenomena and in drawing an analogy with orgasm, Newberg and d’Aquili heavily rely on Gellhorn and Kiely’s thinking.\textsuperscript{42} Here is a telling example:

“It was postulated by Gellhorn and Kiely (1972) that the reversal state and the state of maximal discharge of both the sympathetic and parasympathetic systems are associated with physiological states such as sexual orgasm or prolonged stress, learned behaviors such as meditation or ecstatic states and pathological states such as psychoses.”\textsuperscript{43}

There are two important aspects about this passage. First, note the phrase ‘it was postulated by’. In other words, the basis for positing MSCs as involving 3\textsuperscript{rd} stage states is theoretical and not experimental. But second, despite very close reading I found no hint whatsoever in Gellhorn and Kiely’s 1972 paper on orgasm as involving 3\textsuperscript{rd} stage states. In fact, the paper says nothing at all about orgasm. The same goes for Gellhorn and Kiely’s 1973 study in which they outlay the doctrine of three stages of autonomic states.

The linking of orgasm with the Gellhorn and Kiely model is d’Aquili’s deed. In 1983, he writes, “The simplest paradigm to explain [MSCs is] \[---\] orgasm. During orgasm \[---\] there is intense simultaneous discharge from both the autonomic subsystems.”\textsuperscript{44} Neither in this nor in any of the other papers I am familiar with does d’Aquili provide direct references to relevant empirical results that would allow one to substantiate the claim. On considerations such as

\begin{itemize}
\item Gellhorn & Kiely 1972; 1973.
\item Newberg & Iversen 2003a, 265–266.
\item D’Aquili 1983, 263.
\end{itemize}
these, it is not difficult to argue that positing MSCs as 3rd stage states is weakly documented, inferential and dubious.

However, such a conclusion is misaimed and, above all, very counter-productive when it comes to understanding and studying mystical states. I already pointed out above that there are good reasons to view orgasms as involving sympathetic and parasympathetic coactivation. The same is true of MSCs – despite the fact that specific empirical evidence for it is difficult to obtain and hard to interpret. The Peng et al. 1999 and similar references were never offered by Newberg and colleagues with an intent to unambiguously prove their point. Their function is to simply provide additional support to a position that, fundamentally, relies on data of a completely different type.

The strongest support to the view that MSCs involve sympathetic and parasympathetic coactivation comes from phenomenological analysis of MSCs, not typical ANS-related measures. That this is the real basis for associating MSCs with 3rd stage autonomic functioning is clear from Newberg and Waldman’s following argument:

“After profound meditative states, practitioners report having felt both intense arousal or ecstasy and deep calm and tranquility. For instance, Richard Bucke’s memoirs clearly reflect this, as do the writings of many saints like Teresa of Avila and John of the Cross.”

It is this paradoxical duality in the descriptions of MSCs (affirmed by many a scholar of religion) that actually forms the backbone of the MSCs-as-3rd-stage-phenomena hypothesis, not experimental results. And thus, the credibility of the concept, at the end of the day, depends on whether one is or is not ready to accept the link between the duality of autonomic functioning and those of conscious emotional experience. If such an analogy is accepted (and there are good reasons for doing so), then the often-discussed paradoxicalities (such as the coinciding of fear with exaltation in religious awe) really are suggestive of a coactivation of both autonomic subsystems.

On the basis of the foregoing argumentation it seems, thus, that – at least as far as the coactivation of both autonomic “limbs” is concerned – Newberg and d’Aquili’s proposed link between orgasms and MSCs bears out. If one were looking for a metalevel integrative denominator between the above analyses of orgasm and MSCs, then it would be found in the notion of duality: both orgasms and MSCs are characterized by involving a paradoxical coactivation of opposites.

In the case of orgasm, the paradoxical duality does not end with sympathetic and parasympathetic coactivation but carries on to neurohormonal interactions. According to Motofei and Rowland, for example, in both men and women,

46 As explained in chapter IV, there is a long and venerable tradition of relating ANS functioning to those of somatic and cerebral, the tradition going back to W. R. Hess’s ideas.
orgasm (as well as sexual arousal in general) is associated with the concomitant action of the two antagonistic classes of sex hormones, androgens and estrogens. A similar case can be made for the pair oxytocin-vasopressin and some other pairs. This suggests that looking for the concomitant action of other antagonist “players” beside the sympathetic and parasympathetic system might be a good heuristic strategy for future studies of MSCs, too. Especially in mapping out the possible varieties of MSCs (currently, the Newberg and d’Aquili model only allows for two basic types of MSCs, one based on overexciting the sympathetic and the other on overexciting the parasympathetic system).

For now, though, let me turn to another ANS-related parallel that Newberg and d’Aquili have used to argue for an evolutionary link between orgasm and MSCs. It has to do with the question of how the 3rd stage states are elicited, i.e., what does it take to push either of the autonomic subsystems to overexcitation.

C. RHYTHMICITY AND THE “STAIRCASE” PHENOMENON

In WGA, Newberg and d’Aquili point out that the neural mechanism of orgasm is activated by repetitive rhythmic stimulation. The same, they argue, is true of MSCs. The importance of rhythmicity as a trigger of all 3rd stage states (be they orgasmic or mystical) is also constantly emphasized in most other Newberg and d’Aquili’s writings. As examples of ritual rhythmical practices that can potentially lead to 3rd stage ANS states, d’Aquili lists dance, chanting, drum-beating and several others. The rhythmicity aspect is also present in Newberg and d’Aquili’s 1993 model of meditative MSCs, represented by the notions of the forming of a “reverberating loop” of neural impulses that gathers in intensity during each subsequent cycle (the “recruitment” of stimulation).

This emphasis is best understood if one views the rhythms involved against the background of normal, “baseline” brain and biological rhythms (such as the brain’s beta rhythm or the circadian rhythms). The idea is that the rhythms of ritual and mystical (and sexual) practices alter the “baseline” rhythms and, hence, consciousness.

47 Motofei & Rowland 2005b, 80.
50 WGA, 125–126.
51 For a good early example, see: d’Aquili 1983, 262.
52 D’Aquili 1986, 141–142.
The influence of rhythms upon states of consciousness is easily verified in everyday life. Take, for example, our waking-up rituals. The bell rings, we get out of bed, brush our teeth, drink coffee. We read the morning paper, drive to work (usually taking the same route every morning). The way this rhythm “tunes” our consciousness is at once clear if, for some reason, an element of the routine (e.g., the coffee part) is skipped — the “feeling” is not “right”.

The rhythms within and without ourselves are fundamentally interdependent. For example, musical tempos relate to human pulse rate. The typical tempo for a peaceful ballad is around 60–70 beats per minute — roughly equal to the resting pulse rate and to the pace of a relaxed walk. The typical tempo for club music is between 130–160 beats per minute. This compares to the pulse rate one develops when dancing to such music. Cardiac rate is regulated by the ANS. At the same time, according to d’Aquili, the ANS influences cerebral rhythms. In this light, Newberg and d’Aquili’s idea that repetitive rhythmic stimulation can “drive” the autonomic system, thus “tuning” our states of consciousness seems highly reasonable. The rhythmical patterns repeated can be various, from shamanic drumming to everyday routines — anything organized in a time-sensitive looping sequence.

Since we are all constantly bombarded by all sorts of rhythms, one could say that, in a way, all states of consciousness are somewhat “altered”. From this viewpoint, a mystic’s state during an MSC is not fundamentally different from normal waking states. Just as a youngster in a night club might “get heated” in response to certain combinations of rhythms being played over and over (no need for drugs for that to happen!), in the same way all states of consciousness are conditioned (elicitable?) by interdependent, complex patterns of rhythm. This is why a shaman’s use of drum can be effective in inducing trance. This, also, is how the rhythms involved in sexual behavior can lead to the altered state called orgasm.

As a side remark, given the latter insight, it is not all that surprising to find that human ritual (including mystical) practices in many ways reflect animal mating rituals. The latter, just like human rituals (such as the Gregorian chants or the Polynesian fertility dance), are, according to Newberg and d’Aquili, comprised of structured, patterned responses — dancing, vocalizing, specific movements — that are rhythmic and repetitive, often very odd and with no practical function outside the context of ritual. These repetitive rhythms drive an animal’s ANS to 3rd stage states, this helping it to “transcend” the normal self-protective patterns of behavior and engage in interactions with conspecifics. D’Aquili writes, “This sense of harmony with the universe [during MSCs] may be the human cognitive extrapolation from the more primitive sense of

56 WGA, 81–83.
union with other conspecifics which ritual behavior also excites in prehuman animals.”

As an example, Newberg and d’Aquili employ the mating ritual of a butterfly known as the silver-washed fritillary. It consists in a precisely organized joint flight. First, the male flies several looping circles around the female, his wings almost brushing her body. Then, with the female gliding on a straight, steady path, the male darts acrobatically above and below her, performing, in all, seven distinct acts to each of which the female must respond appropriately. The butterflies then land, posture and exchange scents. This harmony of “understanding” between the butterflies is, according to Newberg and d’Aquili, the result of a biological “resonance” between them, set up by the repetitive rhythms of the courtship flight upon their respective nervous systems.

While the rhythmicity of stimulation is clearly an important element in eliciting both orgasms and MSCs, it is insufficient (this is why meditation does not always lead to enlightenment and why making love can fail in eliciting orgasms). To push the ANS into 3rd stage states, the rhythm of stimulation has to gather in intensity during each subsequent cycle. This is called the “staircase” (or “recruitment”) phenomenon.

In the case of orgasm, Komisaruk and Whipple explain the situation as follows:

“[T]here is a ‘staircase’ or recruitment phenomenon […] in spinal cord neurons in cats, in which a stepwise increase in firing rate occurs in response to repetitive vaginal stimulation. A critical factor in the recruitment of diverse systems into coordinated high levels of activity involves the timing of the stimulation. As Larsson […] has shown in male rats, if the spontaneous mating behavior rhythm is interfered with, marked alterations in ejaculation latency and occurrence result. Thus, the timing of motor activity-induced sensory input is critical for the generation of the recruitment-induced activation of neural systems necessary for orgasm.”

This is an extremely informative passage when it comes to understanding the link between MSCs and orgasm (on the one hand) and Newberg and d’Aquili’s modelling of MSCs (on the other hand). The concept of recruitment is used in the 1993 MSC model in a remarkably similar way. Note that the rhythmicity of stimulation is seamlessly linked to recruitment. To push the ANS into 3rd

57 D’Aquili 1985, 29. I shall discuss the transcendence aspect involved in detail below.
60 D’Aquili & Newberg 1993, 187; 193.
stage states, thus, it is not enough to rhythmically repeat a pattern of stimulation – every cycle of stimulation has to also lead a “step” up a “staircase”.

This is especially important since one must not forget that eliciting 3rd stage states involves pushing either of the autonomic subsystems to extremes – levels of activity that would in “normal” states of consciousness probably be perceived as aversive. Concerning this, Komisaruk and Whipple note: orgasm involves a buildup of excitation in response to sensory stimulation via recruitment (e.g., by rhythmic stimulation) of neural elements. Since genital stimulation suppresses pain, it increases the tolerance of intensities of sensory stimulation that might otherwise be perceived as aversive. The recruitment, facilitated by the analgesia, then, can lead to a level of excitation that surpasses the threshold of high activation-threshold systems mediating ejaculation or uterine contraction, thereby activating these processes.61

The concept ‘high activation-threshold system’ can, in this case, be well compared to d’Aquili’s concept of 3rd stage states. The latter, too, have “high thresholds” for taking effect. For comparison: d’Aquili writes that in reaching the 3rd stage states, in the first stage, activity in one autonomic subsystem increases while it decreases in the other. After stimuli (assumed to be rhythmic) exceed a certain threshold, the second stage of “tuning” is reached in which stimuli which usually elicit a response in the nonsensitized system instead evoke a response in the sensitized system (reversal phenomena). If stimulation continues beyond this stage, increased sensitization can lead to a third stage in which the reciprocal relationship fails and simultaneous discharges in both systems result.62 Clearly, this schema only works on the condition that the stimuli gather in intensity during each subsequent cycle, i.e., only if recruitment is involved.

The use of the recruitment phenomenon in non-reproductive contexts – as is done by Newberg and d’Aquili – is probably well justified. As Komisaruk and Whipple note, “These properties are characteristic of, but not unique to, the genital system.”63 That is, it is not only the specific spinal cord neurons implied by sexual sexual behavior that respond to rhythmic stimulation this way. In discussing emotional states and love, Komisaruk and Whipple generalize:

“Even to the giver of love, his or her motoric actions are tuned to sensory input. In metaphorical terms, if one is pushing another on a swing, the pushes are adjusted to the rhythm of the other to increase the momentum of the swing, not to damp it. The afferent and re-afferent rhythm and pattern of stimulation emerges from the realm of metaphor into the realm of physical reality in its most evident form during physical, particularly sexual, interaction, in which making love can build in excitation to orgasm.”64

61 Komisaruk & Whipple 1998, 934.
63 Komisaruk & Whipple 1998, 935.
64 Komisaruk & Whipple 1998, 928
The swing metaphor is very fitting especially in the present context since it beautifully describes also the rhythmical, ever repeating patterns of stimulation that Newberg and d’Aquili employ in their MSC model. Significantly, it also directly relates to Newberg and d’Aquili’s “spillover” metaphor. What happens if one keeps pushing a swing to ever increasing amplitudes? At a certain point, the swing “spills over” the axle. This is exactly what is supposed to happen during 3rd stage ANS states.

The driving of the ANS to extreme levels of activity is achieved – by the mystics – via very different practices yet all these practices have in common that they make use of the “swing” effect, the “afferent and re-afferent” rhythms and patterns of stimulation. That the process is largely the same as in providing and receiving intimate stimulation, becomes evident from Komisaruk and Whipple’s explanation that the stimulatory patterns involved in loving interactions can vary from physical to symbolic, from hugging and cuddling to fantasizing. But in all cases the idea is to provide/receive intimate, ever increasing stimulation.65 And hence, at the very least, orgasm can function as a good analogy for analyzing what happens in the nervous system during mystical encounters. Whether it can also be used to explain the evolutionary origins of MSCs demands additional analysis.

D. ROUND-UP

Taken together, the results from the ANS-level comparisons between MSCs and orgasm are as follows.

• There are clear parallels between orgasms and MSCs on the autonomic level: both can be characterized as 3rd stage states and both are elicited by repetitive rhythmical practices via the “staircase” phenomenon.

• Conceptually, Newberg and d’Aquili’s notions of hypothalamic “spillover”, simultaneous activation of the ANS branches and rhythmicity – used to describe MSCs – all have equivalents in recent papers on the neurophysiology of orgasm (hypothalamic overexcitation, coactivation of the autonomic branches and recruitment, respectively).

• Hence, at the very least orgasm can function as a good analogy to model MSCs. To argue for an evolutionary link, though, more is needed.

For this next level of analysis, the above swing metaphor provides a good starting point. For a mystical (or sexual) practice to “work” (in leading to 3rd stage states), it has to recruit ever greater neural impulses. For that to occur, the practice has to motivate, be meaningful for the practitioner, mere rhythmicity is not enough.66 As it turns out, it is the analysis of the motivatory “sequence”

65 Komisaruk & Whipple 1998, 928.
66 For an informative test in this regard, see: Telles, Shirley, Nagarathna, R., Nagendra, H. R. Autonomic Changes While Mentally Repeating Two Syllables – one
involved in MSCs that can provide the best way to develop a refined hypothesis on the mystical-orgasmic link.

The key structure implied in this motivatory “sequence” is the hypothalamus. It bridges the ANS with the limbic system and the higher brain structures and is fundamentally important for sexual behavior because of its involvement with regulating the levels of sex hormones in the organism. This suggests that one should find parallels between MSCs and orgasms on the level of limbic system, too. So let us now move up a “storey” – to the limbic system.
CHAPTER VI. THE TEMPORO-LIMBIC PARALLELS

A. STRUCTURE AND FUNCTION BASED CONSIDERATIONS

§ 1. The “transmitter to God”?

The points of convergence noted in the previous chapter serve to point out how orgasms and MSCs can be viewed within the same “system of coordinates” at all. I now come to discussing what apparently forms the most fundamental intersection between orgasms and MSCs – the brain’s limbic system.

If there is any consensus among the researchers of MSCs, then it lies in holding the limbic system (along with the overlying cortical areas of the temporal lobe, especially on the right side) crucial for the generation of MSCs. In fact, several authors (e.g., Jeffrey Saver and John Rabin,1 Rhawn Joseph,2 Michael Persinger3) have expressed the opinion that MSCs are of essentially temporo-limbic origin. Even to the point of claiming the limbic system to be the “transmitter to God” (Rhawn Joseph4) or speculating on there existing a specific “God-spot” in it (Vilayanur Ramachandran5). Newberg and d’Aquili have, in this respect, been more “modest”, but as is clear from chapter IV, they, too, give the limbic structures an important (if not decisive) role in enabling MSCs.6

It is, therefore, of considerable interest that when researchers such as Barry Komisaruk and Beverly Whipple or Francesco Bianchi-Demicheli and Stepha-

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6 To be clear about the matter: the work of all the authors mentioned is highly compatible. Newberg and d’Aquili’s position differs from the rest of the mentioned authors in that it concentrates on MSCs that arise as a consequence of centered effort. The other mentioned approaches tend to be more concerned with spontaneous MSCs. Thus, Newberg and d’Aquili’s hypotheses form a special case from the perspective of the limbic-system-theories. Since my work consists in trying to make sense out of (and develop) Newberg and d’Aquili’s ideas, the limbic system aspect may in the present volume be somewhat underrepresented. However, the relevant information can easily be incorporated.
nie Ortigue start discussing the cerebral correlates of orgasm, they point specifically at the same temporolimbic structures. The parallels with research into MSCs in such discussions are, in fact, obvious. For example, Bianchi-Demicheli and Ortigue argue that the cerebral control of orgasm is mainly localized to the nucleus paragigantocellularis and the limbic system (the paraventricular and medial preoptic nuclei of the hypothalamus, nucleus accumbens, amygdala and hippocampus – largely the same structures discussed in chapter IV for their involvement in the generation of MSCs). In outlining their “Concise Neurological Model of Orgasm”, Komisaruk and colleagues also list several limbic areas relevant in Newberg and d’Aquili’s modelling of MSCs as involved with generating orgasms (e.g., the cingulate cortex, amygdala, septum etc).

For convenience of presentation I shall save the neuroimaging data on limbic activity during orgasm and MSCs for chapter VII and discuss the limbic convergence points here via (a) functional analysis and (b) evidence derived from the study of temporal lobe epilepsy in both cases.

First, a couple of general remarks about the limbic system – to provide context for the below discussion. Newberg and d’Aquili argue that, functionally, in both human beings and other animals, the limbic system is the primary generator of aggressive and sexual responses. As the primate brain evolved, though, the range of limbic responses widened, allowing for the development of the full emotional repertoire available to humans. Newberg and d’Aquili note that the evolutionary “background” of emotions in the primitive responses of aggression and sexual behavior supports the Freudian view – that human emotions and psychological development are based on the most primitive behaviors.

The latter idea is further substantiated in the light of Todd Tremlin’s discussion of how the functions of the limbic system have shifted over the evolutionary time. He notes that the limbic system, while taking the lead today in the experience and expression of emotions, originally evolved to evaluate smell. For animals with powerful olfactory senses, smell is a primary means for negotiating the world, such as deciding whether an object should be approached or avoided. However, as in primates and humans the sense of smell has been superceded by vision, the structures of the limbic system have largely lost their links to smell yet retain their job of generating emotional reactions ranging from fear to elation.

The human limbic system generates and modulates the feelings of fear, happiness, sadness, aggressiveness, love. Many of these are, according to Newberg and d’Aquili, absolutely necessary to life. Animals must be aggressive to find food (especially predators). They must have some form of affiliative

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7 Bianchi-Demicheli & Ortigue 2007, 2649.
8 Komisaruk et al. 2006, 120.
9 D’Aquili & Newberg 1999, 57.
behavior (i.e., primitive love) for there to be offspring and so that they care for their offspring until they can survive on their own.\textsuperscript{11}

Ashbrook and Albright make a similar point. They argue that the functions of the limbic system are all intimately involved with emotion. These functions include eating, mating, fighting for food and mates, playing and the care of the young. Memory, an important limbic function, while not strictly emotional, is still closely involved with emotion: one remembers most easily and most fully that which matters to one emotionally.\textsuperscript{12}

When it comes to the particular structures included as part of the limbic system, Rhawn Joseph lists the hypothalamus, amygdala, cingulate gyrus, hippocampus and the septal nuclei. According to him, these structures are primary in regard to memory, the production of visual imagery and the expression and perception of most aspects of emotion. In addition to the emotions listed above, Joseph significantly notes ecstasy (both sexual and religious).\textsuperscript{13}

Of these structures, three deserve special attention when it comes to uncovering the link between orgasms and MSCs. The hypothalamus is both more ancient and more primitive in emotional expression than, for example, the amygdala. According to Joseph, the hypothalamus mediates very intense, rudimentary, transient \textit{motivational} states that are common to most creatures, including reptiles, amphibians and fish. It monitors internal homeostasis and mediates the desire to eat, drink, attack and have sex.\textsuperscript{14} Joseph specifically points at sex and pleasure as of utmost “concern” to the hypothalamus. To this type of stimuli, it responds by generating orgasmic sensations of great intensity.\textsuperscript{15}

The amygdala, Joseph argues, being intimately interconnected with the hypothalamus, adds nuance to emotional experience. If, for example, a sound is perceived as \textit{sweet} or a memory is recalled as \textit{bitter}, then these nuances are of amygdalar origin. The same goes for perceiving something as spiritually \textit{significant}, sexually \textit{enticing}, or \textit{good} to eat. Joseph concludes his section on the amygdala by a rather strong statement: if it were not for the amygdala, humans would not be able to love, experience the spiritually sublime, feel religious rapture, or know the ecstasies associated with orgasm.\textsuperscript{16}

The hippocampus, another limbic structure listed above and held important in Newberg and d’Aquili’s modelling of MSCs, is primarily related to memory function (and, hence, also to emotion). It is because of the involvement of the (right) hippocampus with storing visual imagery that Joseph can argue: the hippocampus, in conjunction with the amygdala and temporal lobe, contributes

\textsuperscript{11} D’Aquili & Newberg 1999, 38.
\textsuperscript{13} Joseph 2001, 112.
\textsuperscript{14} The “hypothalamic desires” are sometimes jokingly referred to as \textit{the four F’s}: feeding, fighting, fleeing and sexual behavior.
\textsuperscript{15} Joseph 2001, 112.
\textsuperscript{16} Joseph 2001, 112–113.
to the generation of unusual mental phenomena of both sexual and spiritual nature. As examples of such phenomena, Joseph provides an amusing list starting from dreamlike visions involving sexual intercourse, through hallucinations of demons, ghosts and divinities to visions of pigs walking upright dressed as people. In Joseph’s treatment of the topic, MSCs are of the same basic type.17

These three structures are consistently implied in both MSCs and orgasm research. So let me now provide some details as to how.

§ 2. The special role of the hypothalamus

In Newberg and d’Aquili’s modelling of MSCs, the inclusion of the hypothalamus is directly dictated by the emphasis on the ANS interactions. According to Newberg and d’Aquili, the hypothalamus is the main mediator between the brain and the ANS.18 Its medial sections (especially the ventromedial nucleus) are associated with the parasympathetic system while the lateral sections connect to the sympathetic system.19 As such, it represents the probable actual locus of the “spillover” discussed in the previous chapter. And, importantly for the present discussion, its participation is generally assumed in all aspects of sexual behavior, including orgasm.20

The special role of the hypothalamus in analyzing the MSC-orgasm link becomes even more evident if one takes into account that the hypothalamus – in addition to being the main interface between the ANS and the brain – also forms a key link between the nervous and endocrine systems.21 This is important in the present discussion, because, as Newberg and d’Aquili explain, among the various hormonal systems of the body that find some hypothalamic regulation are also the reproductive hormones.22 I already hinted in the round-up of chapter V that, for the generation of MSCs and orgasm, mere rhythmical stimulation is not enough – strong and continuous motivation is necessary. And it is via the (reproductive) hormones that the strongest of human motivations are triggered.

The way all these aspects come together in the case of sexual behavior becomes evident in Komisaruk and colleagues’ and Austin’s discussions of the topic. Komisaruk and colleagues argue that there is remarkable consistency in the distribution of sex steroid (i.e., androgen and estrogen) receptors in the brain

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17 Joseph 2001, 113. For the relevant research supporting this claim, please refer to the original.
21 WGA, 194.
across mammalian species. Most of the brain neurons that have sex steroid receptors are located in the limbic system, with especially high concentrations in the medial paraventricular and medial preoptic nuclei of the hypothalamus. By binding to these receptors, androgens, for example, trigger a variety of changes (including structural and biochemical ones) that alter the responsiveness of specific neural circuits. With these neural circuits adequately “eroticized” by sex hormones, the presence of appropriate stimuli (a mate) will trigger a sexual response while also inducing sexual motivation and desire.23

Austin, explaining the adult psychosexual behavior, adds an interesting and informative twist to the above – a twist that helps to further understand how sex hormones relate to motivation. He points out that the above mentioned hypothalamic and adjoining brain regions employ a special enzyme that presents a yin/yang paradox in endocrinology. Called aromatase, it converts testosterone (an androgen) molecules to estradiol (an estrogen). Interestingly, in males this estradiol goes on to activate estrogen receptors in such key regions as the medial preoptic area of the hypothalamus. But it still promotes male sexual activity when it acts on these local nerve cells, even though it is still an estrogen. Opposites attract, says Austin. Once their olfactory systems detect the faint signals of pheromones, men and women go on to activate their hypothalami differently. Estrogen-like molecules activate the male hypothalamus, testosterone-like molecules the female hypothalamus.24

The involvement of the hypothalamus in motivating and enabling sexual behavior generally is, thus, clear enough. It is also quite clear in the particular case of orgasm. For example, consider Bianchi-Demicheli and Ortigue’s discussion of the “interface” between the so-called urethrogenital reflex (a spinal sexual reflex consisting of combined autonomic and somatic nerve activity and leading to rhythmical vaginal/uterine and anal sphincter contractions associated with orgasm) and the brain. They point out that the control of the urethrogenital reflex is significantly modulated by the inhibitory and excitatory influence of the brain’s limbic system (including the hypothalamus, amygdala and hippocampus). For example, in rats the urethrogenital reflex (as well as both sympathetic and parasympathetic effects) can be triggered by electrical stimulation of the medial preoptic area of the anterior hypothalamus.25

When it comes to the issue of hypothalamic involvement in MSCs, the situation is more complex since there are no clear outward signs after which to decide whether stimulation of this or that hypothalamic area can trigger MSC-related “responses”. In principle, this difficulty can be overcome by functional brain scanning. Unfortunately, at present this is complicated. The hypothalamus is a relatively small brain structure (about the size of an almond) and is not, either functionally or structurally, homogenous. As hinted above, it consists of several functionally differing nuclei such as the medial preoptic nucleus, paraventri-

23 Komisaruk et al. 2006, 192.
cular nucleus etc. Given that the spatial resolution of functional scanning techniques such as PET ranges anywhere between 4–8 mm (with very poor temporal resolution – a serious limitation since MSCs are short-lived), it does not look too encouraging. The existing scanning devices are simply not precise enough to measure the differential activity in the hypothalamic nuclei.

It should come as no surprise, therefore, that – as Newberg and d’Aquili note – studies of meditation and spiritual experiences have not specifically observed the hypothalamus at work during these states. However, they argue, the results of hypothalamic activity are clearly seen in both autonomic shifts and hormonal changes often observed during such states.26

What this means is that in relating MSCs to the hypothalamus, one has to work from indirect evidence. As noted above, the hypothalamus forms a key link between the brain and the ANS and also bridges between the endocrine and nervous systems. Hence, if a mystical practice is observed to lead to autonomically mediated changes (such as increases and decreases in cardiac and breath rate, electrical conductance of the skin, blood pressure) or changes in hypothalamically regulated hormones (e.g., oxytocin, vasopressin), then these findings can be interpreted to signal hypothalamic activity.

As to autonomic changes during MSCs, there is plenty of data. For example, mystical practices have routinely been associated with the so-called relaxation response associated with reduced blood pressure, anxiety and stress.27 Neurochemical changes are also well documented. Changes in chemicals such as arginine vasopressin, cortisol, melatonin (all produced or regulated by the hypothalamus) do not leave much doubt about hypothalamic involvement in MSCs.28

This covered, there is one more aspect to discuss about the hypothalamus and its involvement in MSCs. I pointed out above that the hypothalamus is strongly implied in generating the basic sexual motivations. As Motofei and Rowland explain, “Libido or sexual interest is a psychological construct intended to explain the likelihood or strength of a sexual response. At the neural level, libido represents a [...] projection that most probably involves integration of ‘motivation’ centres in the diencephalon (e.g. medial preoptic area; sexually differentiated nucleus) with sensory, cognitive, and decision-making centres in

26 WGA, 44 (with references to the following work: MacLean, C. R. K., Walton, K. G., Wenneberg, S. R. et al. Altered Responses to Cortisol, GH, TSH and Testosterone to Acute Stress After Four Months’ Practice of Transcendental Meditation (TM). – Annals of the New York Academy of Sciences, Vol. 746, 1994, 381–384). There is, however, one neuroimaging study by Sara Lazar and colleagues that provides direct proof to hypothalamic involvement in the generation of MSCs. I shall discuss this study in chapter VII.
27 For a thorough review of the relevant data, see: Andresen 2002, 17–74.
the cortex.” It may even be that hypothalamic input is more crucial in creating the conditions in which mating can take place than in the motor act itself.

If this is so and if the hypothalamically created motivations are hopelessly imbued with eroticism, then perhaps mystical practices (as well as MSCs) not only resemble sexual ones. Perhaps they are, physiologically, sexually motivated? Such a view can be defended. Consider the following thoughtful remark by Robert Goss:

“That Jesus died for me only intensified my piety. Passionately, I whipped myself in identification with Jesus and in love for him. I wanted to share the sufferings of the man I loved. Sometimes, looking back, I wonder if flagellation was not a form of masturbation. My Jesuit piety promoted an erotic identification with Jesus. Some former Jesuit friends have told me stories of becoming sexually aroused while flogging themselves.”

Intense religious practices that usually accompany mysticism demand putting up with a lot of discomfort. Anyone who has tried sitting in the lotus posture for even a half an hour will know this. The question, then, is – what motivates people to do such things? What “kick” do they get out of it? One possible key is in the phrase ‘in love for him’ of the above quotation.

According to Tobias Esch and George Stefano, it is becoming increasingly clear that hypothalamic activation is specific to erotic (as compared to maternal)

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29 Motofei & Rowland 2005a, 1333.
31 Goss 2002, 9. Concerning this quote – a critic kindly pointed out that it might be necessary to clarify in what sense can flagellation be seen as a mystical practice since one might argue that it has nothing whatsoever in common with, say, zen meditation or yoga and that, consequently, Goss’ experiences may not be relevant as to MSCs. In reality, though, flagellation and yoga do not stand worlds apart. In Raven Grimassi’s words, as a technique of inflicting pain flagellation can act as both a purifier and a catalyst to inducing states of trance. Throughout history the practice has stood in connection with various mystery traditions, including the Eleusinian and Dionysian rites. Flagellation can induce an altered state known as the alpha state during which (in this case in response to [and in order to relieve] pain) considerable amounts of endorphins are released. This can result in feelings of pleasure and ecstasy (which is why flagellation is sometimes used in sexual settings as well). The rhythmicity of whipping during flagellation has an additional mind-altering effect which is not unlike that of shamanic drumming. Paradoxically, ecstasy and pain can be the same experience (Grimassi, Raven. The Witches’ Craft: the Roots of Witchcraft and Magical Transformation. Woodbury (Minnesota), Llewellyn Publications, 2002. P. 158). The link between flagellation and altered states via endogenous opioids has also been underlined by several other authors, e.g., Michael Winkelman (Winkelman, Michael. Alternative and Traditional Medicine Approaches for Substance Abuse Programs: a Shamanic Perspective. – International Journal of Drug Policy, Vol. 12, Issue 4, 2001, 343).
Given the more or less clear hypothalamic involvement in generating MSCs, this provides a way to classify MSCs as a subtype of erotic love states. The point of this is not to label all religious experiences to be sexual at root. The point is that the specifically erotic hypothalamic aspect may provide a way to *physiologically distinguish* between MSCs and more “conventional” religious experiences. Significantly, Ilkka Pyysiäinen has noted that MSCs may be a “special case” of religious experiences. Hence, he says, an important task for future research is explaining their connection with other types of religious experience. In the light of this idea, proposing the presence of a specifically erotic hypothalamic motivatory sequence for MSCs (but not other, more conventional, religious experiences) might be the beginning of just such an explanation. And, as will become clear in the following chapters, it does provide several interesting insights.

§ 3. The amygdaloid-hippocampal complex

In tracing the limbic parallels between MSCs and orgasm, the second region to be given special attention is the amygdala (with the associated hippocampal and adjoining areas). It is heavily involved with almost all aspects of emotional processing, with fear being the most common response. As Newberg and d’Aquili’s vividly note, if one hears a suspicious noise at night, it is the amygdala, via the sympathetic system, that quickens one’s pulse and triggers the surge of fear. In the case of more positive stimuli – like the smell of food or the sight of an attractive sexual partner – the same process occurs, marked, however, with positive affect.

In calling the mind’s attention to such significant stimuli, the amygdala acts in pair with the hippocampus since the latter enables access to the relevant “memory banks”. The dynamic of functioning of the amygdaloid-hippocampal complex is continuous with that of the ANS. As Newberg and d’Aquili point out, the hippocampus has primarily parasympathetic functions while the amygdala is more related to the sympathetic response.

Amygdalar involvement in both motivating and mediating sexual responses is quite clear. However, the relevant dynamics are far from simple. As Stephan

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33 In the present case, ‘more conventional’ refers to all types of religious and/or spiritual states that cannot be considered mystical according to the criteria outlined in the main introduction of the thesis (e.g., the elation one might experience during the Holy Communion).


35 WGA, 45.

Hamann points out, damage to the amygdala can result in what is called the Klüver-Bucy syndrome which is characterized by atypical and indiscriminate sexual behavior. In this sense, the amygdala seems to have an inhibitory and modulatory influence on sexual responses. At the same time, though, it is strongly involved in motivating them. This becomes evident in Hamann’s discussion of sex differences in the amygdala. He explains that the amygdala is strongly influenced by sex hormones. Like the hypothalamus, it responds differently in males and females due to the differences in the androgens-to-estrogens ratio in the male and female organism. For example, based on animal experimentation, Hamann argues that lesions localized to the medial section of the amygdala “kill” sexual motivation in males but not in females (the actual copulatory behavior is unaffected in this case).  

This interesting duality can also be traced in MSCs. Rhawn Joseph, for example, points out that that several types of religious states (including MSCs) reflect increased amygdalar activation – just as do sexual desires, fear and rage. For example, unusually high activation of the amygdala (and adjoining temporo-limbic structures) can result in frightening hallucinations and paralyzing fear. It is noteworthy, Joseph argues, that (Christian) God seems to be highly concerned with sexuality, is often enraged and requires fear as a precondition to experiencing the divine presence and power: “The fear of the Lord is the beginning of wisdom” (Proverbs 1:7, 9:10, 15:33). At the same time, though, healthy and positive states such as religious awe and mystical ecstasy also reflect amygdalar activity.

Considering the above notes on the Klüver-Bucy syndrome and fear being the feeling most commonly associated with amygdalar activation, it is not surprising that recent brain-scanning studies of both orgasm and states of intense erotic love have revealed significant deactivations in the amygdalar region. Since, according to James Ashbrook and Carol Albright, the amygdala is associated with activities related to the preservation of the self/organism (in contrast, the septum, another limbic structure, is associated with activities related to the continuity of the species while both are closely linked to the olfactory apparatus), the amygdalar deactivation can be interpreted to represent a behavioral disinhibition and letting go of the care for self preservation. This is highly similar to the loss of the sense of self during MSCs.

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38 Joseph 2001, 110; 118.
40 Ashbrook & Albright 1997, 74. While Ashbrook and Albright’s description of the septal functions is poetic, these areas are clearly involved in reproductive responses. It has been showed that the introduction of acetylcholine directly into the septal regions can lead to euphoria and orgasm in association with continuous bursts of high-amplitude spindling (a particular type of electroencephalographic activity) focal in the septal region (Komisaruk et al. 2006, 212).
From the topic of self loss, it is convenient to come to discussing the specifically hippocampal “input”. As noted above, the hippocampus is heavily involved with memory. In Newberg and d’Aquili’s modelling of MSCs, however, it is implied for its capacity to “cut” the PSPL off from incoming stimuli. The hippocampus can figuratively be described as the brain’s riot squad – one of its functions is to inhibit neural stimuli if activity in a brain area reaches an unhealthy level of intensity. In Newberg and d’Aquili’s words, the hippocampus often acts as a “floodgate”, inhibiting the flow of neural input between various regions of the brain. As a result, certain brain structures may be deprived of their normal supply of neural input. One such structure is the PSPL. As discussed in chapter IV, the deprivation of the PSPL of incoming neural stimuli can result in changes in or the loss of the sense of self characteristic of MSCs. As to orgasm, the hippocampus is not only involved in its generation – it seems to be a part of the specific cerebral “circuit” that forms the conscious experience of orgasm which may be relatively independent of genital stimulation.

Moreover, according to Newberg and d’Aquili the hippocampus also modulates the activity in another limbic structure – the thalamus. Beside the hypothalamus it is another important structure connecting the ANS to the neocortex – it is arguably the major sensory relay system to the neocortex. In Newberg and d’Aquili’s experiments on MSCs the thalamus showed increased activity while the activity in the PSPL proportionally decreased. One way of interpreting this is to argue that this activation represents the “jam” of incoming stimuli. Another is to argue that it is the thalamus itself (rather than the hippocampus) that does the “gating” of incoming stimuli to the PSPL.

Franz Vollenweider and colleagues have done just this by positing that the thalamus acts as a filter or gating mechanism for the information flow to the cerebral cortex. To complicate the issue even further, Austin argues for yet

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45 Vollenweider, Franz X., Gamma, Alex, Vollenweider-Scherpenhuyzen, Margaret F. I. Neural Correlates of Hallucinogen-Induced Altered States of Consciousness. – Toward a Science of Consciousness III: the Third Tucson Discussions and Debates. Edited by S. R. Hameroff, A. W. Kaszniak and D. J. Chalmers. Cambridge (Massachusetts) and London (UK), The MIT Press / A Bradford Book, 1999. P. 103. Interestingly, the model of MSCs these authors arrive at from the above is the exact opposite from that of Newberg and d’Aquili. The authors argue that it is the deficits in normal thalamic gating that may lead to both altered and psychotic states, because of the
another structure as a possible candidate for deafferenting the PSPL during MSCs. His idea is that, albeit via the thalamic nuclei, fundamentally it is the activity in the reticular nucleus that brings the deactivation of the PSPL about.\textsuperscript{46} Be that as it may, the involvement of the thalamus in generating MSCs is quite clear from the experiments reviewed in chapter IV. It is also involved in orgasm. Komisaruk and colleagues provide evidence that electrical stimulation of the thalamus and adjacent regions can evoke erotic (and other pleasant) sensations, including orgasm.\textsuperscript{47} Precisely how the thalamus and the other discussed structures work together in generating MSCs and orgasm cannot be explained by the above type of structure-function analysis. I therefore now turn to evidence that is more informative in this sense – the evidence derived from the study of epilepsy.

**B. EVIDENCE FROM TEMPORAL LOBE EPILEPSY (TLE)**

§ 1. TLE and orgasm

The associating of religious-mystical states with epilepsy has a long and venerable history. Jeffrey Saver and John Rabin point out that the early Greeks viewed epilepsy as a “sacred disease”, a visitation from the gods. In the Medieval and early Renaissance periods, wide currency was given the Biblical view that epileptic seizures are manifestations of demonic possession (Mark 9:14–29).\textsuperscript{48} Interestingly enough (and turning a blind eye to the “demon interpretation”), a good case can be made that epilepsy, especially TLE, in addition to being a “sacred disease”, is also an “erotic disease”.\textsuperscript{49}

TLE is, according to Michael Persinger, a special form of epileptic disorder. Unlike the more publicized types of epilepsy that involve either “petit mal” (the patient blacking out for a brief period) or “grand mal” seizures (the patient having a “fit”), TLE is not necessarily associated with convulsions.\textsuperscript{49} And, importantly for the present discussion, epileptic activity in the temporo-limbic regions of the brain can elicit both intense sexual arousal and religious-spiritual states.

This said, a note of warning is in place. The below references to TLE are not to be read as saying that MSCs are something pathological. Rather, the cases in which epileptic (and other pathological) activity in the brain have produced religious-spiritual-mystical or erotic-orgasmic states provide ways (1) to localize the foci in the brain that may be involved in triggering sexual and resulting sensory overload and flooding of the cortex. The result of such overload, these authors argue, would be cognitive fragmentation and ego-dissolution.

\textsuperscript{46} Austin 2006, 221.

\textsuperscript{47} Komisaruk \textit{et al.} 2006, 211.


\textsuperscript{49} Persinger 2003b, 276.
mystical states and (2) to analyze the dynamics of the processes involved in generating both orgasm and MSCs. As Bianchi-Demicheli and Ortigue have aptly pointed out: much of current knowledge of the function of specific brain areas comes from the systematic study of patients with brain damage and/or neurological disorders. When it comes to the study of orgasm and MSCs, this is a highly valuable technique since both phenomena are difficult to test under laboratory conditions in healthy volunteers.50

Taking up from Bianchi-Demicheli and Ortigue’s above point, Komisaruk and colleagues – in coming to discuss TLE and orgasm – note, “Much of what is known about how the brain produces orgasms is based on studies of epileptic seizures. There are numerous reports of men and women who describe orgasmic feelings just before the onset of an epileptic seizure. This experience has been termed an ‘orgasmic aura’.”51 It might be necessary to add to this that epileptic discharges can result in real, spontaneous orgasms as well.52

As a rule, Komisaruk and colleagues note, orgasmic auras originate in the right temporal lobe, more precisely the hippocampus and the amygdala (the site of origin is usually ascertained by EEG). Orgasmic auras may have a spontaneous onset. But they can also have specific triggers. For example, Komisaruk and colleagues point to Y.-C. Chuang and associates’ report of a woman in whom the aura was triggered by tooth-brushing.53

Seizure-related orgasms are often unwelcome for their experiencers but, as Komisaruk and colleagues make quite clear, there are also several documented cases of patients refusing medical treatment for their epilepsy because they liked their orgasmic auras. While this is not entirely surprising, another observation about orgasmic auras certainly is: according to Komisaruk and colleagues, these auras (or actual, seizure-related orgasmic states) are not necessarily experienced as involving genital sensation.54 This provides another interesting and informative clue as to how to conceptualize MSCs in their neurological relation to orgasm.

When it comes to defining the actual cerebral foci particularly associated with the generation of orgasmic auras, then, according to Komisaruk and colleagues, most often they are found in the deep structures of the temporal lobe. This becomes evident in the case of TLE patients who are described as hyposexual prior to treatment. According to Komisaruk and colleagues, after undergoing a type of temporal lobectomy for treatment of the seizures these patients have been observed to become hypersexual (the Klüver-Bucy syndrome alluded to above). What is important is that the surgery in question involves the removal of the anterior part of the temporal lobe on the side that generates the

50 Bianchi-Demicheli & Ortigue 2007, 2650.
51 Komisaruk et al. 2006, 214.
52 Bianchi-Demicheli & Ortigue 2007, 2650.
54 Komisaruk et al. 2006, 214.
seizure, the removal of the limbic structures of the medial portion of the temporal lobe – the hippocampus and amygdala.  

The issue of hypo- and hypersexuality in relation to hippocampal and amygdalar disorders is interesting, among other things, because it provides further insight into the peculiar dual involvement of the amygdala in reproductive responses noted in subchapter A. Not all patients with amygdalar-hippocampal disorders are hyposexual prior to treatment – some are hypersexual. In their treatment of the topic, Bianchi-Demicheli and Ortigue – confirming Komisaruk and colleagues’ associating of the medial temporal lobe (including the amygdala) with various aspects of sexuality – point out that the issue of whether epileptic activity in these areas results in hypersexuality or hyposexuality probably depends on whether the inhibitory or excitatory mechanisms are damaged.  

In trying to estimate how strongly orgasmic auras and epileptic orgasms actually relate to the above mentioned brain areas, Bianchi-Demicheli and Ortigue have performed a meta-analysis of the data provided by studies that report patients having spontaneous orgasms and/or erotic feelings in relation to epileptic discharges. They arrive at the following estimation: in 80% of cases such patients had TLE (70% focal and 11% non-focal), in 16% the epileptic focus involved the frontal lobe and in 21% there were parietal discharges. Further, orgasmic auras usually originated in the right hemisphere (in 70% of cases versus 21%). 11% of patients reporting orgasmic auras had epileptic discharges in both hemispheres. Hence a conclusion that, in the generation of an orgasm, the right temporal lobe plays a crucial role. However, some parietal and/or frontal activity is also implied.  

In discussing these results, Bianchi-Demicheli and Ortigue conclude that although inter-individual differences for medical and epilepsy history have to be taken into account before making any binding statements about the hemispheric lateralization and localization of orgasmic states, it is likely that orgasmic sensations are the result of a spread of focal activity within the right hemisphere that might then be generalized to the whole brain. They contend that even though orgasm is not a pathological symptom, it can be assumed that epileptic orgasmic auras are caused by electric discharges at the same brain regions that produce the physiological orgasm in healthy subjects – a statement that deserves to be emphasized in relation to investigating MSCs, too (too often religious.

57 For the bibliographical data on the reports included in the meta-analysis, see: Bianchi-Demicheli & Ortigue 2007, 2650.  
58 Bianchi-Demicheli & Ortigue 2007, 2650. Note that the references to the temporal lobe include limbic structures. Also note the references to parietal areas which are relevant in bringing the results to bear on Newberg and d’Aquili’s model of MSCs. Again, note the right lateralization of the relevant epileptic activity – this confirms d’Aquili’s early view that MSCs are a right brain phenomenon if MSCs are related to orgasm.
people take such analyses to mean as if their religious experiences were labeled “sick” somehow). However, Bianchi-Demicheli and Ortigue note, it must not be forgotten that the temporal lobe has myriads of other functions beside mediating orgasms. The medial temporal lobe is involved in cognitive functions such as autobiographical and semantic memory, perceptual and motivational functioning, facial recognition, emotion, the fight-or-flight response etc. Therefore, simple pointing at the right temporal lobe and the limbic system does not by itself explain much. Multiple other considerations have to be taken into account.59

Among other things this well-balanced conclusion provides a good key as to the neural dynamics in generating an orgasm. Recall the note on the spreading of focal activity within the right hemisphere that might then be generalized to the whole brain. As it turns out, it is quite important – both in explaining the orgasmic process and in relating it to MSCs. Consider Komisaruk and colleagues’ following analysis of the orgasm-epilepsy link (especially in how they connect the way epileptic seizures are generated to how orgasms are generated): if one recalls the recruitment or “staircase” phenomenon discussed in the previous chapter, it at once becomes clear how the same analogy also works to explain the generation of MSCs.

Here is what they say: the reports that epileptic seizures can generate orgasm-like feelings suggest a basic commonality between the two phenomena. Epileptic seizures are characterized by abnormal, cyclical and synchronous activation and deactivation of large numbers of neurons. It is likely that the rhythmic and voluntary timing of genital stimulation (that ultimately leads to orgasm) also produces synchronous activation of large numbers of brain neurons. A consequence (and probably the function) of this regulated synchronous activity in orgasm is the activation of high-threshold systems (such as the one that controls ejaculation – see the section on the “staircase” phenomenon in chapter V).60

Komisaruk and colleagues argue that the evidence of the ejaculatory mechanism being a high-threshold system comes from the fact that normally rhythmic and timed stimulation is necessary to recruit neural elements to higher and higher states of excitation. In orgasm, genital stimulation is channeled into specific and coordinated systems. By contrast, in an epileptic seizure, the mass of synchronous neural activation becomes abnormally diffuse and “can spill over” into motor systems that are not normally activated simultaneously.”61

These latter considerations – if viewed from the perspective of Newberg and d’Aquili’s analysis of MSCs – make it clear why there is more than enough reason to suspect that a similar link with epilepsy is also traceable in the case of MSCs.

59 Bianchi-Demicheli & Ortigue 2007, 2653.
60 Komisaruk et al. 2006, 216.
61 Komisaruk et al. 2006, 216.
§ 2. TLE and MSCs

Perhaps the best known present-day author to have developed on such an idea is Michael Persinger. He writes,

“The first time I recorded an inconspicuous electrical seizure from the temporal lobe of a meditator and heard the reports of cosmic bliss, I was impressed with the impact of this change on the person’s behavior. Here sat a person waiting with anticipation for the coming of a few short seconds of seizure. There were no convulsions or head movements of any kind, just a slight smile and the facial expressions of cosmic serenity.”

Leaving the ancient “sacred disease” doctrine aside, the possible link between epilepsy and religious-spiritual states first came under neuroscientific inquiry in the 19th century. According to Saver and Rabin, back then the above average religiosity of epileptic patients was attributed to their disability, social isolation and need for consolation. By the beginning of the 20th century the concept changed and the notion of ‘religious auras’ (compare to the orgasmic auras above) appeared, accompanied by a hypothesis that epileptics develop distinctive interictal character traits, one of which is religious fervor. Since then, based on these ideas, a substantial number of leading religious figures have been suggested to have suffered from epilepsy.

With the emergence of technologies such as EEG it has become possible to be more precise about the “epileptic character traits” and religious auras. It seems that – just as in the case of orgasmic auras and epileptic orgasms – both are most often present in the case of TLE (in comparison with other forms of epilepsy). As to the epileptic character traits, Andresen notes that TLE patients are prone to religiosity, hypergraphia, exotic philosophical and mystical ideas, pedantism and psychosis. Sexual dysfunction is quite common. The latter is not surprising, since, as Andresen notes, most often in such patients the

62 Persinger 2003b, 276. Michael Persinger is a controversial and much-criticized Canadian neuroscientist whose research has fueled animated debates in various scholarly communities. He has been found guilty of several scholarly “transgressions”, both on the experimental (his experimental designs are often methodologically deficient) and theoretical plane of his work (for a thoroughgoing analysis, see: Runehov 2007, 99–135). However, when it comes to investigating the suspected links between TLE and MSCs, Persinger’s research still provides a wealth of clues. The fact that many of his ideas have been challenged cannot be taken to mean as if all of them were wrong. Therefore, contrary to several other scholars I do not think one should avoid references to Persinger’s research. One simply has to maintain a critical eye towards his texts (which is something one should also do with any other researcher’s writings).

The link between TLE and the interictal character trait of heightened religiosity becomes apparent from Vilayanur Ramachandran’s work. In reviewing the relevant results, Andresen explains that the team used skin conductance response to measure the strength of connections from the inferior temporal lobe to the amygdala. Using three populations, temporal lobe epileptics with religious preoccupations, normal “very religious” people and normal “non-religious” people, skin conductance response was measured to neutral stimuli, to be compared with responses to three types of emotional stimuli: religious, violent and sexual. In the latter two groups, the responses were maximal to sexual stimuli but rarely high to religious ones. Temporal lobe epileptics showed heightened responses to religious stimuli as compared to religious controls. Hence, it seems that the TLE-related hyperreligiosity is linked to the TLE-related hyposexuality discussed above. If so, then there is a good reason to believe that religiosity and religious (including mystical) experiences are also neurologically linked in normal people.

However, the issue of TLE-specific character traits is very general and difficult to relate directly to research into MSCs. Things are both more clear and more interesting in the case of religious auras often associated with TLE. On these, Persinger significantly notes that they often involve an alteration of the subject’s sense of self. Typically, depersonalization is experienced. The person may feel as “not there”. The body may appear to be in one place while the mind is in another. Considering that changes in one’s sense of self are one of the most important features of MSCs, there is every reason to relate the two phenomena – just as in the case of relating orgasm and orgasmic epileptic auras. Also, just as in the case of the above TLE-specific character traits, religious auras seem to most often relate to epileptic discharges in the amygdala and hippocampus. This becomes evident from Saver and Rabin’s (among others) discussion of the topic as they argue – available evidence suggests that spontaneous discharges or electrical stimulations producing religious auras can be localized to the mesolimbic structures: the hippocampus and especially the amygdala. According to Saver and Rabin, it is these areas that are critically responsible for generating the feelings of unreality about the self or the environment.

Importantly (from the perspective of the question how can spontaneous epileptic-like discharges account for the MSC arrived at via centered effort –

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64 Andresen 2001, 268–269.
such as meditation), as Persinger explains, when electrical criteria are considered, the temporal lobe maintains a unique position among neural tissues. Hippocampal cells, in particular, display more electrical instability than any other portion of the brain. Persinger notes that these cells are also prone to repeated firing long after the stimulation has been removed. This electrical “lability” leads to unique properties. The amygdala and the hippocampus can learn specific electrical patterns. Like the total person learning to drive a car or to play tennis, specific kinds of electrical activity can be slowly acquired by these structures. This means that the experiences associated with those electrical patterns can come under the control of a place (e.g., a church), a behavioral pattern (e.g., meditation) etc. In other words, learned electrical changes within the brain are integrated within the intrinsic patterns of activity.  

The way all of the above fits together is well summed up in Andresen’s overview of W. J. Wildman and L. A. Brothers’s model of religious-spiritual states. These authors argue that epileptic-like temporal lobe “transients” (or microseizures) spontaneously occur in the mesolimbic regions of all normal individuals. This (normal) epileptic-like activity may then spread from their original focus to adjacent structures (such as the hypothalamus), this resulting in intense religious experiences. The amygdala and hippocampus have the lowest threshold for seizure-like activity and the high degree of plasticity of these structures means that they are “trainable”. This fact may be relevant to initiation, training, or “practice” sequences in religious traditions cross-culturally, which often are intended to induce religious experiences and MSCs.  

In addition to providing a good general summary of the TLE-based approach to MSCs, the above also provides another key that is quite important in terms of understanding the neural dynamics involved in the generation of MSCs. Note the notion of epileptic-like activity spreading from its original focus to the adjoining areas and leading to what Saver and Rabin call hippocampal-septal hypersynchrony. This is highly parallel to Komisaruk and colleagues’ above discussed TLE-based explanation of the neural dynamics behind orgasm that also involves synchronous temporo-limbic discharges arrived at via gradual “recruitment” of neural elements.  

Finally, as if these parallels between orgasmic and MSC-related processes were not enough, Bianchi-Demichelli and Ortigue’s above discussed conclusion that orgasmic auras most often occur in relation to right hemispheric TLE is also paralleled in the TLE-based studies of mystical states. In Persinger’s view, for example, MSCs represent the awareness of the right hemispheric equivalent

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68 Persinger 2003b, 275.
of the left hemispheric sense of self. He further argues that many of the qualities associated with MSCs clearly suggest right hemispheric origin. For example, MSCs are profoundly emotional, spatial, “beyond the self” and meaningful. According to Persinger, all of these qualities depend on the right rather than the left hemisphere.

Be the latter as it may, TLE-based models of MSCs are quite common. Occasionally, they have been taken to extremes – Saver and Rabin, for example, argue that temporo-limbic epileptic discharges can produce all of the major features of MSCs. While this is almost certainly an overstatement, the positing of epileptic-like synchronous discharges as involved in generating MSCs (as well as orgasms) probably does have some ground.

Among the leading religious figures whose legacy is suspected of reflecting TLE or TLE-like neural activity are Saint Paul, Muhammad, Saint Catherine of Genoa (a Christian mystic), Teresa of Avila (a Christian mystic), Saint Catherine del Ricci (also a mystic), Emanuel Swedenborg (the founder of the New Jerusalem Church), Ann Lee (the founder of the shaker movement), Joseph Smith (the founder of mormonism), Saint Therese of Lisieux (a Christian mystic) etc. Although not a religious figure, an especially interesting case is that of Fyodor Dostoyevsky who describes religious-ecstatic auras, explaining about them that I have really touched God. He came into me myself; yes, God exists, I cried, and I don’t remember anything else.

In conclusion of the TLE-based considerations on MSCs and orgasm, it may be necessary to once again emphasize that the appeal to epilepsy primarily functions as a heuristic tool (i.e., it is not meant as reducing MSCs to epileptic discharges). Or, as Joseph has put it:

“Abraham both saw and heard his God on numerous occasions, both awake and dreaming, often falling on his face as God appeared. However, they walked and spoke together during the heat of the day and during the darkest hours of the night, his God making all types of grandiose promises and predictions, all of which came to pass. [---] Could this personal God from ancient Ur have been but a hallucination [---] [,] a product of temporal lobe epilepsy or subclinical seizure activity? When we consider that this is the same God (at least in religious theory) who today is worshiped by Jews, Christians, and Muslims, the possibility of hallucinations, although quite plausible, seems unlikely.”


72 Persinger 2003a, 281.


75 Joseph 2001, 131.
C. DETOUR: RHAWN JOSEPH ON SPIRITUALITY AND SEX

Drawing almost exclusively on the idea that limbic structures mediate sexual as well as spiritual states, Rhawn Joseph has developed a detailed theory concerning the sexual connotations routinely encountered in religions. While the link between religion and MSCs is not a linear one, it is certainly present. I hence consider it useful to give an overview of his basic idea.

Joseph starts by rhetorically asking – why the obvious concern about sex, pro or contra, in religious thought? His answer, as one might expect, is that sexuality, as well as the capacity for religious and mystical experiences or the ability to derive pleasure from eating and drinking, is mediated by the limbic system – the hypothalamus, amygdala and temporal and frontal lobes. According to Joseph, sexuality is a central concern of most major religions. It is also a major concern of the limbic system. In fact, almost all major religions and their gods act either to promote sexuality or to suppress it (and women in particular). Joseph notes that this should not be entirely surprising since many religions were originally concerned with the fertility of the fields and the abundance of prey (note that Joseph relies on the limbic association of concerns for sex and food discussed in the beginning of this chapter). Religious rituals, then, evolved accordingly. Many modern mystical and religious practices involve the ritual control over both sex and food. Hence the commandments of the type “Thou shalt not…” According to Joseph, these are limbic taboos, because eating and sexuality (as well as murder and violence the Ten Commandments are to uproot) are under limbic control.78

Joseph repeatedly emphasizes that sex and food (along with fear, rage, and aggression) are probably the most powerful of all limbic emotions and motivators, and, when harnessed or stimulated, they can completely overwhelm or control the brain and lead to limbic hyperactivation (note the obvious allusion to temporal-lobe-epilepsy-like discharges) coupled with religious or spiritual sensations, or, at a minimum, complex dreams or hallucinations.79

By the way, the appeal to dreams and dreaming is of considerable importance in Joseph’s accounts on religious consciousness. He argues that the hippocampus and amygdala form a “reservoir” from which various images, emotions and memories can be drawn, including the imagery involved in the

76 A comment may be necessary as to what the role of this detour is within the context of the thesis (since one of the reviewers of the text got the impression that I am uncritically defending Joseph’s [inadequate] theory of religion – something I definitely am not doing). The point of the detour is to provide a somewhat precautionary example of the sweeping generalizations that have occasionally been drawn on the basis of the links discussed above. That these links should not be interpreted as linearly as in Joseph’s theory will become evident in chapters VII–VIII.

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The "otherworldliness" of such imagery is, according to Joseph, explained by the "dreamlike" quality of the nondominant hemispheric "consciousness". Obviously, then, Joseph – similarly to d’Aquili’s early writings and Persinger’s above statements – attributes MSCs to the right hemisphere. Significantly, in order to substantiate this latter position, Joseph refers to evidence from sleep research. He points out that there are reports on dreaming being abolished with right but not left temporal lobe destruction and then argues – there is a specific complementary relationship between dreaming sleep, hallucinations, mystical experiences and right temporal (including right amygdalar and hippocampal) electrophysiological activity, this activity presumably being epileptic-like.

But back to the main line of the argument. Joseph contends – given that human populations have always been so concerned with obtaining food and sex partners, it is not surprising that many of the earliest religious beliefs and rituals were centered around trying to increase the abundance of game animals as well as preserving their own progeny. In substantiating this idea, he notes that many an ancient Upper Paleolithic cave was decorated with fertility and sex symbols, including pregnant women (Venus figures) and animals, whereas Egyptian tombs contain numerous paintings of food.

According to Joseph, these ancient hunter-gatherer concerns for fertility and food live on in more modern religions. These, too, tend to be very sexual and "limbic" in orientation (even if not in origin). In the great religions of India and China, the gods engage in sexual activities and similar sexual activities are promoted among the believers. Joseph notes that the Vedas are greatly concerned not only with the worship of various nature gods but also with the rituals of sexual union. Ancient Indian religious texts are filled with love charms and instructions about how to win the love of a man or woman or how to protect against demons. Temple prostitutes were quite common throughout India and the Middle East as well as in Rome and Greece. And – sexuality and desire, like religious feelings, are directly mediated by the amygdala and hypothalamus.

Joseph then points out that, occasionally, sexual intercourse itself has been used as a religious ritual – as, for example, among Hindus and Buddhists who practised tantra. Tantric practices were inspired by visions of cosmic sex and highly concerned with sexual energy. It was through tantra that one might be confronted with the cosmic mystery of creation as exemplified by another deity, Shakti, the divine mother.

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80 Joseph 2001, 111.
84 Joseph 2001, 123.
Ancient Chinese and Taoist religions are also quite sexual according to Joseph. He points specifically at the concepts of Yin and Yang which appeared about 3,000 years ago and which represented the male and female principles of the universe. Sexual intercourse, then, was viewed as a symbolic union of the earth and heaven, which were believed to mate during rainstorms.\textsuperscript{85}

Joseph then discusses Judaism and Christianity and finds that the influences of limbic sexuality are quite clear in these traditions as well. Among other aspects, he points out that God, when angry, used explicit sexual imagery in condemning the people of Israel, repeatedly threatening to “strip them naked” and referring to them as a “whore” (Hosea 2). Moreover, sexual behavior seems to be of tremendous concern to God. Why else, Joseph asks, the commands of sexual moral obedience or sayings such as \textit{be fruitful and multiply}?\textsuperscript{86}

The general tone of Joseph’s writing is quite sharp and somewhat “reductio-nist”. His conclusion may, therefore, seem a little unexpected – it could be argued, he says, that the evolution of the neuronal spiritual, mystical, religious capacity is the consequence of repeated and exceedingly intense perceptual and emotional experiences with God and the spiritually sublime over many generations. \textit{Homo sapiens} – perhaps under the guiding influence of God, perhaps after repeated experiences with spirits, demons, angels and lost souls – has evolved these limbic neurons that enabled her to better cope with the unknown as well as to perceive and respond to spiritual messages that increased the likelihood of survival. A true scientist, Joseph argues, would not rule out such a possibility. Regardless of how or why, it is clear that there is in fact a scientific and neurological foundation for religious and spiritual experience. The reason for this is yet to be determined. Indeed, given the obvious role of the temporal lobe and limbic system in the generation and perception of myriad spiritual states, it appears (at least at the level of metaphor) that the limbic system may well be the neural transmitter to God.\textsuperscript{87}

This latter point is intriguing because it seems to suggest that humans may have evolved specific “God neurons” located within the generally food-and-sex oriented limbic structures (this explaining why any religion will always gain sexual undertones). This would resemble what Varela and colleagues (among others) have called the “grandmother cell” doctrine – the idea that there is a correspondence between concepts (such as the concept someone has of her grandmother) and specific neurons. Varela and colleagues note that even though this extreme view is waning in popularity, the basic idea that the brain is an information-processing device that responds selectively to features of the environment remains the dominant core of modern neuroscience.\textsuperscript{88}

The situation is even more curious because Joseph himself directly critiques theories that posit the existence of specific “God-spots” in the brain, arguing

\begin{footnotes}
\footnote{Joseph 2001, 123.}
\footnote{Joseph 2001, 124.}
\footnote{Joseph 2001, 132–133.}
\footnote{Varela \textit{et al.} 1991, 44.}
\end{footnotes}
that, “[T]here are no “demon” (or, for that matter, “God”) neurons but rather neural assemblies that interact under certain conditions to produce hallucinations and feelings of God and the spiritual Hereafter.”89 Perhaps, then, one ought to think of the passage in question as meant to point at the need to keep the door open to new possibilities. Meanwhile – according to the above – one is to acquiesce with the knowledge that, because of its basis in the limbic system, religious fervor will forever be imbued with carnal desire.

**D. ROUND-UP**

It might seem at this point that there is no need for further analysis and that the MSC-orgasm link is exposed clearly enough. Parallelism in the neural processing of MSCs and orgasmic experiences is obvious on the temporo-limbic level. Most importantly:

- MSCs and orgasm seem to have the very same “foci of origin” in the nervous system (the right amygdala and hippocampus, the hypothalamus);
- the neural dynamics seem to involve the gradual spreading (via the “staircase” phenomenon) of synchronous discharges in both MSCs and orgasm.

Since the majority of researchers of the neural substrates of MSCs have classified MSCs as basically temporo-limbic phenomena, there is a temptation to proclaim the case closed and move on to discussing the resulting religious implications.

In reality, though, there are more loose ends here than there are “tight knots”. To name just a few: as was already briefly noted in chapter V, co-activation or “spillover” states may not be nearly as unusual as previously thought: modes of autonomic control may not lie along a single continuum extending from parasympathetic to sympathetic dominance but rather distribute within a two-dimensional space.90 If this is so, then much of the explanatory power of the coactivation of the ANS branches during both MSCs and orgasm vanishes into the thin air – at least if one tries to argue that the capacity for MSCs is an evolutionary byproduct of orgasm specifically.

Further, the positing of the hypothalamus as central in generating MSCs is based on indirect evidence. That this may be a stumbling block becomes evident from sex research. Based on similar indirect evidence, the hypothalamus is generally assumed to be the “prime mover” in orgasm. But recent direct data is contradictory in this respect.91 Hypothalamic involvement may only be necessary for the motivatory (and not consummatory) aspects of sexual behavior. This may mean that at least some of the above “clear” parallels are the result of oversimplifying both sexual function and MSCs and relying too heavily on the idea that specific brain areas have specific functions that can be unambiguously related to specific responses.

As alluded to above, God-spot theories downplay the degree to which the human brain is an integrated organ while overestimating the localization of functions. To a lesser degree, the same critique applies to attributing MSCs (and orgasm) to the limbic system. The importance of integrated neuronal networks in generating complex mental phenomena must not be underrated. As will become clear in the next chapter, the experience of orgasm also heavily depends on the coordinated interplay of many cortical areas, just as do MSCs. The more or less undebated fact that epileptic-like “kindling” in subcortical limbic areas of the right temporal lobe can elicit both orgasmic sensations and mystical states cannot be interpreted to mean that those temporal areas are all there is to orgasms and MSCs.

Last but not least, even though it is clear that more or less close neural parallels do exist between orgasms and MSCs, this *per se* says little about the *evolutionary* “story” behind these parallels. It is, indeed, reasonable to argue that the sexual-response-related functions of the ANS and limbic system evolutionarily predate their “transcendent” or MSC-related functions. But a case for *orgasm* providing an evolutionary prototype for MSCs is not so clear. Elisabeth Lloyd, for example, argues that human female orgasm has no adaptive function. Komisaruk and colleagues go even further, showing that a similar case can be made for the male orgasm, because the latter cannot be conflated with its accompanying physiological signs such as ejaculation. Unfortunately, Newberg and d’Aquili’s argumentation on MSCs being an evolutionary byproduct of orgasm hinges on just such a conflation. And, as to Lloyd’s point – how can one attribute the evolutionary origin of a state to another that itself has no adaptive function?

So far, then, the results are inconclusive. It is time to follow another lead: the hint that the *language* of the mystics is reminiscent of orgasmic imagery, suggesting that one ought to find parallels between MSCs and orgasm on the cortical level as well (since language is a characteristically cortical function). This means engaging functional neuroimaging data on orgasm and MSCs into the discussion. As I hope to show in the next two chapters, this type of data both confirms the suspicion that the above described parallels should not be overestimated and offers a way to come up with a refined hypothesis on the nature and origin of MSCs in relation to orgasm.

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92 For a critique of both God-spot and MSCs-as-limbic-phenomena theories, see: Newberg & Waldman 2006, 297–298.
93 Lloyd, Elisabeth A. The Case of the Female Orgasm: Bias in the Science of Evolution. Cambridge (Massachusetts) and London (UK), Harvard University Press, 2005.
94 Here is the argument: ejaculation cannot be conflated with orgasm. There is a difference between the physical act of ejaculation and the feeling of orgasm. While ejaculation is necessary for reproduction, the feeling of orgasm is not. No adaptive function has actually been demonstrated for men’s orgasm. Consequently, there is no better adaptational explanation for the existence of the male orgasm than there is for the female orgasm (Komisaruk et al. 2006, 12).
CHAPTER VII. NEUROIMAGING MSCs AND ORGASMS: MIXING IN THE NEOCORTICAL PARALLELS

A. FUNCTIONAL BRAIN IMAGING DURING MSCs

§ 1. An interlude concerning a remark made in chapter V

I noted in chapter V that, with one significant exception, Newberg and d’Aquili’s linking of MSCs to orgasm is based on analogies observable in the ANS and limbic interactions. It is now time to discuss that one exception. It offers a fitting introduction to studying the neocortical parallels between MSCs and orgasm while also providing some methodological guidance as to how to actually proceed with such an analysis.

The passage in question is found in d’Aquili’s 1986 *Zygon* paper on the Jungian archetypal hypothesis. Its uniqueness consists in the structure of the argumentation it contains – which is totally different from the rest of those concerning the MSC-orgasm link. Here, the link is defended via an appeal to similarities in the functioning of the right hemispheric PSPL during both states.

As usual, d’Aquili starts from asserting that MSCs are states during which the holistic operator (the PSPL on the nondominant side) functions in an “absolute” manner (i.e., independently of input, this being a condition that can be induced via meditation, ritual behavior, starvation, hypoxia, prolonged sensory deprivation etc.). Continuing along his customary lines, d’Aquili argues that during such states the holistic operator generates a sensation of total wholeness and unity devoid of any specific content. But then comes something surprising: he refers to Paul Bakan’s EEG data\(^1\) on increased activity in these areas during the “period of inevitability” just prior to and during orgasm. He notes that during orgasm there is often a brief period of the sense of obliteration of personal boundaries and of general wholeness, hurrying to add, though, that this is not meant as implying that MSCs are simply protracted orgasms. However, he concludes, the activation of the same right brain centers does impart some of these characteristics to both states.\(^2\)

This argument is a very different “beast” from those discussed so far. Its methodological suggestion is that one should expect directly comparable activity in the PSPL in both cases. Since the neuroimaging results reviewed in chapter IV suggest that during MSCs the PSPL deactivates, one should, on such bases, expect to find similar deactivations during orgasm.

Hence, the above passage legitimates the use of recent neuroimaging data on orgasm to further map the orgasm-MSC link. This is a highly relevant aspect

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\(^1\) Bakan 1976, 68 (with further, unspecified references to Leonide Goldstein’s research).

\(^2\) D’Aquili 1986, 156.
since fundamental methodological objections can be raised against comparing orgasm-related cortical activations to those related to MSCs – on the grounds that MSCs are primarily states of complex mental activity while orgasms are primarily a result of sensory stimulation to which the mental correlates are secondary (or epiphenomenal). In addition to providing a clue as to what to be looking for, the passage above, thus, also shows that d’Aquili himself saw no problem in making direct use of the data on brain activations during orgasm in explaining MSCs.

While at it, I also find it appropriate to re-emphasize here a point made in both chapters V and VI – that direct sensory stimulation is not a sine qua non in orgasm and that it is the brain that triggers orgasm, not the genitalia. Moreover, to approach the matter from the other end, Newberg and d’Aquili have shown that MSCs, too, may be produced as a result of sensory stimulation (as, say, in Sufi dancing), although more typically they are generated in a “top down” manner – via activity within the brain that then carries on down through the body via the sympathetic and parasympathetic efferents. Thus, the source of stimuli leading to either MSCs or orgasm, is not as all-important as it might seem at first glance.

In essence, then, the main effort of this chapter will be channeled towards analyzing the metabolic activity in the general region of Brodmann’s area (BA) 7 (i.e., the region of the PSPL – see Appendix for Brodmann’s relevant mapping) during orgasms and MSCs – via looking for an overlap of activation-and-deactivation patterns as mapped by functional brain imaging (PET, SPECT and functional MRI [fMRI]) studies.

§ 2. Reviewing the imaging results on MSCs

As B. Rael Cahn and John Polich point out in their recent data review on meditation, several authors have reported changes in the activity of the PSPL as associated with changes in the perception of self and non-self boundaries. However, the described dynamic of such changes varies from study to study. There are also significant variations in the lists of brain areas found activated or deactivated during meditative and mystical states. In all likeliness, this reflects the differences in the meditative practices used to induce altered states in laboratory conditions. Hence, the issue of which of the existing neuroimaging studies and data on meditation should be included as relevant to the present emphasis on the specifically mystical states is somewhat unclear. I therefore consider it necessary to briefly report on the results of all of the existing imaging studies on meditation here – in order to allow the reader to decide for

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3 WGA, 86; 97.
herself whether my selection of the data to further work with has been appropriate.

In a review from 2003, Newberg and Iversen report that, to their knowledge, there are five neuroimaging studies performed on meditation. (1) Herzog et al. (PET) report increased frontal and decreased parietal activity. (2) Lou et al. (PET) report increased parietal and hippocampal and decreased PFC activity. (3) Lazar et al. (fMRI) found increased prefrontal, parietal, hippocampal, cingulate and hypothalamic activity. (4) Kjaer et al. (PET, EEG) investigated dopamine activity and report it increased in the striatum. (5) The fifth study listed is Newberg and colleagues’ own study on Buddhists reviewed in chapter IV.5

As it turns out, there are several studies Newberg and Iversen had overlooked. In their overview from 2006, Cahn and Polich list 11 neuroimaging studies (if only PET, SPECT and fMRI studies are taken into account) on meditation. To differing degrees, all of these provide insights as to brain activations and deactivations during MSCs. Here are their basic results (note: ↑ = activations, ↓ = deactivations).6

<table>
<thead>
<tr>
<th>Study</th>
<th>Meditation type</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herzog et al.</td>
<td>Yoga meditation</td>
<td>PET</td>
<td>↑: frontal-parietal and frontal-occipital activation ratios. Low resolution analysis. ↓: posterior-anterior ratios</td>
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<tr>
<td>1990</td>
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<tr>
<td>Lou et al.</td>
<td>Yoga nidra meditation (guided)</td>
<td>PET</td>
<td>↑: anterior parietal, fusiform gyrus, occipital cortex. ↓: dorsolateral orbito-frontal, cingulate and temporal cortices, caudate, thalamus, pons, cerebellum</td>
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<td>1999</td>
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<tr>
<td>Lazar et al.</td>
<td>Kundalini yoga meditation (with mantras)</td>
<td>fMRI</td>
<td>↑: dorsolateral PFC, anterior cingulate, parietal and temporal cortices, striatum, hypothalamus, pre- and postcentral gyri. ↓: 20% globally</td>
</tr>
<tr>
<td>2000</td>
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<tr>
<td>Khushu et al.</td>
<td>Raja yoga meditation</td>
<td>fMRI</td>
<td>↑: PFC. ↓: none, low resolution analysis</td>
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<tr>
<td>2000</td>
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6 The table is based on: Cahn & Polich 2006, 197. For the bibliographical data on the studies mentioned but not further discussed in this volume, please refer to the original.
Study | Meditation type | Method | Results
---|---|---|---
Newberg et al. 2001 | Tibetan Buddhist meditation | SPECT | ↑: dorsolateral PFC, thalamus, midbrain, sensorimotor, cingulate and inferior orbito-frontal cortices. ↓: PSPL
Azari et al. 2001 | Psalm 23 recitation | PET | ↑: dorsolateral PFC, right medial parietal cortex, cerebellum. ↓: none reported
Kjaer et al. 2002 | Yoga nidra meditation (guided) | PET, EEG | ↑: EEG theta activity. In this study, dopamine activity was measured. The study cannot be directly compared to others listed.
Ritskes et al. 2003 | Zen meditation | fMRI | ↑: dorsolateral PFC (more prominent on the right side), basal ganglia. ↓: right anterior superior occipital gyrus, anterior cingulate cortex.
Newberg et al. 2003 | Christian centering prayer meditation | SPECT | ↑: PFC, inferior parietal and inferior frontal cortices. ↓: PSPL
Lazar et al. 2003 | Mindfulness vs. Kundalini yoga meditation | fMRI | ↑: cingulate cortex (in both kinds of meditation), right temporal lobe (in mindfulness only). ↓: none reported

From this, one could generalize that the cortical areas consistently showing up as involved in the generation of meditative altered states include the PFC, cingulate cortex and several parietal and temporal foci. This is in good accordance with Newberg and d’Aquili’s theoretical model. The fact that some of the mentioned studies report activations in the parietal areas (rather than deactivations) should not be interpreted as necessarily contradicting Newberg and d’Aquili’s results, since, as noted above, in all likeliness the differences in patterns of neural activity of the reviewed studies reflect the differences in the practices used to induce the state under scrutiny. Moreover, as Newberg and Lee explain, it is not fundamentally clear whether the activation of inhibitory neurons will show up on a scan as an activation or a deactivation. Given that the methods used in the above studies differ somewhat, this might further explain why in some studies the investigators observe activations and in others deactivation in the areas of interest. In other words – the important thing is that the same areas of brain show metabolic changes during the states under scrutiny. Whether these changes are described in terms of activation or deactivation is of secondary importance.

8 This is easily seen from Newberg and colleagues’ own studies. For example, in their investigation of glossolallic experience Newberg and Waldman found the activity in the PSPL increased and the activity in the PFC decreased. In another experiment with a secular atheist meditator, the situation was reversed. But in both cases the areas to show
I hence consider it justified to proceed, in the comparative analysis of the cortical activity during MSCs and orgasm, on the overall basis of the experimental findings presented in chapter IV. However, there are two imaging studies, the results of which need to be incorporated into the analysis. One of them is the above noted study by Sara Lazar and colleagues from 2000. The other is a recent fMRI study by Mario Beauregard and Vincent Paquette that was not yet available at the time Cahn and Polich released their review. The first deserves close attention for providing insight into not only the general cortical areas involved in generating MSCs – it also offers detailed, fMRI-based information on subcortical activations. This, as it will become clear below, is of considerable importance in relating MSCs to orgasm. Significantly, the study – to my knowledge – is the only one performed on altered states in which the hypothalamus has been directly observed to activate. The Beauregard and Paquette study is important, first, because it is the most recent study on specifically mystical states. Second, it relates mystical states directly with states of strong love – an aspect that is of considerable importance in relating mystical states to those directly involved with reproductive behavior.

Lazar and colleagues used blood oxygenation level dependent (BOLD) signal to investigate the metabolic changes in the brain during a simple form of Kundalini meditation. The subjects were to passively observe their breathing and silently repeat the phrase ‘sat nam’ during inhalations and ‘wahe guru’ during exhalations. All subjects (aged 22–45) had practiced Kundalini meditation daily for at least 4 years. During fMRI scanning, the meditation session was preceded by a control session during which the subjects were to silently create a list of animals and not to observe their breathing. The results, thus, represent the changes observable from the control versus meditation comparison.

Here is what Lazar and colleagues found. There were significant increases in the metabolic activity of the putamen, midbrain, anterior cingulate cortex and the hippocampal/parahippocampal formation. The authors explain that significant activations were also observed in the septum, caudate, amygdala and hypothalamus. However, they advise to be cautious about the latter findings – because these foci lay close to areas that are known to produce what they call susceptibility artefacts.

As the reader can see, the structures already discussed in previous chapters come up again – this time via direct measuring. What is interesting, however, is that the neocortical areas supposed to be involved in generating MSCs by metabolic changes were the very same, indicating the importance of these areas in many types of MSC-related states (Newberg & Waldman 2006, 205ff; 226–233).  

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12 Lazar et al. 2000, 1582.
Newberg and d’Aquili – the PFC and parietal regions – did not come up as activated in comparing the meditation state to the control state. They did show up, though, in comparing the brain metabolism during the early versus the late phase of meditation. In this comparison, Lazar and colleagues note the following activations: the PFC, some parietal and temporal foci, the pre- and postcentral gyri, the hippocampal formation, the hypothalamus, septum and amygdala.13

This seems to fit very well with the epilepsy-based idea that the neural dynamic involved in the generation of altered (including mystical) states consists in the gradual spreading of ever increasing (via the “staircase” phenomenon) activity from one or another original focus out all over the brain, the neocortical regions only “kicking in” in a later phase. This may turn out to be helpful in distinguishing the properly mystical states (that involve changes in both the PFC and PSPL) from other states. More importantly, though – the finding is extremely helpful in bringing the imaging data on orgasm into connection with that on MSCs.

§ 3. Beauregard and Paquette on the neural correlates of MSCs

Since Beauregard and Paquette’s MSC study is the most recent available, I shall review it in more detail. Just like that of Lazar and colleagues, the study is based on tracking the BOLD signal with MRI. What makes it especially interesting is that the type of MSCs studied is characterized by the authors as involving a sense of union with God, of having touched the ultimate ground of reality, of timelessness and spacelessness, of union with humankind and the universe, of positive affect, peace, joy and unconditional love.14 This description is highly similar to that used by Newberg and d’Aquili. Therefore – since fMRI has better spatial and (especially) temporal resolution than SPECT, there are good reasons to think of the study as potentially providing a refined view of the brain during states similar to those investigated by Newberg and colleagues.

The study was performed on 15 Carmelite nuns (aged 23–64). No subject had a history of psychiatric or neurological disorder. BOLD signal changes were measured during (a) mystical; (b) control and (c) baseline condition. In (a), the subjects were asked to remember and relive (eyes closed) the most intense MSC ever felt in their lives (this technique was adopted since the nuns were convinced that God cannot be “summoned” at will). In (b), the subjects were instructed to remember and relive (eyes closed) the most intense state of union with another human ever felt in their lives. Two weeks prior to scanning

13 Lazar et al. 2000, 1582.
sessions the nuns were to practice these two tasks. State (c) was the normal restful state (eyes closed).15

The blocked-design paradigm of scanning was used (i.e., the scanning sessions were divided into blocks according to the experimental tasks performed, the subject, then, alternating between rest, control and mystical tasks). After scanning, the intensity of the subjective experience during the control and mystical blocks was measured using numerical rating scales ranging from 0 (no experience of union) to 5 (most intense experience of union).16

Images representing the metabolic activity in the subject’s brain were acquired on a MRI scanner, 28 “slices” (5 mm thick, voxel size = 3,4 mm × 3,5 mm × 5 mm) every two seconds. Following functional scanning, high-resolution anatomical images were acquired. Earpad foam cushions surrounding the head of the subjects and earplugs were used to reduce the noise of the MRI scanner. The collected data were analyzed using SPM software.17

Below are the activations (baseline versus mystical tasks) that can be considered statistically significant.18

<table>
<thead>
<tr>
<th>Region</th>
<th>BA</th>
<th>Stereotactic coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right medial orbitofrontal cortex</td>
<td>11</td>
<td>2 46 –14</td>
</tr>
<tr>
<td>Right middle temporal cortex</td>
<td>21</td>
<td>49 –12 –14</td>
</tr>
<tr>
<td>Left inferior parietal lobule</td>
<td>7</td>
<td>32 –79 38</td>
</tr>
<tr>
<td>Right inferior parietal lobule</td>
<td>40</td>
<td>36 –76 30</td>
</tr>
<tr>
<td>Right superior parietal lobule</td>
<td>7</td>
<td>26 –67 46</td>
</tr>
<tr>
<td>Left caudate</td>
<td>10</td>
<td>–6 8 3</td>
</tr>
<tr>
<td>Left medial PFC</td>
<td>32</td>
<td>–140 7</td>
</tr>
</tbody>
</table>

These results are quite well in line with the above discussed findings. Especially interesting – from the perspective of Newberg and d’Aquili’s arguments – is the cluster of activity noted by Beauregard and Paquette in the right side of BA 7. It does not precisely coincide with that revealed in Newberg and colleagues’ 2001 imaging study (there, a comparable cluster was centered at the coordinates x = 18, y = –68, z = 56, i.e., closer, sideways, to the cerebral midline and higher up). But considering the methodological differences across the two studies, the statistical “smoothing” of the data and the spatial limitations of the used technologies, it is still remarkable. The fact that in Beauregard and Paquette’s study this region shows activation and not deactivation is less important (see the

18 The table is based on: Beauregard & Paquette 2006, 186; 188.
note on this above). This becomes clear in the discussion section of Beauregard and Paquette’s paper. The authors note: given that the right superior parietal lobule is involved in the spatial perception of the self, this cluster of activity might reflect a modification of the body schema associated with the impression that something greater than the subjects seemed to absorb them.

In other respects – as in the studies reviewed above, the anterior cingulate cortex shows activation. Again, there are several clusters of activation in the inferior parietal and temporal cortices. Also important are the clusters centered in the caudate nuclei. But the most significant aspect of the study – from the perspective of the present volume – becomes evident not from the results themselves. It “enters the picture” as Beauregard and Paquette start contrasting the “mystical condition” to the control condition.

Recall that the control task, in Beauregard and Paquette’s study, was re-experiencing a state of strong love. As to this, the authors argue: the caudate nucleus has consistently shown up activated in functional brain imaging studies of positive emotions such as romantic love. Thus, the caudate activations in this study may be related with the feelings of joy and unconditional love involved. The brainstem activation may be linked to the somato-visceral changes associated with those emotions. The insula, another structure found activated, is involved in autonomic regulation and has also been seen activated in several studies of emotional processing. Hence, the authors argue, it is plausible that the insular activation, too, is related to the feelings of joy and love, whereas the cluster of activity in the PFC may be linked to conscious awareness of those feelings. Moreover, the cingulate activation is also almost certainly related to the processing of the specifically emotional aspects of the states involved. Importantly for my purposes, the authors note that the anterior cingulate projects strongly to the hypothalamus.

While the latter clues are quite general, they do provide an additional “bridge” from MSCs to sexuality – via the romantic love link. This contributes to my previous hint (in chapter VI) that it may be possible to distinguish between MSCs and other religious-spiritual states via an appeal to their being erotically motivated. However, before engaging into a detailed discussion on this idea, it is necessary to get several more important issues “out of the way”.

19 Beauregard & Paquette 2006, 189.
20 Beauregard & Paquette 2006, 189. For references to the relevant research backing up this interpretation, please refer to the original.
B. NEUROIMAGING ORGASMS

§ 1. Reviewing the basic results on orgasm

My account on the neuroimaging results on orgasm will be two-phased. In the first phase, I shall rely on Bianchi-Demicheli and Ortigue’s overview\(^{21}\) to then engage the original studies. The reason for this is that, as will become clear below, the relevant results are somewhat contradictory. Therefore, starting from the original data would make it difficult to see the “broad picture”.

The data used in Bianchi-Demicheli and Ortigue’s overview basically come from two research groups – that of Barry Komisaruk (based chiefly on BOLD-fMRI) and that of Janniko Georgiadis (based on PET).\(^{22}\) Bianchi-Demicheli and Ortigue start by summarizing (pointing specifically at Komisaruk and colleagues’ findings) that, critically, the orgasmic response activates the following brain regions: the insula, limbic system (medial amygdala, hippocampus, cingulate cortex and hypothalamus [along with its preoptic area]), nucleus accumbens, basal ganglia (especially putamen), superior parietal cortex (especially the post-central sulcus), dorsolateral PFC and cerebellum, in addition to lower brainstem (the central gray, mesencephalic reticular formation and nucleus tractus solitarius).\(^{23}\)

Importantly, considering the orgasmic neural dynamics discussed under the TLE-based approaches and the Lazar and colleagues’ MSC data above, Bianchi-Demicheli and Ortigue then point out that the orgasmic response seems to consist in a gradual buildup\(^{24}\) of activity which follows a specific sequence.

\(^{21}\) Bianchi-Demicheli & Ortigue 2007.


\(^{23}\) Bianchi-Demicheli & Ortigue 2007, 2653.

\(^{24}\) The concept of gradual buildup of activity is important in several respects from the viewpoint of this thesis. It relates to Newberg and d’Aquili’s concept of ‘recruitment’ of neural activity in ever-repeating “loops” of stimulation during practices leading to MSCs (e.g., see: d’Aquili & Newberg 1993, 186–191). It is via this schema that the “spillover” phenomenon is claimed to occur. It also relates to what Komisaruk and Whipple have called the “staircase” phenomenon which consists in the gradual buildup in the intensity of neural discharges on the basis of rhythmicity of stimulation (Komisaruk & Whipple 1998, 935 [with further references to: Price, D. D., Bushnell,
First, the medial amygdala, basal ganglia (especially the putamen) and insula “come online”, then the cingulate cortex “turns on”. At orgasm, the nucleus accumbens, paraventricular nucleus of the hypothalamus and hippocampus become activated with the activity finally spreading out over the neocortical areas. Thus, orgasm is characterized by a spread of neural activity all over the brain – as also suggested by the epileptic data.25

In their discussion of these findings, Bianchi-Demicheli and Ortigue point out that the above results highlight the relationship between the orgasm-related cerebral network and specific cognitive functions. They argue that the key location of the orgasm-related cerebral network is within or near the limbic system (especially the amygdala) which is crucial in human emotional processing (hence the intense emotion felt during orgasm). The activation of the cingulate cortex points at more subtle emotional aspects involved in orgasm, since the cingulate plays an important role in regulating (in addition to sexuality) emotional life, reactivity to emotional stimuli, perceptual and motivational functioning, memory, facial recognition etc.26

According to Bianchi-Demicheli and Ortigue, the importance of cognitive processes in orgasm is also clear from the activation of such brain areas as the hippocampus (involved in encoding and re-experiencing detailed episodic and spatial memories), the cingulate cortex and the insula (structures involved in pleasure, pain, empathy, partner selection, the self’s and another’s perspective taking27 etc.).28

Having made this clear, Bianchi-Demicheli and Ortigue then come to pointing at something that, from the viewpoint of Newberg and d’Aquili’s hypothesized link between MSCs and orgasm might be considered decisive. Relying on Komisaruk and colleagues’ imaging data, they maintain that the importance of higher-order cognitive functions in orgasm is also obvious from the activation of the dorsolateral PFC and the superior parietal lobe, which play an important role in a variety of cognitive functions such as decision

M. C., Iadorola, M. J. Primary Afferent and Sacral Dorsal Horn Neuron Responses to Vaginal Probing in the Cat. – Neuroscience Letters, Vol. 26, 1981, 67–72; Larsson, K. Effects of Enforced Intervals on the Mating Behavior of Rats of Different Ages. – Zeitschrift für Tierpsychologie, Vol. 17, 1960, 547–551]). In both orgasms and MSCs, then, the rhythmicity of stimulation might be the decisive factor (see chapter V for a further discussion of this).25


27 As a side remark – note the notion of ecstasy or stepping out (Greek ek-stasis) of one’s self implied when Bianchi-Demicheli and Ortigue describe perspective taking and empathy as related to the functions of the cingulate cortex. Since the cingulate cortex is also activated during MSCs, the notion can be used to refine Newberg and d’Aquili’s analysis of how changes in one’s sense of self could be altered on the level of neural activity (e.g., by stretching Bianchi-Demicheli and Ortigue’s view a little, one could jokingly argue that MSCs involve empathically taking the perspective of God).

making, risk-taking, body image, motor imagery, integration of abstract representations, cognitive time management and perspective taking. They conclude that, taken together, current neuroimaging results suggest that orgasm is in many ways dependent on cognitive factors, i.e., how a person feels about herself (body image, abstract representation of the self) and her partner, how safe she feels emotionally and socially etc.29

The mentioning of the dorsolateral PFC and superior parietal lobe in relation to orgasm may – taken together with the epileptic data in the previous chapter and the list of limbic structures involved in generating orgasm – seem to close the “circle” in comparing the neural substrates of MSCs to those of orgasm. After all – every single structure held important in Newberg and d’Aquili’s 1993 model of MSCs is also implied in Bianchi-Demicheli and Ortigue’s discussion of orgasm. Moreover, it might even seem that not only are MSCs an evolutionary byproduct of the phenomenon of orgasm – they may be a special case of orgasm. To the relief of religious believers and theologians, though, such a conclusion is a little premature.

§ 2. Gender differences in orgasm, and a curious dilemma

The way the above conclusion is premature becomes evident as Bianchi-Demicheli and Ortigue start discussing possible gender differences in orgasm. By itself, this topic is not of particular interest from the viewpoint of the present volume. However, it offers a good starting point to expose the fundamental difficulties involved in actually relating MSCs to sexual response.

To get under way, Bianchi-Demicheli and Ortigue note that on the phenomenological level, the male and female orgasms have proven to be indistinguishable. They point at Ellen Vance and Nathaniel Wagner’s 1976 study in which 48 written descriptions of orgasm (24 by males, 24 by females) were submitted to 70 judges. The judges (obstetrician-gynecologists, psychologists and medical students) had to sex-identify the descriptions (give-away terms such as penis and vagina were replaced by neutral terms such as genitalia), looking for gender differences. The judges could not correctly identify the sex of the person describing an orgasm. Furthermore, male judges did no better than female judges and vice versa. The conclusion drawn was that males and females share common mental experiences during orgasm.30

Having made this clear, Bianchi-Demicheli and Ortigue ask – can the same conclusion be arrived at on the basis of current neuroimaging data? In answering this question, they first point out that in both males and females the

urethrogenital reflex is mediated via interactions between the spinal cord and the inhibitory and excitatory influence of supraspinal sites such as the nucleus paragigantocellularis and the paraventricular and medial preoptic nuclei of the hypothalamus. Second, they show that, for both males and females, orgasm associates more with changes of cerebral activity in the right hemisphere – with the main activations localized to the septal region and temporal and parietal cortices (Holstege and colleagues go even further, suggesting that the neocortical activations associated with orgasm are found exclusively on the right side). Third, Bianchi-Demicheli and Ortigue argue, current neuroimaging studies suggest that the male and female orgasm share a common distributed cerebral network characterized by activations in the following regions: the insula, putamen, temporal (BA 20, 21), parietal (BA 7, 40) and prefrontal cortices, septal region and cerebellum.

However, in more specific aspects there are also differences in the neural substrates of the male and female orgasm. For example, as Bianchi-Demicheli and Ortigue point out, the activation of the medial amygdala seems to be characteristic of the female orgasm only. Other possible gender-specific aspects may be that the female orgasm specifically involves the nucleus accumbens, anterior cingulate, hippocampus and hypothalamus, while the male orgasm specifically involves the meso-diencephalic region (the ventral tegmental area and thalamus) and visual cortex.

It is from this point in Bianchi-Demicheli and Ortigue’s reasoning that the fundamental difficulties in relating MSCs to orgasm start to become evident. There, thus, seem to be more or less clear differences in the male and female “orgasmic substrate” (such as the decrease of activation in the male vs. female amygdala during orgasm). Of these differences, the most surprising is that Holstege and colleagues found no increased activation in the male hypothalamus during orgasm while it was clearly observed activated in females by Komisaruk’s research group. As explained in chapter V, the hypothalamus has traditionally been associated with all aspects of sexual behavior. On this basis, Bianchi-Demicheli and Ortigue argue that the absence of hypothalamic involvement during the male orgasm – rather than reflecting a true gender difference in orgasm – is an artefact resulting from the insufficient temporal resolution of PET (Komisaruk and colleagues used fMRI which has much better temporal resolution). In other words, PET may be too limited to detect short-lasting events occurring in the hypothalamus. In confirming this argument, they

31 Holstege et al. 2003, 9185; 9187.
33 This argument by Bianchi-Demicheli and Ortigue is based on the finding by Georgiadis’s research group (lead in the case of male studies by Gert Holstege) that the amygdala – even though presumed to participate in enabling orgasm on the basis of animal experimentation – not only fails to activate during human male orgasm but actually seems to deactivate (Holstege et al. 2003, 9185).
34 Bianchi-Demicheli & Ortigue 2007, 2656.
point at Georgiadis and colleagues’ recent PET study on the female orgasm that also failed to expose hypothalamic activation during orgasm – a result that directly contradicts those by Komisaruk and colleagues.36

Now, while it is, indeed, possible that in this case the conflict of results stems from the insufficient temporal resolution of PET, Georgiadis and colleagues’ other results from the 2006 study undermine this interpretation. Basically, a largely different activation pattern (in comparison to Bianchi-Demicheli and Ortigue’s clearly preferred reports by Komisaruk and colleagues) was revealed from that described above. Georgiadis et al. scanned 12 women (age 21–47) during orgasm and found – instead of wide-spread activations – a general “shutdown”, especially in the areas associated with anxiety and fear, such as the amygdala and hippocampus. During orgasm, activity also decreased in the ventromedial PFC, left lateral orbitofrontal cortex, inferior temporal gyrus and anterior temporal pole. Georgiadis and colleagues interpreted this to reflect the behavioral disinhibition during orgasm (see the notes on the Klüver-Bucy syndrome in chapter VI) and hypothesized that deactivation of the temporo-limbic structures is directly related to high sexual arousal.37

In the face of such conflicting evidence it seems doubtful to ascribe all of the differences to the technical limitations posed by the use of PET. As far as I can tell, the experimental setup used by Georgiadis and colleagues has many advantages over the ones used by Komisaruk et al. This forces me to suspect that other factors may be at play here. This is all the more important since if one were to argue for there being a direct neurological link between the experience of orgasm and MSCs, it would be fairly simple based on Komisaruk and colleagues’ results but quite difficult on the basis of Georgiadis and associates’ results. Moreover – if it should really be the case that the male and female orgasms are considerably different on the neural level, then, with respect to Newberg and d’Aquili’s speculation – should MSCs be thought of as byproducts of the male or female orgasm?

36 Bianchi-Demicheli & Ortigue 2007, 2655 (with references to: Komisaruk et al. 2004; Georgiadis et al. 2006).
37 Georgiadis et al. 2006 (as interpreted in: Bianchi-Demicheli & Ortigue 2007, 2654). By the way, if the issue should be unclear, task-induced deactivation is defined as relative decrease in regional activity, as measured by blood flow or the BOLD signal during an active task compared to a “resting” baseline (McKiernan, Kristen A., Kaufman, Jacqueline N., Kucera-Thompson, Jane, Binder, Jeffrey R. A Parametric Manipulation of Factors Affecting Task-Induced Deactivation in Functional Neuroimaging. – Journal of Cognitive Neuroscience, Vol. 15, No. 3, 2003, 394). As such, deactivations should not be dismissed from analysis as meaning that the areas deactivated are not “doing anything”. That an area deactivates during a task, in fact, signals its direct involvement in generating the state associated with the task under scrutiny.
§ 3. Komisaruk et al. versus Holstege, Georgiadis et al.

Given the above questions – before submitting to the conclusion that MSCs are a byproduct of orgasm, one should give some more thought as to why the data from the mentioned research groups contradict each other. As noted above, I think that Bianchi-Demicheli and Ortigue downplay the significance of the problem. The explanation of the discrepancy via an appeal to the limited temporal resolution of PET is, while certainly reasonable, definitely not indisputable. Also, there are good alternatives to it.

Again, traditionally, the hypothalamus has been linked to every aspect of sexual behavior.\(^{38}\) Its activation during orgasm, in both sexes, is something one would certainly expect based on textbook neurology. Also, as was pointed out above, it is known from animal experimentation that the urethrogenital reflex is controlled via the hypothalamus. Thus, there is a strong temptation to pronounce the lack of hypothalamic activation in the results by Georgiadis et al. an artefact created by the poor temporal resolution of PET.

However, when one compares the experimental designs and protocols used by Komisaruk et al.\(^{39}\) and Georgiadis et al.\(^{40}\) one-on-one, it becomes clear that, methodologically, Georgiadis’s experiments are better set up. For example – since in Komisaruk and colleagues’ studies it is the subject herself who provides the stimulation necessary to generate an orgasm, it is difficult to see how the effects of the accompanying motor activity are to be cleared out from the finished scans. Georgiadis and associates’ designs are more rigorous – every thinkable precaution has been taken to eliminate everything from the scans that is not directly related to orgasm itself.\(^{41}\)

It is therefore all the more significant that when all the “noise” is eliminated from the orgasmic “scene”, the results coming up contradict textbook neurology. This contradiction is not something one can sneak around by simply pronouncing it a result of using insufficiently sensitive technology. One should at least ponder the other possibility – that the problem is with textbook neurology rather than the experimental results. Perhaps, then, what one is faced with here is not a problem of limited temporal resolution? What if Georgiadis and colleagues’ results mean that orgasm as a brain state – if taken in and by itself – does not presuppose hypothalamic involvement? In fact, although Bianchi-

\(^{38}\) Georgiadis & Holstege 2005, 37.
\(^{40}\) See: Georgiadis & Holstege 2005; Georgiadis et al. 2006.
\(^{41}\) However, it must be acknowledged that Georgiadis and colleagues’ studies, too, have problems. One very significant advantage of Komisaruk and associates’ research is that it is embedded in a broader theoretical framework that enables the authors to interpret their experimental findings with enhanced confidence (see: Komisaruk et al. 2006). In a way, Georgiadis and colleagues’ not being able to detect hypothalamic activation during the orgasmic process is an oddity that is very difficult to interpret. For an interpretation, a broader theoretical framework similar to that found in Komisaruk and colleagues’ work would be needed.
Demicheli and Ortigue have for some reason ignored it, Georgiadis and colleagues have offered an alternative explanation to the surprising lack of evidence of hypothalamic activation in their experimental results – an alternative that provides good bases for analyzing both the orgasmic process and MSCs.

The basic idea behind the alternative is that one should think of the orgasmic process as consisting of two related but distinguishable “sequences” – the motivational and the consummatory sequence. Referring to A. Ferretti’s research, Georgiadis and colleagues speculate that the hypothalamus might only be involved in the motivational part of the human sexual response and not in the consummatory part of it.42

In other words, the idea is that since the experiments by Georgiadis and colleagues were designed to study the brain correlates of orgasm per se, due care was taken to keep brain activities not directly involved in generating one to minimum in the subjects. Thus, the results may be representative of the neural correlates of the consummatory aspect of sexual response and not its motivational aspect, this, then, explaining the lack of hypothalamic (as well as general limbic) activation. Hypothalamic involvement would, in this case, be rendered an aspect of the motivational drives involved in sexual response – an idea consistent with a point made in chapter VI (in relation to the hypothesis that MSCs may be distinguishable from more “conventional” types of religious-

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42 Georgiadis & Holstege 2005, 37 (with references to: Ferretti, A., Caulo, M., Del Gratta, C., Di Matteo, R., Merla, A., Montosori, F., Pizzella, V., Pompa, P., Rigatti, P., Rossini, P. M., Salonia, A., Tartaro, A., Romani, G. L. Dynamics of Male Sexual Arousal: Distinct Components of Brain Activation Revealed by fMRI. – NeuroImage, Vol. 26, 2005, 1086–1096). In fact, Georgiadis and colleagues have offered several more hypotheses to explain the lack of hypothalamic activity in their results. As to females specifically, Georgiadis and colleagues offer the following interpretations: (1) the synthesis of “hypothalamic” hormones on which the orgasmic response depends (e.g., oxytocin and vasopressin) is unaltered during sexual activities and release requires no metabolic increase and, hence, no rCBF increase; (2) the temporal resolution of PET may be too limited to detect short-lasting events occurring in the hypothalamus; (3) vaginocervical stimulation may be more effective in activating the hypothalamus, this meaning that the PET results may reflect a qualitative difference between clitoral and vaginal orgasms (Georgiadis et al. 2006, 3315). As to males, they argue that hypothalamic involvement may only be necessary during the onset of erection and not for its sustaining. The hypothalamus, therefore, might be involved in the motivational part of the human male sexual response and not in the consummatory part of it (Georgiadis & Holstege 2005, 37). Of these interpretations, (2) seems to have formed the basis for Bianchi-Demicheli and Ortigue’s above discussed “artefact” interpretation. Whether correct or not, the issue of temporal resolution is of fundamental importance in relation to investigating both orgasm and MSCs. In Georgiadis and colleagues’ PET studies, the time frame for measuring orgasm was around 60 seconds. But orgasm itself is (usually) a matter of just a couple of seconds. Consequently, the studies may not tell one much about the exact moment of orgasm. The same may be true for studies on MSCs such as Newberg and colleagues’ SPECT studies.
spiritual states via an appeal to their hypothalamically mediated motivational sequence).

I am not saying that this alternative view is necessarily “true”. I do, however, find it useful in making sense out of the neuroimaging data on both orgasm and MSCs. The patterns of brain activation described by Bianchi-Demicheli and Ortigue encompass more or less the whole brain (and especially the limbic system). If there is no way to estimate, which ones of the recorded activations are the sine qua non and which ones not, then the described patterns are of little use. In this sense, the experimental designs and results of Georgiadis and colleagues represent a refinement of the current understanding of the orgasmic process. The argument is not that the hypothalamus is not important in the generation of orgasms since it did not show activation during the conducted experiments. The argument is that perhaps it is useful to view the brain patterns associated with the motivational and consummatory aspects of orgasm apart. In real life, of course, orgasms come in a “contextually situated” form with both aspects deeply intertwined. But (or so it seems from Georgiadis and colleagues’ research) in a lab setting – if the designs used are stringent enough – it is possible to distinguish between them.

If one takes such a view and tries, based on Georgiadis and colleagues’ results, to describe the elements of the consummatory part of orgasm, then the “picture” simplifies somewhat. As to females, significant activations (orgasm vs. rest) were only found around the dorsal aspect of the central sulcus and in the cerebellar nuclei. As to males, the strongest activations (orgasm vs. stimulation) were recorded in the meso-diencephalic region, putamen, claustrum and cerebellum. In the neocortex, activations were observed only on the right side (in BA 7/40, 18, 21, 23 and 47).

It is not difficult to see that if this is the fundamental “core” of orgasm, then the MSC-orgasm link largely vanishes (except for a vague parallel in the thalamic region and BA 7/40 in males). Thus, there is a temptation to proclaim most of the above observed parallels in the neural dynamics associated with orgasm and MSCs to relate to how the “pursuit” for these states is physiologically promoted and not to how they are actually enabled. Unfortunately, if this were the case, then while one would still gain some interesting insights as to why MSCs are often described in erotic terms, the possibility to explain the actual enactment of MSCs in the brain via references to orgasm would be lost. Hence, it is critically important to go one level deeper with the analysis.

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43 Georgiadis et al. 2006, 3308.
C. A COMPARATIVE ANALYSIS

§ 1. The “best match” and the “worst match”

Going “one level deeper”, in this case, means bringing the particular results of particular neuroimaging studies on orgasm and MSCs directly “face to face”. In the hope of gaining a refined understanding of the MSC-orgasm link in the process. The main problem with actually performing an analysis of this kind is that the outcome depends directly on which imaging studies one picks out for comparison. Since there are no objective selection criteria, I decided to proceed in two steps. First, I briefly consider the “best match” and “worst match” pairs of studies. I then try to arrive at a balanced estimation of how far the parallels between MSCs and orgasm go and to which extent they might also be present in the “consummatory sequences” involved in each case.

The “best match” pair is easily formed. Take the Lazar and colleagues’ fMRI study on MSCs discussed above.\(^{45}\) If one compares it to Komisaruk and associates’ fMRI study of orgasm\(^ {46}\), then one is tempted to conclude that, physiologically, MSCs are no more and no less than a (possibly very profound and significant) version of orgasm. The areas activated are largely the same. Lazar and colleagues list the putamen, midbrain, anterior cingulate cortex, the hippocampal complex, the septum, amygdala and hypothalamus. In addition, some frontal, parietal and temporal clusters of activation are noted (e.g., in the pre- and postcentral gyri).\(^ {47}\) Komisaruk and associates list the hypothalamus, medial amygdala, anterior cingulate, septum, insula, nucleus accumbens, hippocampus, putamen, cerebellum, frontal and parietal cortices.\(^ {48}\) The neural dynamics reported are also highly similar: the listed structures do not all activate at once but “come online” gradually, the activity finally spreading out all over the brain.\(^ {49}\)

Moreover, both studies fit nicely with Newberg and d’Aquili’s modelling of MSCs and, to a lesser degree, with their SPECT results. The decisive clusters of activity in BA 7 (centered at the stereotactic coordinates \(x = -16, y = -58, z = 50\) on the left side and \(x = 18, y = -68, z = 56\) on the right side) have parallels in Lazar and associates’ results (four clusters in the left BA 7, the most closely matching one centered at \(x = -21, y = -63, z = 53\) ). Komisaruk and colleagues do not provide a table indicating the centers of clusters of activity in terms of their stereotactic coordinates, offering (both in the 2004 paper and the 2006 book) reproductions of the original fMRI scans instead. Unfortunately, the “slices” representing the activity in the relevant BA 7 region have been omitted.

\(^ {45}\) Lazar et al. 2000, 1581–1585.
\(^ {47}\) Lazar et al. 2000, 1582.
\(^ {48}\) Komisaruk et al. 2004, 83–84.
\(^ {49}\) For a detailed discussion of this aspect, see the analysis of Komisaruk and colleagues’ 2004 study in: Komisaruk et al. 2006, 253–260.
Based on data reviewed by Bianchi-Demicheli and Ortigue, though, it is fairly likely that the parietal activations noted by Komisaruk and colleagues associate with BAs 7 and 40 – areas also implied in Newberg and d’Aquili’s model. The fact that in both Lazar and colleagues’ and Komisaruk and associates’ studies the relevant parietal areas come up as activated rather than deactivated may be the result of differences in the method (fMRI versus SPECT) and experimental design.\(^50\)

The “worst match” pair is just as easily formed. As already briefly noted, if one compares Newberg and d’Aquili’s SPECT results (see chapter IV) to Georgiadis and colleagues’ 2006 PET results,\(^51\) then the outcome is devastating – there is almost no overlap at all (except for an uninformative cerebellar link that only becomes evident via Newberg and associates’ less stringent ROI analysis and an insignificant cluster of activity noted by Georgiadis and colleagues in BA 7 in comparing the rest condition to a control condition).\(^52\) While looking at the matter with an “innocent eye”, it would be naïve to expect clear overlaps in the patterns of activity during each state (after all, no one is claiming that orgasms and MSCs are the same thing!), the material reviewed in this and previous chapters suggests otherwise. Nevertheless, the imaging results forming the “worst match” are just as real as those by Lazar, Komisaruk and associates.

Can it really be the case that all of the parallels so far presented form, from the perspective of orgasm, only the motivatory sequence while having almost nothing to do with its neurological “core” (this, then, explaining away the discrepancy between the best and worst “match” results)? The full complexity of the problem is most easily demonstrated (and a more balanced understanding reached) by tracking the changes in BA 7 functioning during orgasms and MSCs (remember – d’Aquili has suggested that the functioning of BA 7 should be similar in both cases\(^53\)).

§ 2. MSCs, orgasm and Brodmann’s area 7

In interpreting the parietal activations during orgasm within the context of discussing MSCs, one has to be quite careful. After all, the cortical sensory representation of the genitalia is located within the paracentral lobule in the centro-parietal region.\(^54\) Therefore, unspecified hints on parallel parietal activity during orgasm and MSCs are “slippery” (to say the least). The same goes for unspecified references to parallel BA 7 functioning during both states. Thus, let


\(^{51}\) Georgiadis et al. 2006.

\(^{52}\) Newberg et al. 2001, 117; Georgiadis et al. 2006, 3309.

\(^{53}\) D’Aquili 1986, 156.

\(^{54}\) Bianchi-Demicheli & Ortigue 2007, 2650.
me now get more specific. Below is a table that summarizes the particular clusters of activity observed in the above discussed studies that fall closest to those found by Newberg and colleagues to deactivate during MSCs.

<table>
<thead>
<tr>
<th>Study, conditions compared</th>
<th>Side, center of cluster, type of finding</th>
<th>Stereotactic coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newberg et al. 2001, mystical vs. rest</td>
<td>Right superior parietal lobule, deactivation</td>
<td>18  -68  56</td>
</tr>
<tr>
<td>Newberg et al. 2001, mystical vs. rest</td>
<td>Left superior parietal lobule, deactivation</td>
<td>-16 -58  50</td>
</tr>
<tr>
<td>Georgiadis et al. 2006, stimulation vs. rest</td>
<td>Left superior parietal lobule, activation</td>
<td>-30 -56  50</td>
</tr>
<tr>
<td>Georgiadis et al. 2006, orgasm vs. stimulation</td>
<td>Left superior parietal lobule, deactivation</td>
<td>-36 -66  56</td>
</tr>
<tr>
<td>Holstege et al. 2003, orgasm vs. stimulation</td>
<td>Right precuneus (BA 7), activation</td>
<td>8  -54  50</td>
</tr>
<tr>
<td>Lazar et al. 2000, late vs. early meditation</td>
<td>Left superior parietal lobule, activation</td>
<td>-21 -63  53</td>
</tr>
<tr>
<td>Beauregard &amp; Paquette 2006, MSC vs. rest</td>
<td>Right superior parietal lobule, activation</td>
<td>26  -67  46</td>
</tr>
<tr>
<td>Beauregard &amp; Paquette 2006, MSC vs. control</td>
<td>Left superior parietal lobule, activation</td>
<td>-35 -56  55</td>
</tr>
</tbody>
</table>

Given that the listed coordinates represent the centers of clusters of activity (in millimeters from the “brain zero”, the x axis measuring the left-right, the y axis the anterior-posterior and the z axis the superior-inferior dimension), it should be quite clear that the “parallels in parietal activity” described above are anything but obvious. For example, the Newberg and colleagues’ 2001 left PSPL finding, while well paralleled by the Georgiadis and associates’ stimulation vs. rest finding in y and z dimensions, “sits” 14 mm further to the left. In addition, the latter is an activation and not a deactivation finding. Not to even mention that it is only apparent in comparing control conditions and not orgasm. The other Georgiadis and colleagues 2006 finding noted in the table, while indeed a deactivation, is centered even further away from those by Newberg and associates. In addition, it does not come forth in comparing orgasm to rest, suggesting that the activity in the surrounding structures is not significantly lower during orgasm than during rest. These two examples, I believe, suffice to point out how easy it is to prove the “parietal parallels” between MSCs and orgasm nonexistent.

However, if one is still determined to argue for the involvement of the same superior parietal region in generating both MSCs and orgasm, there are several
ways to deal with the situation. The fact that some of the above findings are activations and some deactivations can be dealt with—as already explained. Then, considering that the noted coordinates are only the statistical centers of clusters that themselves may overlap and that, furthermore, the spatial resolution of the used scanners is around 3–10 mm, one could argue that there is, indeed, an overlap in the parietal areas involved in generating both MSCs and orgasm. Or, one might try to resolve the issue by suggesting that the parietal parallels between orgasm and MSCs are only present via the motivatory sequence. Then, since Holstege, Georgiadis and colleagues’ studies only describe the consummatory aspect of sexual response, it would not be surprising that the above results do not sit together well. Yet another strategy would be to simply conclude that in arguing for the activity in the PSPL during orgasm to be similar to that during MSCs, d’Aquili was wrong. Hence, while there truly are some remarkable parallels between orgasm and MSCs on the autonomic and limbic levels, the analogy breaks down on the neocortical level. After all, the analogy has to break down somewhere because MSCs are not orgasm.

It should be quite clear from the foregoing that, fundamentally, on the level of PSPL functioning one’s seeing or not seeing parallels between MSCs and orgasm is a matter of interpretation, not data. And any interpretation involves imaginative “stretching” of data. Hence, the analysis provided below is not to be read as in any way definitive. It is simply an attempt to make sense out of the above imaging findings in a reasoned way. My starting point will be the question to which extent can the BA 7 region be viewed as a single “organ”.

As to this, Austin provides a good introduction. Suppose, he writes, there were a patient who had a brain injury confined to just BA 7. What functions would she lose? Austin answers: patients in whom the right superior parietal lobule is damaged are no longer aware (1) of the left side of their body and (2) of items in their left extrapersonal space. Other three-dimensional skills are also affected. Such patients (3) cannot tell where and in what position their left body parts are and (4) when they must rely on memory alone, they cannot locate, reimage and reconstruct familiar external objects that had once been located out in the left half of their external space. In other words, such patients lose their normal, private topographical “master map”.

Assuming that the left side of BA 7 functions for the right side of the body in a similar way, it would seem that, in a broad sense, one could think of BA 7 as an integrated area involved with “master mapping” of elements of both the self and the surrounding space. The idea is further substantiated in Austin’s

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55 It is not clear whether the activity of the inhibitory neurons will come up as an activation or a deactivation with PET and fMRI (Newberg & Lee 2005, 477). Hence, there is some room for “explaining away” the problem if one so wishes.

56 This strategy, albeit tempting, is difficult to defend. The parietal clusters of activity that can be shown to be directly related with the motivatory sequence associated with orgasm (love, desire) are even more difficult to relate to MSCs than the ones reviewed here. See chapter VIII for a related discussion.

57 Austin 2006, 148–149.
discussion of the precuneus – an area within the medial part of the posterior parietal cortex shown activated by Holstege and colleagues during orgasm – as he notes that the precuneus plays a significant role in reflective self-awareness.58 Taken together, this would mean that the clusters of activity in BA 7 listed in the above table can, after all, be used to back up the idea that there are changes in how people perceive themselves and the surrounding space during both orgasms and MSCs.

For Newberg and d’Aquili, the idea that the whole of BA 7 is important in constructing the body image and structuring the space around it seems to not even have caused hesitation. In some papers, they have more or less identified the PSPL with BA 7.59 And in almost all of their publications, the PSPL as a whole is noted as related to the maintaining of the self image and constructing the space around it.60 If so, then – again – any change in the activity of BA 7 during orgasm and MSCs will be relevant in mapping the neurological parallels between these states. It is on this level of generalization, to use the conceptual framework by Francisco Varela and colleagues,61 that the phenomenology and neurology of self loss during orgasm and MSCs are brought together. It is on this level that Newberg and Waldman can argue that there is little difference between MSCs and meaningful or pleasurable activities during which one’s sense of self is temporarily lost.62 It is on this level that Beverley Clack’s description of orgasm as the breaking down of boundaries between self and other, self and the world, for example, can be seen as related to BA 7 functioning.63 The same holds for Lene Sjørup’s description of orgasm via self-loss as she rhetorically asks where do I end and where do you start?64

Now, while this level of generalization does allow one to maintain the orgasm-MSC analogy up to BA 7 functioning, it is difficult to maintain with a straight face. Firstly, as Newberg and d’Aquili, too, warn – even though a particular function might be quite specifically related to a part of the brain, that

58 Austin 2006, 204–205.
61 Varela and colleagues suggest that the human body ought to be thought of as both a physical and a lived, experiential structure – in short, as both “outer” and “inner,” biological and phenomenological. Hence, embodiment encompasses both the body as a lived, experiential structure and the body as the context or milieu of cognitive mechanisms (Varela et al. 1991, xv–xvi). The attempt to relate experiential states (such as MSCs and orgasm) via references to similar underlying bodily changes on the basis of similarities in how they are consciously perceived relies largely on this basic understanding.
62 Newberg & Waldman 2006, 236.
part is fundamentally integrated with all other parts and all these work together to carry out a particular function. But more importantly, as Newberg and Waldman aptly note – when one looks at a quarter-inch section of the brain with a scanning device, the area one sees may contain thousands of neurons. Even though the area may show activation during the state under investigation, it is quite possible that only a small percentage of the neurons in the area are active. This aspect is difficult to measure, particularly since that quarter-inch matrix is connected to many other quarter-inch segments of the brain, any of which may be related to the functioning of the tiny area one is observing.

Therefore, in order to gain at least some sort of a more deep-going perspective on how far the findings presented in the opening table of this section may be related and how the talk of “quarter-inch matrices” fits in, I did two things. First, I tried to find out how might human self-referential processing be localized in terms of the underlying neural networks and how these networks relate to BA 7. Second, I tried to indirectly estimate what might be the allowable space within which one can still in a justified manner claim that a cluster of activity close to those exposed by Newberg and colleagues in their SPECT study is related to them.

As to the first aspect (and well in accordance with the point made in the “quarter-inch matrices” passage), specialists in self-referential processing are quite clear in that the “neural architecture of the self” is highly structured and references to any one particular brain area (especially large areas such as BA 7) are somewhat uninformative. For example, in their recent metastudy, Georg Northoff et al. present a highly complex network-based model that rests on data indicating that self-related stimuli are processed through various cortical midline structures. They provide a three-block “solution” to the problem of self-referential processing. One of their large blocks does imply the parietal region claimed by Newberg and d’Aquili to be involved in maintaining the sense of self. However, the block cannot be described in terms of anatomical structures. It is a theoretical construct intended to group small, apart-standing clusters of neurons that have been identified as involved in self-referential processing. If one looks at the graphs presented, a sentence by Francisco Varela and colleagues comes to mind that “the self or cognizing subject is fundamentally fragmented, divided, or nonunified.” Hence, the question to which extent the results in the opening table of this section may have to do with changes in the sense of self remains unclear. However, since one of Northoff and colleagues’ three large blocks does imply a considerable area in the relevant

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65 Newberg & d’Aquili 2000, 57.
69 Varela et al. 1991, xvii.
region, it may still be that all of the BA 7 findings in the above table may, indeed, have something to do with changes in the subjects’ sense of self.

As to the second aspect – to estimate how precise the match in the stereotactic coordinates ought to be to Newberg and colleagues’ findings in order to be considered significant, I assumed that the deactivated regions are, as claimed by Newberg and d’Aquili, also involved in spatial orientation tasks. Since there is an fMRI study by Amy Shelton and John Gabrieli from 200270 performed specifically to study spatial orientation that contains easily comparable results, the comparison of the findings provides insight as to how precise the “hit” in the coordinates has to be in order to be considered relevant. In this study, the following foci of interest in BA 7 (in addition to other areas) were found activated: the left PSPL (x = –18, y = –63; z = 60) and the right PSPL (x = 15, y = –63, z = 57).71 When set against Newberg and d’Aquili’s above discussed results (the left PSPL x = –16, y = –58, z = 50; the right PSPL x = 18, y = –68, z = 56), the proximity of the foci across the two studies is quite remarkable, especially on the right side. It seems quite clear, therefore, that in claiming that their imaging results reflect changes in spatial perception during MSCs Newberg and d’Aquili are not off course. As to what the allowable range of variation in the coordinates of the centers of the clusters might be in order to be considered relevant parallels to Newberg and colleagues’ findings, this suggests around ± 5 mm in each direction.

Within this space, only one of Beauregard and Paquette’s parietal findings can be seen to form a meaningful parallel with the orgasm data by Georgiadis et al. With some imagination and stretching, Lazar and colleagues results can be brought in, too. To place Newberg and associates’ results within the same context, however, seems to be too long a shot.

Taken together, this means that while on the general (structure-function) level the BA 7 (and other cortical) parallels between orgasm and MSCs are clear enough, they are no longer clear on the level of particular findings of particular studies. Many questions remain. The answers are, currently, a matter of interpretation and depend – as shown above – on how close one decides to “zoom in” on the supposed parallels. Fundamentally, only specified experimental studies can provide more substantiated answers.

71 Shelton & Gabrieli 2002, 2713.
D. ROUND-UP

The above analysis allows one to draw the following conclusions as to d’Aquili’s speculation that cortical functioning, too, is analogical during MSCs and orgasm:

- if one remains on the level of review literature and/or structure-and-function analysis, the speculation is easily confirmed;
- if the analysis is taken onto the level of particular neuroimaging results, the analogy largely fails.

The latter conclusion is, of course, not at all surprising since MSCs are not orgasm and the analogy has to fail somewhere. However, even the mere existence of comparable neocortical findings from MSC and orgasm research deserves serious attention. Hence, if I were asked whether there were any parallels between MSCs and orgasm on the neocortical level, my answer would be – moderately affirmative. However, positing a straightforward analogy is clearly not enough refined a way to look at the matter.

That this is so is evident not only in comparing the activity in BA 7 during orgasms and MSCs. Recall the issue of distinguishing between the motivatory and consummatory sequences involved in orgasm and how it may relate to MSCs. If there is controversy as to hypothalamic involvement in orgasm per se, at least some of the so-far-unquestioned links between orgasms and MSCs become problematic as well.

There is, thus a need, for a more refined way to look at the matter. But this does not change the fundamental insight that there is something remarkably similar in MSCs and orgasm. Paraphrasing Volney Gay’s amusing point – in both kinds of experience one acquiesces; “powers” beyond the ego impinge upon it with great force. MSCs and orgasms are alike in that neither can be willed into existence. One must wait, wonder, and not worry.72

Keeping this in mind, it is now time to turn to the “final frontiere” left open in “covering” Newberg and d’Aquili’s idea that MSCs are linked to orgasm. It is the question of whether the discovered parallels can be interpreted in an evolutionary framework. That is – whether the more or less prominent similarities between the two phenomena can be viewed as having an evolutionary basis.

CHAPTER VIII. REFINING THE SPANDREL ACCOUNT: EVOLUTION AND LOVE

A. AN EVOLUTIONARY EXPLANATION OR ANALOGY?

§ 1. Stephen J. Gould, Richard Lewontin, spandrels and adaptations

The concept of spandrels was introduced in biology by Stephen Jay Gould and Richard Lewontin in 1979.1 The term was borrowed from architecture where it denotes “the tapering triangular spaces formed by the intersection of two rounded arches at right angles.” More conventionally, spandrels are the triangular spaces that are left above an arch when a lintel is placed on top of it so that it sits on the extensions of the pillars that carry the arch. Gould and Lewontin point out that because architectural spandrels are usually filled in with exquisite decorations, it is easy to come to view them as being purposefully designed and as parts of the artistic and aesthetic intentions of the architect. However, they argue, such a view is mistaken: spandrels are not specifically designed to serve some particular purpose, they are architectural byproducts that result as arches are integrated into their surrounding (rectangular) structures.3

Drawing an analogy between architectural and biological structures, Gould and Lewontin then propose that in many cases the project of trying to explain the evolutionary origins of a trait or a phenomenon exclusively in terms of adaptations and natural selection might be misleading. The elaborate decorations that are used to fill in a spandrel represent a secondary utilization of a formation that is present for reasons of geometrical necessity. To argue that spandrels were specifically designed to provide space for the decorations would be absurd. By analogy, then, it may very well be that in living organisms, too, some traits are best explained in terms of secondary utilizations of structures that are present for “architectural”, developmental or historical reasons. In such cases, the immediate utility of the trait in question says nothing about the reason for its being (e.g., the aesthetic impact, which is the immediate utility of the decorations used to fill in spandrels, does not explain why the spandrels are there in the first place).4

Gould and Lewontin’s idea has been used in many contexts. In WGA, Newberg and d’Aquili propose that many of the human mind’s higher functions (such as the abilities to ponder philosophical concepts, appreciate music and art and experience complex emotions such as love, grief and envy) – not to

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mention the capacity for MSCs – may have arisen as evolutionary byproducts.\(^5\) Marc Hauser and colleagues argue that the human capacity for language, too, may have evolved as a byproduct and might not, therefore, be an adaptation (in the strict sense of the word).\(^6\) Paradoxically from the perspective of Newberg and d’Aquili’s discussions, human female orgasm may also represent an evolutionary byproduct since it has no obvious reproductive function. Lloyd argues that instead of viewing the female orgasm as an adaptation, one should think of it as a byproduct of embryological development.\(^7\) Curiously, then, there are theories on both the capacity for MSCs and (the female) orgasm being byproducts, leaving the capacity for MSCs a byproduct of a byproduct in at least one sex…

Be the case with the female orgasm as it may, in viewing MSCs – and religion generally – in terms of spandrels Newberg and d’Aquili are not alone. For example, Todd Tremlin has put forward an argument that the evolutionary “engineering” of the past was done without regard to enabling cognitive skills beyond those necessary to solve problems within the Pleistocene environment. The novel ways humans use their minds today, however impressive, are secondary consequences of their functional design and cannot be used as an explanation for how that design came to be.\(^8\) He continues:

“[I put] forward the same argument for the phenomenon we call religion. Religious thought is a by-product of similar, seemingly more “natural” forms of thinking. The cognitivist approach to religion is not that humans evolved to think religiously or that religious thought is somehow adaptive, but that religious thought rests on normal mental structures and processes designed for different though functionally related purposes.”\(^9\)

In thinking along the lines of MSCs being evolutionarily linked with reproductive responses, Newberg and d’Aquili are not alone either. Tremlin’s related point is quite general: “The first principle is elementary: nervous systems, like all body parts, evolve because improvements enhance an animal’s chances to survive and reproduce.”\(^10\) Freud’s doctrine of sublimation is more refined.\(^11\)

\(^5\) WGA, 124–126. In fact, in at least one of their papers d’Aquili and Newberg have gone as far as claiming that awareness itself has no adaptive function (d’Aquili & Newberg 1996, 243). Although explicitly discussed in an evolutionary framework mostly in WGA, the idea that MSCs are a byproduct enters d’Aquili’s reasoning very early on. For example, in 1982 he writes, “transcendent experiences [---] are a by-product of the machinery which evolved for other purposes” (d’Aquili 1982, 378).


\(^7\) Lloyd 2005, 107–108.

\(^8\) Tremlin 2006, 58–59.

\(^9\) Tremlin 2006, 108.

\(^10\) Tremlin 2006, 55.

\(^11\) See chapter IV A for a brief discussion of the doctrine of sublimation.
According to Gay, sublimation means (intermittently) deflecting the sexual instinctual forces away from their original sexual to higher aims. The key word here is ‘instinctual’. In an evolutionary perspective, it clearly suggests that religious practices, along with MSCs, represent secondary utilizations of the neuropsychological structures involved in reproductive responses. McGraw argues for the link from yet another angle that is related to both Freudian and d’Aquili’s ideas. He notes that the pursuit of and desire for altered states is like a basic instinct – an innate, normal drive analogous to hunger or the sexual drive. Amusingly, in substantiating this idea, McGraw points out that some nonhuman species, too, appreciate altered states: the reindeer possess a preternatural lust for the colorful fly-agaric mushrooms and delightedly munch them down, becoming inebriated. Be that as it may, it does seem to be the case that, as d’Aquili notes, the earliest glimmerings of what would be recognizable to humans as MSCs have arisen out of responses and behaviors that go back to premammalian species.

Now, arguments such as these are often perceived as devaluing religion and the related (altered) states. Therefore, it is important to keep in mind that the evolutionary origin of a phenomenon is a different question from that of its immediate utility. As Lloyd puts it, affirming that a trait has originated as a byproduct does not automatically mean that it has currently no utility. Conversely, affirming that a trait is currently useful does not automatically imply that it has a specific evolutionary function. Evolutionary functions require that there were past selection pressures that built the trait over evolutionary time. But currently useful traits include both those with evolutionary functions and those without.

The difference this distinction makes in relation to the question of the origin of MSCs is vividly clear from an argument by John Horgan – a trait’s byproduct origin does not exclude its ever acquiring a use or value. Hence, the biological origin of religion and MSCs has no bearing on their truth and value or lack thereof. Even if a religious believer or leader is shown to be schizophrenic or epileptic – as Saint Paul, Saint Teresa and Muhammad may well have been – that per se does not invalidate their insights, any more than the mental illness of an artist like Van Gogh or a scientist like John (Beautiful Mind) Nash invalidates their achievements. Religious phenomena must be judged by their fruits, not their roots. Horgan concludes his argument by a reflective remark that if a spandrel is defined as something intrinsically purposeless and unnecessary, then everything is really a spandrel, including humanity, life and the entire universe.

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12 Gay 1992, 110.
14 D’Aquili 1986, 143.
15 Lloyd 2005, 155.
Taken together – it seems to be a widely spread opinion that, evolutionarily, religious phenomena (such as MSCs) represent secondary utilizations of pre-existing structures and functions. This may well be true. After all, as Regine Kather notes, “The human form of consciousness did not arise out of simple matter; it has developed step by step from more basic forms of consciousness, feeling and sensitivity.”17 However, I would point out that many of the authors mentioned above have missed an important clue in Gould and Lewontin’s architectural analogy. The concept of byproducts presupposes that the structures the secondary-utilization-phenomena are dependent on have themselves not significantly changed – either in their “primary” function or basic “architecture” – during the relevant evolutionary time period. While in the general case of religious-spiritual phenomena the issue is unclear, it is not difficult to show that this condition for conceptualizing a phenomenon as an evolutionary byproduct is not satisfied in the particular case of MSCs vis-à-vis orgasm. The rest of this chapter is dedicated to clarifying the issue to gain a refined outlook.

§ 2. MSCs and orgasm: a mere analogy?

The first step towards a refined view is to be clear about how and where the MSCs-as-byproducts-of-orgasm account (as found in WGA) fails. The first step in this, in turn, is to note the gap between exposing neural parallels between MSCs and orgasm and constructing an evolutionary explanation of these parallels.

This gap comes ruthlessly forth in Newberg and d’Aquili’s claim that the neural circuitry involved in MSCs and incorporating the autonomic and limbic systems primarily evolved to produce the phenomenon of orgasm.18 Not only is this claim completely unrelated to the data on the neural parallels between MSCs and orgasm. It is naïve. To claim that the ANS and a large portion of the subcortical parts of the brain evolved primarily for the purpose of orgasm is equivalent to the claim that, in males, the heart evolved primarily to pump blood into the penis so that erection and, thereby, procreation would be possible. The ANS regulates such vital parameters as cardiac and breathing rate, blood pressure etc. These functions cannot be reduced so as to claim that the ANS evolved primarily for the “purpose” of sexual response (except in the trivial sense that all parts of the body have evolved so as to enable an organism to procreate19).

18 WGA, 125.
19 This view is interestingly defended in: Crews, David. The Evolutionary Antecedents of Love. – Psychoneuroendocrinology, Vol. 23, No. 8, 1998, 754.
True, if viewed in the context of Newberg and d’Aquili’s other writings, it is clear that the problems with the critiqued claim are more a result of loose wording than of genuine confusion. Nevertheless, the example shows that the talk of primary and secondary functions is a slippery road and one does well to think twice before “buying” into it. One way to do this is to first weigh the alternatives.

Within an evolutionary framework, there seem to be only two basic options. One – the capacity for MSCs is adaptive and got picked up by the evolution for its own survival value. If this is true, then one would predict the discovery of a “God gene” and/or a “God-spot” in the brain – some specifically evolved nuclei or mechanisms responsible for mediating the religious impulse.

This scenario is dubious. MSCs are far too complex to be reducible to the functioning of a handful of specialized neurons. They involve interactions between many parts of the brain and neuronal networks. “God-spot” theories, thus, are too simplistic. Moreover, if the capacity for MSCs is directly selected for, then why are there such varieties to religious-mystical experience? Something genetically “prescribed” would likely be quite rigid in its basic form. This MSCs are not. But more importantly – it takes an enormous leap of imagination to describe MSCs as directly adaptive. Of course, a fitting scenario can be imagined. But one would then be in trouble explaining the obvious similarities between MSCs and other, ordinary states.20

The second option is that the capacity for MSCs is, indeed, an evolutionary byproduct of one or another adaptation. The question in this case is – of which one? Orgasm is a good candidate. The problem, though, is that in actually arguing for it one is bound to reflexive analogies rather than data. An example: in tracing the link between MSCs and orgasm, Newberg and d’Aquili go down the evolutionary “lines” to butterflies.21 The parallels between the mating rituals of butterflies and MSC-inducing human ritual practices are impressive. But they say little about the evolutionary link between MSCs and orgasm. The pairing of the latter states depends on extrapolating from the subjective experience of orgasm. It is more a commonsensical, reflexive analogy than a weighed biological argument. In fact, the notion of MSCs itself, too, unavoidably relies on reflexive analogizing. Consider the following statement by Newberg and d’Aquili: “[W]hile the mystics of different times and traditions have used many techniques to attain this lofty union, from the pious self-denial of medieval Christian saints to the ritual sexuality of some tantric Buddhists, the mystical states they describe sound very much the same.”22 This statement is highly analogical and reflexive.

If so, then perhaps it would be wiser to abandon the byproduct account as too “strong” a statement, maintaining instead that orgasm is simply a good and handy analogy to analyze MSCs? In that case one can say nothing about the

20 For a discussion of these similarities, see: Saver & Rabin 1997, 507.
21 WGA, 83–84.
22 WGA, 102. My italics.
The evolutionary origin of MSCs. Analogies cannot expose the causes of phenomena as can evolutionary explanations. Moreover, it seems that if two types of states have physiological parallels, then stopping at positing a mere analogy is too “weak” a statement. The limbic system is evolutionarily ancient and hence — if MSCs are largely of temporo-limbic origin and parallel orgasmic dynamics on this level, then it is tempting to describe the discovered parallels in terms of evolution. Since reproductive behaviors are clearly more ancient than MSCs and have, in addition, undebated survival value, and since MSCs are clearly a fairly “recent” development, there must be some kind of an evolutionary link. However, the claim that MSCs are evolutionary spandrels vis-à-vis the adaptation (if the latter is, in fact, an adaptation) of orgasm is an overstatement.

I think there is a third, more balanced way to look at the matter that goes further from positing a mere analogy between MSCs and orgasm and is at the same time better balanced and more refined than the byproduct account. Its departure point is that orgasm and MSCs represent typologically similar “end solutions” in evolutionary developments relating to the concern for the survival of the species vs. the individual. This concern is manifested in various responses that are associated with what humans refer to as love and that involve overruling the “default” self-protective behaviors. Consequently, the link between MSCs and orgasm may be best explained via the common basic evolutionary concern behind MSCs and orgasm (how to motivate an individual to “transcend” self-protective behaviors so that procreation would be possible) rather than by labeling one a byproduct of the other.

In essence, my hypothesis is that the evolutionary origin of transcendent states lies in the “tension” between the survival “interests” of the individual vs. the species. Anthropocentrically speaking, the idea is that, from the perspective of an individual, the survival of the species is a secondary concern. If the species is to survive, then individuals must have strong motivation for abandoning self-sustaining behaviors temporarily — either to mate or to take care for the offspring. One such motivator is pleasure. In other words, there is strong selection pressure for pleasurable ec-static states. Orgasm is one such state, MSCs are another.

In such a framework, MSCs are not direct byproducts in the sense of relying on the neural circuitries that evolved to enable orgasm specifically. Both are versions of pleasurable ec-static (self-transcending) functioning and since there are selection pressures for such states, the spandrel analogy might not be the best way to conceptualize their link. All the more so because the spandrel accounts presume secondary utilizations of pre-existing “machinery” but since both MSCs and orgasm are states of consciousness depending on the specifically mammalian nervous system it is not clear whether the capacity for orgasmic experiences does or does not actually predate the capacity for MSCs.

As a viable alternative (or, at least, a refinement) to the byproduct account, I offer the concept of exaptation as used by Stephen Porges in articulating his so-
called polyvagal theory of the evolution of emotion. This concept allows one to at once make sense of the distinction between the motivatory and consummatory sequences of sexual response noted in the previous chapters and model the evolutionary link between orgasm and MSCs in a refined way. Therefore, I shall first detour via the polyvagal theory of the origin of love to then discuss how its insights apply to the MSC-orgasm link.

§ 3. Detour: love and ANS evolution – the polyvagal theory

Porges starts by pointing out that although love is a human emotion, the neurobiological processes involved in its experience and expression are shared with other mammals. Central to these processes is the ANS. Porges notes that the phylogenetic changes in the ANS are related to the emergence of two phases of love: a motivatory phase (associated with courting behaviors) and a consummatory phase (associated with sexual behaviors). He contends that courting is dependent on phylogenetically newer structures, whereas passionate visceral feelings during copulation depend on phylogenetically older structures.

Such blunt distinction might be a bit too far-reaching. But Porges’s next ideas put the claims into context. He argues that the mammalian ANS retains components of three interactive but distinct, phylogenetically dependent neural systems associated with (1) the dorsal vagal complex, (2) the sympathetic nervous system and (3) the ventral vagal complex. These neural systems are linked with specific emotion subsystems observable in humans. Each carries out specific adaptive functions. With the increased neural complexity paralleling phylogenetic development, the organism’s behavioral and affective repertoire is enriched.

Porges notes that the dorsal vagal complex represents the phylogenetically oldest stage. It is characterized by a primitive unmyelinated vegetative vagal system that fosters digestion and responds to novelty or threat by reducing cardiac output. Behaviorally, it is associated with immobilization behaviors (e.g., death feigning). The sympathetic system evolved as a neural regulator that can rapidly increase metabolic output and inhibit the primitive vagal system to foster mobilization behaviors necessary for fight or flight. The ventral vagal complex represents the phylogenetically most recent stage and is unique to mammals. It is characterized by a myelinated vagal system that can rapidly regulate cardiac output to respond to the environment and consists of the myelinated vagus and portions of other cranial nerves.

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divides the vagal-parasympathetic system in two – both structurally and functionally. As will become clear shortly, this is highly significant, both in understanding 3rd stage autonomic states (of which orgasm and MSCs are two) and the orgasm-MSC link.

Porges then turns to discussing the interactions between these three subsystems in relation to sexual response and love. According to him, the ventral vagal complex serves as the neurophysiological basis for courting behaviors. Its related structures signal availability and promote proximity. The sympathetic system promotes sexual arousal and is associated with intense emotion. The third, phylogenetically oldest emotion subsystem relies on the dorsal vagal complex. In mammals, it is primarily associated with digestive, gustatory and hypoxic responses and provides the primary control of sub-diaphragmatic visceral organs.²⁸

In relation to the dorsal vagal complex, by the way, it is interesting to note that meditative MSCs have often been thought of in terms of what is highly reminiscent of an “immobilization response”. John Young and Eugene Taylor even define meditative MSCs as voluntary hypometabolic states of parasympathetic dominance. They analyze the parallels between meditative MSCs and hypometabolic states in nonhuman species such as hibernation and argue, in essence, that the nonhuman “prototype” for meditative states may be hibernation – this providing an evolutionary explanation for the existence of such states.²⁹

Having subdivided the mammalian ANS into three units, Porges then comes out with what from the perspective of the present chapter is of fundamental importance. He underlines that the evolution of the ANS provides substrates for the emergence of three emotion subsystems. And then notes – although this idea is reminiscent of the triune brain model proposed by Paul MacLean,³⁰ the polyvagal theory emphasizes that even the phylogenetically more primitive structures have changed in both structure and function. According to Porges, this phylogenetic adjustment represents an exaptation (structural and functional shift) in the ANS that is related to the emergence of emotions.³¹

Now, if one takes this idea seriously, then Gould and Lewontin’s spandrel analogy falls out of place in tracing the evolutionary origins of MSCs. The spandrel analogy is directly dependent on structural and functional consistency. Hence, if the ANS has undergone important structural and functional shifts during the evolution from nonmammalian to mammalian form, one should not employ the concept of byproducts, at least when tracing the origin of a human

phenomenon down past mammals as Newberg and d’Aquili have done in the above referred butterfly analogy.

That the functional and structural shifts may be fundamentally important in the present case, becomes evident from Porges’s further argumentation. Namely, he argues that it may be thanks to such shifts that some states and behaviors can incorporate the simultaneous activation of more than one of the above described ANS units. As an example of a state involving the coactivation of more than one component of the ANS, Porges significantly points at sexual arousal. In his theory, sexual arousal represents a coactivation of the specifically mammalian ventral vagal complex and the sympathetic system.\footnote{Porges 1998, 844.} Hence, there may be several different types of 3\textsuperscript{rd} stage states and in that case mere pointing at the simultaneous activation of the sympathetic and parasympathetic systems is not sufficient to argue for the origin of the capacity for MSCs in orgasm.

Also, following Porges, it seems that coactivation states, far from being rare and exclusively related to sexual response, are constituent elements of many prosocial behaviors and states. For example, courting demands the coactivation of the ventral vagal complex and the sympathetic system. The sympathetic system mediates the fight-or-flight responses and its activation is associated with fear. However, its participation is also needed in actively engaging a possible mate. In the case of courting, then, the ventral vagal system modulates the self-protective and defensive responses of the sympathetic system while the latter is still active. Such a state promotes proximity and increases the probability of reproductive behaviors.\footnote{Porges 1998, 845–847.} Or, as Porges poetically notes – during such states the organs of fear and vigilance become organs of pleasure, nurturance and reproduction.\footnote{Porges 1998, 856.}

The above suggests that in tracing the evolutionary antecedents of MSCs orgasm specifically is too narrow a category. At the very least, the full cycle of sexual response has to be engaged, starting from the motivatory phases. This is even more clear if one considers the fact that the 3\textsuperscript{rd} stage states involved in orgasm are not things in themselves. They represent a “solution” to an evolutionary “problem” and thus need to be analyzed within the context of that problem. It would be absurd to try analyzing the nature of the feeling of satiety in isolation from the context of hunger (the motivatory state) and the process of consuming food (the response). The same goes for analyzing orgasm and MSCs and especially for looking for an evolutionary link between them. Curiously, though, this is exactly what Newberg and d’Aquili seem to have tried to do in WGA 123–126, the initial text for the present thesis.

As I hope to show below – the case of the origin of MSCs (and other 3\textsuperscript{rd} stage states) becomes considerably more clear as soon as one engages the motivatory context behind such states into discussion. In fact, it allows for raising a refined, testable hypothesis on the nature and origin of MSCs in their
relation to reproductive responses. This motivatory context is found in the states humans usually refer to as love but that can also be studied in a variety of nonhuman species (differently from orgasm) – on the basis of reproductive, parental and affiliative behaviors – as Sue Carter rightly notes. In the light of what follows, Philip Hefner’s beautiful saying that “thinking is not the critical mark of being human – loving is” gains a new dimension.

B. THE ORIGIN OF TRANSCENDENT STATES

§ 1. The neural correlates of Eros and Agape

The fundamental importance of motivatory sequences behind MSCs and orgasm is, in fact, clearly evident from d’Aquili and Newberg’s own writing, too: “One might ask why one would wish to transcend oneself. It is intuitively obvious why human beings would wish to control their environment. It is not immediately so obvious why one would wish to transcend the self.” The answer, to use Kather’s words, is that it is impossible for an organism to exist completely through itself. Self-preservation (and the survival of the species, I would say) depends on self-transcendence. To be open to the world is a necessary condition for life. The identity of an organism does not depend on internal relations only, but also on the relation to otherness. It is in the dependence of self-preservation (and the survival of the species) on transcending the “default” self-protective responses that both MSCs and orgasms have their evolutionary origin.

No wonder, then, that Newberg and d’Aquili suggest – human and animal rituals (that lead to self-transcendent states) have common evolutionary origins in having evolved as a primordial form of communication intended to help individual animals recognize and understand the behavior of other individuals significant in their lives and on whom their own chances of survival depend. A similar idea is found in The Mystical Mind, with the additions that rituals also help controlling aggression and forming bonds among individuals. In a sense, transcendent states (MSCs included) are all about communication, about transcending the “default” self-protective behaviors to enable contact. Obviously, such states are absolutely necessary for the survival of the species.

However, it is important to keep in mind that, for any organism, the first concern is still staying alive. And giving up self-protective behaviors is

35 Carter 1998, 780.
38 Kather 2008, 27.
39 WGA, 83.
dangerous. Therefore, if transcendent states are to be possible, there is need for motivational states that are strong enough to overrule that first concern. Such motivational states – as is clear on the basis of Joseph’s arguments reviewed in chapter VI – are generated by the limbic system (especially the hypothalamus). As Newberg and d’Aquili put it, the limbic system “gives animals the aggressiveness they need to find food, the fear that compels them to avoid predators and other dangerous situations, and the affiliative longing – primitive “love,” if you will – that drives them to mate and care for their young.” My suggestion is that the evolutionary link between orgasms and MSCs goes largely via the motivatory sequence associated with the limbically generated “primitive love” and that the link cannot be understood at all if this element is left out of the analysis.

At first glance, resorting (in explaining the MSC-orgasm link) to a concept as vague and experiential as love might seem unreasonable and open to Occam’s Razor type of critique. As Newberg and Waldman note, love seems to have no substance in the world – one cannot see it or touch it. It is a highly complex cognitive and emotional process, evolutionarily recent and, unlike ejaculation, for example, difficult to measure and experiment on. Plus, as David Crews notes, love as a human emotion has its biological foundations in the sexual and parental bonds. Whether it exists in animals is an anthropocentric question. Hence, when looking for evolutionary antecedents, it is more useful to focus on the reproductive behaviors associated with love than on human understandings of the emotion. It is for this reason that Newberg and d’Aquili, too, instead of explaining MSCs via love, refer to mating rituals. And the point is well taken.

However, this argument cannot be taken to mean that in looking for evolutionary antecedents it is sufficient to focus on orgasm. True, sexual behaviors are evolutionarily ancient. But orgasm – as an altered state of consciousness – is not. Ejaculation does not equal orgasm. It is not self-evident that orgasms evolutionarily precede MSCs. Such an argument is not a justified inference from the fact that mating behaviors are evolutionarily ancient. Orgasmic experiences as known to humans depend on the mammalian nervous system which – as shown above in discussing the polyvagal theory – is both structurally and functionally different from others. When it comes to sexual climax as experienced by, say, alligators, one has no more idea of its qualities than of what it is like to be a bat. The conscious orgasmic experience is itself a result of exaptations, just as is the capacity for MSCs. Both depend on processes that motivate and enable an individual to give up self-protective behaviors so that

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41 WGA, 43.
42 Newberg & Waldman 2006, 23–24.
43 Crews 1998, 751.
44 On this, see: Komisaruk et al. 2006, 11–12.
the survival of the species becomes possible. There is no better evolutionary explanation for orgasm than there is for MSCs. Hence, an appeal to orgasm as an evolutionary antecedent of MSCs is insufficient. The underlying motivatory sequences involved in each case also need to be covered. And these sequences are most readily described in terms of love – despite the fact that love is difficult to define in a way that would apply to nonhuman species, too.

In taking the latter challenge, Komisaruk and Whipple note that the word ‘love’ derives etymologically from ‘desire’, ‘yearning’ and ‘satisfaction’ and that it shares a common root with ‘libido’. They then define love as \textit{one’s having stimulation one desires}. The nature of the stimulation may range from the most abstract cognitive to the most direct sensory. Thus, love encompasses having a bond with for whom one yearns as well as having stimulation one desires. The strength of this definition is that it is applicable also to nonhuman species and directly points at the \textit{motivatory} quality of love in relation to reproduction. This, as will become clear shortly, is a centrally important aspect in explaining the mystical-erotic parallels.

As repeatedly noted in chapters V–VII – in the case of orgasm it is heuristically useful to distinguish between the motivatory and consummatory phases. The strategy works quite well in analyzing MSCs as well. Numb and unmotivated practicing of the “exercises” prescribed by a mystical guidebook (stimulation without desire) is not effective in evoking MSCs. The stimulation provided by the exercise must be emotionally yearned for and have deep, personal meaning \textit{(desired stimulation)}. The same is true of the relation between having sex and reaching orgasm.

Now, strong motivatory states such as desire seem to heavily rely on the evolutionarily ancient hypothalamus – the key link between the ANS, the brain and the endocrine system. This is supported by the data reviewed in the previous chapter that suggest – hypothalamic input is more vital to motivating sexual behavior than to its consummatory phase. That the motivatory states mediated by the hypothalamus are specifically erotic becomes evident from the fact that recent BOLD-mfMRI imaging studies on love have found the hypothalamus active in states of strong romantic but not nonsexual (parental) love.

\textbf{Komisaruk & Whipple} 1998, 927 (with references to: \textit{Onions, C. T.} The Oxford Dictionary of English Etymology. New York, Oxford University Press, 1966; \textit{Shipley, J. T.} Dictionary of Word Origins. New York, Philosophical Library, 1945). It is interesting to note that the English word ‘belief’ is adapted from the German \textit{glauben}, ‘to hold dear’ or ‘to love’ and was originally used to refer to one’s trust and faith in God (\textit{Newberg & Waldman} 2006, 25).

\textbf{Komisaruk & Whipple} 1998, 927. The central idea of this definition is well paralleled by Newberg an Waldman as they explain that love feels real because the emotions triggered by a \textit{combination of hormones and romantic ideals} are powerful and impart a strong impression of reality (\textit{Newberg & Waldman} 2006, 24).

For an interesting study on this, see: \textit{Telles et al.} 1998, 57–63.

On the one hand, this explains the discrepancy between the imaging results on orgasm of Komisaruk’s and Georgiadis’s research groups. But on the other hand, it allows for raising a refined hypothesis as to the origin and nature of MSCs. As shown in the previous chapter, parallels between MSCs and orgasm become hazy if only the consummatory phase of sexual behavior is taken into account. Now, if more significant parallels between orgasm and MSCs are found on the motivational side of the “equation” (as mapped during imaging studies on love), then it makes sense to link MSCs and orgasm in a more structured way, with additional references to the hypothalamically mediated motivational sequence, to specifically erotic love, to the hormonally mediated motivation to unite.

This idea, while preserving the orgasm-MSC link, is more refined than the original byproduct account and provides testable predictions. According to it, MSCs and orgasm represent motivationally interdependent outputs of the neural apparatus promoting pleasurable ecstatic (transcendent) states that are adaptive in enabling an individual to temporarily abandon the concern for survival which is necessary for reproduction but also for communication.

Intuitively, this seems a reasonable hypothesis. Newberg and d’Aquili, too, note a possible link between states of strong erotic love and MSCs. Specifically, they view erotic love as a transitional state between everyday, baseline consciousness and MSCs. But what is the evidence that the link between MSCs and orgasm goes largely via the hypothalamically mediated motivational sequence?

Here, there are two important imaging studies by Andreas Bartels and Semir Zeki – one on the neural correlates of romantic love and the other on maternal love as compared to romantic love. On the basis of these studies, the following aspects should be highlighted. (1) As to the hypotalamic input – the hypothalamus was indeed observed to activate during erotic love while it showed no change during maternal love. (2) Many (if not most) aspects of the “orgasmic pattern” of brain activity as described in Bianchi-Demicheli and Ortigue’s above discussed overview are actually associated with erotic love, forming the motivational drives behind seeking orgasms. (3) Most of the “obvious parallels” between MSCs and orgasm relate to the “love pattern” common to them and disappear if one subtracts the activations associated with love from the activations during MSCs and orgasm. (4) Since maternal love does not activate the hypothalamus but in other aspects the activations largely overlap with those during erotic love, one may hypothesize that the states associated with parental love may have formed the neural basis for the

emergence of more traditional religious states (this relating to the concept of *agape*). (5) Taken together, this means that in critiquing Newberg and d’Aquili for not engaging the neuroscientific work done on emotionality in their model, Spezio was right.  

To be more specific now: in their BOLD-fMRI study on erotic love, Bartels and Zeki found significant neural activity in two main cortical areas: the middle insula and the anterior cingulate cortex. Prominent activations were noted in the hippocampus, caudate nucleus, putamen and cerebellum. Deactivations concentrated in the right prefrontal, parietal and middle temporal cortex, in addition to the posterior cingulate gyrus and medial PFC. Subcortically, there was a deactivation in the posterior amygdaloid region. There are obvious parallels here with Komisaruk and colleagues’ 2004 orgasm results and Lazar and associates’ MSC results described in the previous chapter. If one then considers the discrepancy between the orgasm results of Komisaruk’s and Georgiadis’s research groups and hypothesizes that the results of the latter group are representative of the consummatory phase of sexual response, then it is clear that the parallels between MSCs and orgasm run largely via the motivatory sequence.

This is further confirmed from Bartels and Zeki’s comparative fMRI study on maternal vs. erotic love. As the authors note, the similarity of results in both cases is striking. Several regions overlap precisely, others are specific to each form of attachment. Overlapping regions include those in the striatum (the putamen, caudate and several others), insula and anterior cingulate cortex. Erotic love activates specifically the hippocampus and the hypothalamus (e.g., the cluster centered at x = –3, y = –12, z = –14) which are not active with maternal love. Activity specific to maternal love includes the lateral orbito-frontal cortex, and, subcortically, the periaqueductal gray.

Thus, there are obvious overlaps in the regions that activate during maternal and erotic love. Hence, maternal and erotic love (or, in religious parlance, agape and eros) should not be played out against one another. They are variations on the same “theme”, the defining character being the hypothalamus. In the light of these results it is clear that although orgasms and MSCs do share some of their neural constituents on the consummatory level, too (e.g., the “staircase” phenomenon), ignoring the underlying motivatory sequences is misleading.

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54 Spezio 2001, 477–484.
56 Bartels & Zeki 2004, 1161.
§ 2. What about mystical love?

Given the above, one would expect the neural substrates of yearning for and love of God to clearly overlap with those of maternal and erotic love. Well, then, how well does mystical “love” fit in what Bartels and Zeki found? This is an interesting question both neurologically and theologically. Theologically, God is defined vis-à-vis love. Thus, a loving communion with God in MSCs should neurologically resemble to the above varieties of interpersonal love. There are two questions: (1) to which extent is yearning for God in fact neurologically commensurate with erotic and maternal love?, (2) to which variety of interpersonal love does mystical love resemble more?

The first question is not difficult to answer. To start with a general note, in their review on meditative states, Cahn and Polich point out that meditators consistently report feelings of love during meditation, although these feelings are not the explicit goal of meditation.\(^{57}\) If so, then the presence of these feelings might reflect love’s motivatory role in these states. Particular evidence for the overlap in the neural correlates of MSCs and interpersonal love states is most readily available from comparing Bartels and Zeki’s above results to those by Beauregard and Paquette on MSCs in Carmelite nuns.\(^{58}\) This is because, in their fMRI study, Beauregard and Paquette used states of interpersonal love as a control condition for MSCs and directly discuss MSCs in terms of love.

The activated regions during MSCs that overlap with those activated during interpersonal love most significantly include the insula, anterior cingulate cortex and caudate nucleus. Beauregard and Paquette note that these regions are consistently reported to activate in association with positive emotions and love and hence describe MSCs as a “version” of love. A marked difference from the varieties of interpersonal love, according to Beauregard and Paquette, is the absence of activity in the putamen during MSCs. This becomes evident in comparing the control condition to the mystical.\(^{59}\)

Clearly, then, the neural correlates of MSCs overlap with those of interpersonal love. Mystical love does not fundamentally differ from erotic and maternal love. Hence, I consider it fairly safe to argue that many of the neurological parallels between orgasm and MSCs noted in the previous chapters reflect common motivatory sequences. This is not to say that there are no direct parallels in the “consummatory” sequences. It is to say that there is something remarkably similar in what motivates an animal to travel hundreds of miles through mud and snow for a few brief moments of copulation and in what motivates a mystic to spend years in often painful practice – for a few brief moments of mystical unity which, until her first MSC, she cannot even be sure is attainable. All of the parallels between MSCs and orgasm noted in the previous chapters only describe how those “few lucky moments” are neurally

\(^{57}\) Cahn & Polich 2006, 199.
\(^{58}\) Beauregard & Paquette 2006.
\(^{59}\) Beauregard & Paquette 2006, 188–189.
generated (the “staircase” phenomenon, rhythmicity, 3rd stage states etc.) but they do not explain why the animal or the mystic would “bother” at all. An appeal to the common motivatory sequence, I believe, fills in this gap and hence represents a refinement of Newberg and d’Aquili’s original hypothesis.

The second question – does the neural substrate of MSCs resemble more to that of erotic or maternal love – is not as easy to answer. Specified experimental research is needed to say something conclusive. However, the already existing data suggest that MSCs are more closely associated with erotic love. The key issue here is that of hypothalamic input. Recall the decisive role the hypothalamus plays in Newberg and d’Aquili’s modelling of MSCs. Since Bartels and Zeki’s above discussed comparative analysis associates hypothalamic activation with erotic but not maternal love, a reasonable inference is that the motivatory sequence behind MSCs resembles more to erotic than to maternal love. This idea can be further substantiated on the basis of Lazar and colleagues’ fMRI data which provides direct evidence on not only that the hypothalamus does activate during MSCs but also that several other structures involved in states of erotic love and orgasm are intimately involved in generating MSCs as well.60

Theologically, this would mean that a mystic’s relation to God or the Higher Plane of existence is erotic rather than agapic. Given that in Christianity the emphasis has always been on the importance of selfless, agapic love, this explains why mysticism has often been viewed as standing on the verge of heresy. Also, this explains the obvious erotic connotations in many mystical writings.

This hypothesis is not difficult to test. I would suggest using the experimental design and protocol developed by Bartels and Zeki to study erotic love states. The design is based on measuring the subjects’ BOLD signal in response to viewing pictures of their beloved partner vs. unfamiliar controls.61 For Christian mysticism, this design can easily be modified to allow for testing the above idea – by replacing the pictures of the beloved partner with those of Jesus. As subjects, one would need a group of accomplished mystics and another, age-and-gender-matched group of “conventional” religious believers. The results obtained would be directly comparable to those by Bartels and Zeki on both erotic and maternal love since the study on maternal love62 is based on the same experimental design.

My first prediction is that the patterns of activation in response to viewing the pictures of Jesus will in the mystics’ group resemble more to that associated with erotic love and in the “conventional” group more to that associated with maternal (agapic) love. If this prediction should be found to bear out, then one has arrived at a rudimentary biologically based classification of religious experiences. The more “conventional” religious experiences might then be

60 Lazar et al. 2000, 1582–1584.
mapped in relation to unsexual, agapic manifestations of love and MSCs in relation to erotic love.

My second prediction is that the results will be gender specific. Lene Sjørup has argued that, at the deepest level, religious experiences are for both males and females experiences of infinite oneness with all that is, of being loved by sources greater than oneself. However, descriptions of MSCs often involve gender metaphors (more on this in the next chapters), suggesting underlying biological differences as well. James Asbrook pointed out already in 1993 (in his critique of d’Aquili’s biogenetic structuralist approach) – the well known gender differences in the physical brain must unavoidably be reflected in the organization of experience, too. Recall that males and females activate their hypothalami differently in response to erotic stimuli. If MSCs are hypothalamically motivated, then these differences should show up on one or another level.

If these predictions (and the hypothesis itself) should bear out, then what one would have would be solid proof that the pursuit for and attainment of MSCs is fundamentally continuous with yearning for and experiencing of interpersonal, sexual love. This is an insight Newberg and d’Aquili have, albeit from a different angle, discussed within the context of what they call the aesthetic-religious continuum. Several other authors have also pondered the possibility. An example from Saver and Rabin’s research:

“Most religious experience parallels ordinary experience. The religious sentiments include religious joy, religious love, religious fear, and religious awe. These religious emotions are analogues of ordinary emotions of joy, love, fear, and awe, differing not in their emotional tone, but only in being directed to a religious object. Their neural substrate is likely to contain nothing of a specifically religious nature, but instead to rest upon the same limbic and subcortical networks that support nonreligious joy, love, fear, and awe, directed by dorsolateral and orbital frontal cortices to religious rather than nonreligious targets.”

At first glance, such a view can be somewhat disenchancing for a religiously inclined person. But it should not be – as I hope to make clear in the next part of this volume. At the very least, considering MSCs as continuous with states of interpersonal love (both in its motivatory and consummatory aspects – it must

63 Sjørup 1998, 156.
65 For example, see WGA, 113–117. Newberg and d’Aquili are not the only ones explaining MSCs on a continuum. Roland Fischer, for example, argues that ecstatic states can be placed on a circular continuum representing varying states of subcortical arousal. Movement in one direction reflects ergotropic arousal and movement in the other direction indicates trophotropic arousal (Andresen 2001, 260–261).
not be forgotten that the actual attainment of MSCs still depends on the “staircase” phenomenon, rhythmicity of stimulation and several other elements associated with the consummatory phase of sexual response) makes it quite clear why would evolution “equip” every sexually reproducing species with a “machinery of transcendence” that, in humans, has proven to enable not only ecstatic, unitary states with other human beings but also intimate encounters with the Divine.

C. CONCLUSION TO PART TWO

The primary aim of the present part of the thesis was (1) to establish to what extent Newberg and d’Aquili’s speculation in WGA 123–126 on the byproduct origin of MSCs vis-à-vis orgasm can be covered with data and defended and, (2) if possible, to come up with a testable, scholarly hypothesis on the subject matter. Having now raised the above hypothesis, documented the “case”, discussed the limits of the byproduct account and offered a refined version, I consider the specifically neuroscience-related part of my analysis completed. It only remains to sum up the results.

In this regard, I would highlight the following points. The WGA spandrel account cannot be unambiguously defended. However, the point made by Newberg and d’Aquili elsewhere on MSCs being merely analogous to orgasm is too “weak” a statement. The spandrel account fails in underestimating the structural (and functional) differences between the mammalian vs. other types of ANS (and other neural structures). While it seems plausible to affirm that the evolutionary origin of transcendent states (including MSCs) is traceable back to mating and parenting behaviors, both of which presuppose an individual’s temporarily giving up self-protective behaviors, it almost certainly cannot be attributed to orgasm specifically.

Orgasm cannot be conflated with ejaculation. The fact that the basic ejaculatory “mechanism” goes back to premammalian species and is related to reproductive behavior does not mean that these premammalian species experience orgasm. Just as we do not know what it is like to be a bat, we cannot possibly know what is it like for a reptile to experience ejaculation. As long as MSCs are associated with 3rd stage states, it must be taken into account that the mammalian ANS is unique (see the polyvagal theory above) – a phylogenetic adjustment or exaptation has taken place which enables ANS states unique to mammals. Since it may be that the evolution of emotions and even awareness is dependent on this, no specifically human states of consciousness should be viewed as mere byproducts, secondary utilizations of structures that emerged prior to mammalian nervous system (since the spandrel analogy presupposes secondary utilizations of structures that are themselves unchanged).

Thus, while the origin of transcendent states probably can be traced to reproductive and parenting behaviors at least down as far as the emergence of two opposing branches of the ANS (enabling 3rd stage autonomic states
associated with ecstasy or “stepping out of one’s self” in order to overcome self-protective behaviors and enable reproduction), it cannot be traced to orgasm specifically. Rather, both orgasm and MSCs (as states of consciousness) represent specific varieties of 3rd stage, motivationally interrelated states enabled by the evolution of the distinctly mammalian nervous system.

My conclusion, therefore, is that MSCs are not byproducts of orgasm. Neither are they direct adaptations. Rather, they should be explained in terms of exaptations of the structures involved in sexual and parenting responses. This way, the parallels between orgasm and MSCs revealed in chapters V-VII are preserved but further appeals are made to the differences in the makeup of the mammalian vs. other nervous systems and to distinguishing between the neural elements directly involved with attaining an orgasm or an MSC and the motivational sequences promoting their seeking.

The latter appeal allows for a hypothesis that MSCs can be distinguished from other spiritual and religious states on the basis of involving a specifically erotic, hypothalamically mediated motivational sequence. This may explain why mysticism has usually been a non-mainstream “enterprise” within traditional religious systems. The hypothesis provides several predictions and is easily testable. Perhaps the most intriguing of these is the prediction that MSCs may be gender specific.

What is left open by the above analysis is the “big question” – if the human capacity for MSCs has emerged from circuitries enabling loving, interpersonal interactions, then is it possible that, by way of several consecutive exaptations, evolution has in humans “stumbled” upon enabling the perception of and interacting with something truly Divine and real? To this question, there are no neuroscientific answers. Alan Wallace, for example, points out that, today, no one knows what, at the end of the day, is the relationship between the neural correlates of an experience and the experience itself.67 Lee and Newberg, too, note that the direction of causality between the neural correlates and the “inner qualities” of mental states is not clear.68 Even more importantly (from the perspective of the present discussion), Newberg and Lee point out that the problem with neurocognitive study of MSCs is that one never escapes the neurocognitive perspective to get at something that might be “truly” spiritual. The only way would be through a process of elimination in which all other factors – cognitive, emotional and sensory – are eliminated, leaving only the spiritual components of the experience. They conclude by saying that the most interesting result from a brain scan of someone in prayer would be to find no

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significant change in the brain during the time that the individual has the most profound spiritual experience.\textsuperscript{69}

So, all of the above is tentative at best. In closing of this part of the thesis (and, quite frankly, to reassure myself as a theologian trespassing the territory of neuroscience), it is, therefore, highly fitting to reiterate Andrew Newberg and Mark Waldman’s “final diagnosis”: “At present, neuroscience is more of an art than a science, particularly in the way it evaluates complex mental processes. It is filled with assumptions, conjectures, postulates, and rationalizations.”\textsuperscript{70}

\textsuperscript{69} Newberg & Lee 2005, 472.
\textsuperscript{70} Newberg & Waldman 2006, 27.
PART THREE:
Reflect/x-ions on Bodiliness, Gender and Mystical Love – a Spiritual Map

CHAPTER IX. MSCs AND GENDERED BODIES

A. SCIENCE, MYTH AND GENDER

§ 1. Love – a basic natural force

If the foregoing sounded esoteric, then what follows will be even more so. For what I am going to do in this part of the thesis is asking how the likely neurophysiological link between the erotic and the mystical reflects in religion (especially Christianity) and theology and how it should be interpreted if one shares a Christian outlook on life.

Despite the fact that such an analysis unavoidably relies on loose analogical and metaphorical associations, it is still necessary to undertake. Theologically, the reliance of MSCs on reproductive biological processes is something like a hot potato in one’s throat that can be neither swallowed nor spitted out. It demands attention. One cannot respond to it by withdrawal. Moreover, as Theodore Jennings has noted – as a theologian, one has a task of interpreting the natural world in conversation with science. Neither simple denial nor literal appropriation of the latest science are options. The task demands one’s ongoing willingness to seek interpretive analogies. Because science is concerned with understanding the same world that, for a theologian, represents the theater of the glory of God.¹

Theological reflection is all the more important because MSCs are not the private affair of a few eccentric weirdos whose strangely channeled erotic urges one could politely ignore. They form a basis from which public religious traditions arise, from which they derive their credibility and without which they would likely not survive. According to Newberg and d’Aquili, religion will not “go away” because it serves two survival-related functions: (a) self-maintenance, and (b) self-transcendence.² The transcendent function is largely maintained via MSCs. Moreover, as Newberg and d’Aquili note, MSCs are a decisive factor in the development of religious beliefs themselves. This is affirmed by both Eastern and Western traditions. Also, MSCs are just about the only mechanism by which human beings can actually “enter” into the realm of

God or Ultimate Reality, however the latter would be conceptualized by a particular faith tradition.3

Last (but definitely not least), religious reflection is necessary because too often scientific investigators of religion and spirituality related phenomena have forgotten and ignored the feelings and integrity of the audience to whom their findings most matter – the religious people. Today, if an investigator would, for example, publish a claim on homosexuality being reducible to one or another pathology, she would probably be “stoned”. Yet we are hardly surprised when religious phenomena are labeled pathological by investigators. And the religious people are simply to swallow it…

A good place to start the religious/theological elaboration on the neural parallels between MSCs and erotically marked states is the notion of embodiment. In other words, the first thing to do is to acknowledge that all human experiences, including MSCs, take root in and are constrained by our bodiliness (which is how they are open to scientific study). Experience, MSCs included, therefore unavoidably reflects the evolutionary history and biological processes of the body.

How deeply human experiences depend on bodily functioning is well seen in Sue Carter’s witty observation that many emotional concepts connote visceral sensations mediated by the ANS. She points at concepts such as love sickness and heartaches and folk sayings such as the way to a man’s heart is through his stomach.4 Carter’s observation shows how fundamentally “impotent” the classical dualist worldviews are and suggests that even the most sacred of human thoughts and longings are deeply “bodily”. Visceral associations are as much present in the case of MSCs as in the case of sexual desire and orgasm. For example, see Saint John of the Cross’ famous mystical poem Dark Night of the Soul – it swarms with visceral connotations.5 Biblical passages, too, can be viewed in this light. For example, consider Jesus’ commandment of love: “You shall love the Lord your God with all your heart, and with all your soul, and with all your mind, and with all your strength.” (Mark 12:30). Clearly, the imperative here is to love God fully, through and with the body, viscerally as well as spiritually.

Human sense and experience of the world is embodied. And one of the most fundamental qualities of this embodied experience is the viscerally mediated longing for intimacy. We need intimate communion, in every imaginable (including religious) sense of the word. Human touch and love, to use Robert Goss’s words, are real needs. Young babies need loving, physical touch to survive. But so do mature contemplatives.6 Saint John of the Cross’ above mentioned poem clearly reflects this. Therefore, fighting against the embodied,

4 Carter 1998, 808.
5 Full online version available from Christian Classics Ethereal Library. For the stanzas, see: www.ccel.org/ccel/john_cross/dark_night.vi.html (accessed 02/17/2009).
physical need for loving intimacy in pursuit of ascetic, disembodied theological ideals is necessarily bound to fail in the long run.\footnote{Goss 2002, 14.}

In coming to “navigate” through these evolutionarily conditioned bodily cravings in their relation to MSCs, I find Jonathan Lear’s reconceptualization of the Freudian doctrine of \textit{libido} in his \textit{Love and its place in nature}\footnote{Lear 1990.} enormously useful. Lear argues that the doctrine should be understood to mean that love is a basic force of nature:

“Love is a basic natural force, and so the perspective of natural science must be a perspective that includes love. \[---\] Since love is manifest in my own psychological activity, there is no perspective from which one can “look down” on the drives as brute natural forces, determined for me rather than by me.”\footnote{Lear 1990, 181.}

This point has obvious theological significance to which I shall come in subchapter B below. For now, I want to take up another lead in it – the connection Lear makes between scientific and love-infused (including religious) world-views. This provides a fruitful starting point for a religious reflection on both the data presented in the previous chapters and the conclusion that disembodied, ahistorical (in the evolutionary sense), “purely spiritual” love is impossible.

I pointed out in chapter II that any writing on mysticism is itself also a mystical writing.\footnote{See chapter II D.} This is in line with Lear’s idea. All perspectives on the world are to an extent love-infused (reflexive), including scholarly ones. Scientists, too, are bodily beings and scientific insights come in the form of embodied experiences. As Varela and colleagues note – if scholars do not recognize the importance of who and how performs an investigation, then the obtained results become disembodied and present a (useless) view from nowhere.\footnote{Varela et al. 1991, 27.} In a sense, then, any scientific description is more than a cognitive model – in implicitly representing the experiential journeys and longings of particular scientists as well.

Embodiment makes neutrality impossible. It also fundamentally constrains the perception of reality (both scientific and religious). Or, as Charles Laughlin, one of the “fathers” of biogenetic structuralism, puts it – reality represents a set of limiting conditions on our knowing.\footnote{Laughlin, Charles D. Biogenetic Structural Theory and the Neurophenomenology of Consciousness. – \textit{Toward a Science of Consciousness III: the Third Tucson Discussions and Debates}. Edited by S. R. Hameroff, A. W. Kaszniak and D. J. Chalmers. Cambridge (Massachusetts) and London (UK), The MIT Press / A Bradford Book, 1999. P. 461.} And yet, it is only thanks to the body/brain mediation that one can perceive reality at all (at least in this world!).
If it were not for embodied perceptions, humans would not perceive God even if He existed (again, at least in this world!). Neither would science be possible.

The fundamentality of bodiliness in perception is well expressed in a humorous remark by Newberg and Waldman on yawning – not only is it hard not to react with a yawn if we see someone yawning, it is also hard not to yawn even when one simply reads the word.13 Such bodily, reflexive mirroring is a way of “understanding” the word. To varying degrees, perception (including scientific and religious perception) always involves reflexive, bodily mirroring.

Carol Albright explains this via the notion of “humanizing”. Having pointed out that all claims to objective knowledge are, at least to an extent, reflexive in nature, she argues that since humans have no choice but to use a human brain in understanding the world, they “humanize” everything they think about. In other words, we think through our own, personal bodily experience. This is both the limitation and the glory of being human. Such reflexive conditioning in every phase of knowing and perception, however, does not mean as if there were no way to know something about the world as it really is. Because human reasoning has enabled the species to get along in the world, it must indicate something about what the world is really like. Even though it has limitations, it still provides information correlated with the “really real” and, hence, clues as to the nature of the world itself.14

When it comes to thinking about MSCs and perceiving God or the Higher Plane of existence, the same embodied constraints apply. As Albright puts it – perceiving and thinking of God as He would really be is far beyond the limits of the embodied human mind. We are “locked” in the analogies and metaphors that can be drawn from experience and the surrounding culture. The best one can do is aiming at the truth as best as one can at the time.15

Bodiliness is, thus, reflected both in MSCs themselves and in the scholarly studies of them – because the latter are based on reflexive mirroring (via the body) of MSCs. Jeffrey Kripal proves this point convincingly in the case of Evelyn Underhill’s classical account on mysticism. He cites Underhill’s idea on the nature of MSCs in that the “light whose smile kindles the Universe” is ever the same but the self through whom it passes and by whom one must receive its report, has already submitted to the moulding influences of environment and heredity. The response which it makes to Divine Love will be the same in type as the response which its nature would make to earthly love, but raised to the nth degree (note the excellent accordance of this idea with the arguments in the previous chapters). Kripal then points out that the same is true of Underhill’s

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13 Newberg & Waldman 2006, 35.
15 Rausch Albright 2002, 64.
own theoretical report on mysticism. MSCs and the study of them are continuous.

Again, there is no escape from the body. In the motion picture *What the bleep do we know!*? one of the commentators asks why do we keep getting into the same type of relationships, why do we find ourselves over and over in the same types of situations. The Kantian answer is that a precondition for having any experiences at all are certain prior forms of perception. Outside these preset, embodied categories there can be no conscious experience at all. The movie is more “optimistic”, suggesting that by treating reality creatively and relativizing the default, genetically and culturally inherited categories of perception, it is possible to stretch the repertoire of human experiences. This is a good advice for human advancement and well in line with the recent insights in epigenetics. However, not all of the inherited forms of perception are reprogrammable. There are limits to how far one can go. As Otto Neurath has pointed out, we are like sailors at sea who have to rebuild their ship while staying afloat in it. This is what the notion of exaptation (vs. that of spandrel) is all about, too. One of the irreprogrammable aspects of embodied experience is its being structured in terms of the erotic tension between self and Other, female and male. This prior “erotic coloring” is one of the most fundamental ways of “humanizing” what we think about and perceive – be they fundamental particles, God or other people. In this sense, not only are MSCs erotic and embodied – so is the study of mysticism. How these insights help to interpret the MSC-sexuality link becomes clear from a reflection on d’Aquili’s heritage.

§ 2. D’Aquili’s legacy as an Erotic Myth: a case study

“Scientists affirmed the left side [of the brain] as “human” and intelligible and the right as speechless and “animalistic.” They went further and associated the emotional, the organic/nutritional, psychopathological madness, and female inferiority with the right hemisphere […]. Such thinking reinforced the tradition of classifying divine and human activities as “dual” – the good right hand and the bad left hand.”

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17 Arntz, William, Chasse, Betsy, Vicente, Mark (dirs.). What the Bleep Do We Know!? Lord of the Wind Films, 2004.
18 For a good introduction, see: Lipton, Bruce H. The Biology of Belief: Unleashing the Power of Consciousness, Matter and Miracles. Santa Rosa (California), Mountain of Love / Elite Books, 2005.
This thoughtful passage by Ashbrook and Albright provides a revealing clue as to how deeply the above discussed prior “erotic coloring” really dominates human thinking. If one looks at d’Aquili’s scriptural legacy from this point of view, then it starts to become clear to what extent studying mysticism is itself a mystico-erotic practice.

For starters, as already hinted in chapter IV, I strongly suspect that the “sexing” of brain structures ruthlessly exposed by Ashbrook and Albright above may have formed part of the basis on which d’Aquili originally linked MSCs to orgasm – in a rather surprising way. Namely, the functions and the nature of the consciousness each hemisphere generates according to d’Aquili are an almost perfect match to the patriarchal, sexist gender stereotypes. Thus, the dominant hemisphere engages in logic, math, abstract reasoning, verbal conceptual expression – all “masculine” (yang-type\(^{21}\)) activities. The right hemisphere is a “dreamer” – holistic, irrational, emotional, a “nice girl” (for “she” is nondominant, submissive to the “Alpha Male” left hemispheric consciousness). However, “she” does have chthonic aspects since, according to d’Aquili, it is the right hemisphere that enables the capacity for orgasm.\(^{22}\)

This is an incredibly sexist schema. But it is also highly eroticized because in it every act of interhemispheric communication takes on an erotic “shade”. And since d’Aquili views the hemispheres as extended ergotropic and trophotropic systems (see chapter IV), these and also the sympathetic and parasympathetic systems automatically become “gendered” as well. The more so because they are polar opposites, just like the male and female in patriarchal stereotypes).

Now, while the above interpretation is a bit far-reaching, it is helpful in clarifying something that is of considerable importance in understanding d’Aquili’s legacy. Namely, d’Aquili often discusses MSCs as ritual-induced states that resolve a myth-based problem. The latter is always presented in terms of irreconcilable, juxtaposed opposites. MSCs, then, enable transcendent, experiential unification of the polar opposites, via 3\(^{rd}\) stage autonomic states.\(^{23}\)

In other words, one has two opposing “characters” that are then united in a kind of coniunctio oppositorum via MSCs.

Now, if the ergotropic and trophotropic systems are viewed as polarized and gendered and MSCs are described in terms of their paradoxical coactivation (recall the “spillover” metaphor), then a strange analogy emerges between d’Aquili’s theory of myth and how he conceptualizes neural functioning. The opposition between the ANS branches can – in terms of d’Aquili’s own theory – be viewed as a mythical problem and their coactivation represents the resolution of the opposition. What I am saying, then, is that d’Aquili’s theory of MSCs is

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\(^{21}\) For a discussion of the principles of Yin and Yang in relation to hemispheric lateralization, see chapter X or refer to: Ashbrook & Albright 1997, 125.

\(^{22}\) For references to evaluate this (addmittedly far-reaching) interpretation, start from: d’Aquili 1986, 148–149; 156.

itself structurally similar to a myth. This mythical quality may be the reason the theory intuitively feels profound and correct as Albright notes. “Intuitively [---] [the theories] feel correct, whether or not all the neurological detail proves out.”24 We do not demand neurological proof when dealing with myths! In other words, it may be precisely because of its mythical structure that the theory feels correct.

It could be claimed at this point that, with the above, I have proven d’Aquili’s whole theorizing to be circular (one should not explain something by using that same thing as part of the explanation). However, that a theory has mythical qualities and may partly be circular does not mean that it is necessarily wrong. D’Aquili might here reply that the circularity is a result of the constraints the brain architecture sets to our creativity – the brain only has so many cognitive “operators” and the circularity is a result of the cognitive imperative (the compulsion to make sense out of the world).25 Be that as it may, the above insights already show – every writing on mysticism is itself also a mystical text.

This is further confirmed as one looks deeper into the implicit gendering of neural structures introduced above. I am not the only one who has noticed these reflexively based aspects in d’Aquili’s legacy. James Ashbrook has argued that some of d’Aquili’s concepts have (homo)sexual connotations.26 I would approach the issue from another angle. D’Aquili had great interest in Jung’s works and the nondominant hemisphere. It is the right hemisphere that he relates to God and the mystical, it is the nondominant hemisphere that can provide a fresh, holistic view of the world – if only allowed “in”. And in at least one paper d’Aquili argues that females are more “right brain biased”.27 Taken together with the above discussion on the “sex” of the hemispheres and d’Aquili’s Jungian interests I suggest d’Aquili’s theorizing was really an erotic pilgrimage after his contrasexual, feminine “soul” – his Anima figure presumed to dwell in the right hemisphere.

This interpretation can at least partly be defended. D’Aquili started from split-brain research. Split-brain studies had revealed what he viewed as a mystical, second, potentially independent consciousness within our skulls (see chapter IV). Such an insight provokes a question whether it would somehow be possible to actually experience that “other consciousness” in its pure form. Note that if the hemispheres are implicitly given a “sex”, then the plain fact of conceptualizing the nondominant hemispheric consciousness as other assigns it a contrasexual polarity from that of the baseline self. Now, the Jungian view is that the way to the depths of the unconscious goes via the archetype of

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Anima/Animus. And d’Aquili explicitly puts the archetypes in the nondominant hemisphere.28

Perhaps, then, it was the erotic allure of his right hemispheric Anima that motivated his theorizing? There are hints that point in this direction – even in the later papers. For example, the 1998 Zygon account attributes romantic love, aesthetic beauty, feelings of numinosity and just about everything else that is good and desirable in the world to the above usual activation of the right hemispheric holistic operator.29 In The Mystical Mind, it is specifically noted that there is a sensory representation of the entire body within the right hemisphere, separate and distinct from the primary representation of the body in the primary receptive areas of the left and right parietal lobes.30 In the above context, one is tempted to ask what that ‘distinct’ means. Could it, for example, have contrasexual features?

Be that as it may, d’Aquili does link the nondominant hemisphere (and the parasympathetic branch of the ANS) to the Holy. Since Jungian thinkers view the contrasexual Anima/Animus archetype as a messenger between this world and the Beyond and since the archetype dwells in the nondominant hemisphere, d’Aquili’s fascination with it (and the parasympathetic system) is erotic. In this sense, Ashbrook was undoubtedly right in critiquing d’Aquili for not paying enough attention to gender implications in his theorizing – a critique d’Aquili accepted: “Unfortunately, I must accept Ashbrook’s critique of our paying insufficient attention to gender differences in the organization of experience.”31

These erotic aspects can be traced even further if one takes a closer look at the metaphors d’Aquili (with Newberg) has used to describe the neural states characteristic of MSCs. Expressions such as powerful discharge, maximal excitation and spillover are all highly “orgasmic”.32 In fact, it is quite obvious that they have been derived from a direct, embodied experience of the male orgasm. In this sense, it could even be argued that the point is not in orgasm being the simplest paradigm to explain MSCs (as d’Aquili argues) – rather, Newberg and d’Aquili’s MSC model is constructed on the basis of orgasm experience.

In addition to its’ mythical quality, this is the other reason d’Aquili’s theorizing intuitively feels so convincing. It presents an erotic mythical plot that culminates in fitting orgasmic expressions of relief and exhilaration. The theory (should I say narrative?) feels natural because it is resonant with the universal bodily sensations known to most adults. And in this sense it makes very little difference whether the theory is correct or not. It helps one “bodily understand” complex phenomena even if it should be entirely amiss neurologically.

If one brings all of the above leads together, then what one has in d’Aquili’s earlier writings is an erotic myth of a lone wanderer “male” left hemisphere on a pilgrimage to meet “his” free-as-a-bird “female” right hemispheric counterpart that leads to a happy end consisting in a mystical marriage held in the PSPL.

The foregoing is not intended to ridicule d’Aquili or to question the validity of his theories – the latter issue is, I hope, covered enough by the previous chapters. Furthermore, d’Aquili is far from being the only one using a “mythical” structure in scholarly theorizing. The argument is aimed at something else that I think is quite important – one trying to do good and honest science as objectively as possible does it from within a gendered bodily structure that moulds and eroticizes her reality perception. One trying to understand her science also does it from within a gendered bodily structure. And the extent to which a theory is felt to solve the problem – just as in the case of MSCs and orgasm in d’Aquili’s presentation – may depend more on the extent to which it succeeds in structurally mimicking and “resonating” with basic bodily processes and hormonally conditioned cravings than on its intellectual truth. To use James Austin’s words, “the deep issue here is metaphysiological, and lies beyond metaphysical word-play.”

It is for this reason that mythical narratives (as well as scholarly theories) can be powerful regardless of their particular content. If they “resonate” with our biological “ticking”, they are experienced as “true” and compelling. Therefore, I not only agree with Albright as she suggests that constructing narratives to order and explain experience might be a biological compulsion – it seems that, in addition, bodily processes and drives also provide “templates” for these narratives. In a sense, the body is a narrative, through all of its internal processes. The body and narrative are continuous. There is no more escape from narrative than there is from the body. It is, therefore, interesting that, as Hefner explains:

“Most of the people who are known today for their mastery of the dense facts of the world – scientists, engineers, policymakers, and the like – do not cotton to the idea that their work is dependent on imagination and story. Most religious believers share this skepticism about story. Most of the scientists and religious people I know share a dislike for the word postmodern precisely because they wish to fence off fact from story. [---] We would like the facts to be immune

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33 Motofei and Rowland, for example, explain orgasm and sexual desire via a very similar “mythical” structure that is based on two interrelated polar oppositions: the sympathetic vs. the parasympathetic and estrogens vs. androgens (Motofei & Rowland 2005b, 81–82).

34 I remember a remark made by a female scholar – there is nothing sexier in the world than a good scientific argument…


from our story and imagination. When the doctor tells us that diagnosis is as much an art as a science, our confidence is not strengthened. We would like our diagnosis and our therapy to be utterly fact-based.”37

In the above light, Hefner’s point can be viewed as revealing the human fear of and dream of escaping the fundamental bodiliness, uncertainty, insecurity of biological existence – in this case into a soteriologically conceived “realm of pure fact”. Unfortunately, there is no way to escape our bodily, biological environment and its narratives. This is what it means that God “formed man from the dust of the ground” (Genesis 2:7). Again, the main issue is meta-physiological, not metaphysical. Fencing off narratives from facts is like fencing off the body and its cravings from spirit – an enterprise that will always fail because the two are fundamentally continuous (as shown in the previous chapters).

Looked at from this angle, the strength and power of the Christian narrative is its affirming this continuity via Jesus. As a human being, Jesus can be bodily, viscerally “understood”. One can mirror his compassion bodily as, for example, he tells a widow whose only son has died, “Do not weep” (Luke 7:13). The greatest weakness of Christianity is that it has never been able to squarely face the implications of this affirmation, resorting into disembodied and counterintuitive doctrines (such as that of transsubstantiation) and ideals. One of these is the fundamentally gendered, hormonally conditioned and bodily nature of human love – including the love for God.

B. THE SEX DRIVE AND CHRISTIAN IDEALS

§ 1. The topic of sex in Christianity and other religious traditions

According to Lear, love is a basic natural force. Hence, there is no perspective from which to look down at the sexual drives as something brute and impersonal.38 Christian theology and piety, though, have often treated sexual (and other) urges from just such a disembodied perspective. This has resulted in a fundamental distrust towards and “abhorrence” of romance and sexuality and the favoring of mortification rather than celebration of the bodily. However, as the material presented in this volume clearly shows, the mystical and the erotic cannot be separated. No wonder, then, that there is considerable confusion and discussion among Christians about issues of sexuality. John Portmann, in his characteristic ironical manner, summarizes this confusion: given the churches’ notable preoccupation with sex and gender, one could say that religious

37 Hefner 2003, 68–69.
38 Lear 1990, 181.
devotion today revolves around sex – whereas God once rested at the center of
the spiritual universe, genitalia do today.39

This remark is certainly well-aimed. Among other things, it serves as a
healthy and welcome arrow of critique towards the line of research pursued in
this volume. However, its deeper imperative is that Christians finally quit
squeamishly circling around the issue and start calling things by their right
names. Several theological thinkers, Portmann himself included, have taken this
challenge. Their insights on the issues of celibacy, homosexuality, carnal desire
and the like in the relation of the latter to Christian core beliefs provide
considerable support to the hypotheses and predictions in the analyses above.
They also help to further clarify the above insights on the fundamentality of
embodiment – in ruthlessly exposing the religious confusion that ideals going
against our biological “ticking” result in.

To get under way – Lene Sjørup, affirming that God was never separate and
far from sexuality, lyrically reflects: “Be fruitful, multiply, enjoy! This red
desire to unite: women and men, men and men, women and women, hummingbirds, giraffes, a lust for living and continuing to live.”40 This bold celeb-
ration and affirmation of sexuality, while perhaps true of God’s attitude towards
sexuality, is certainly not shared by most religious “offices”. Portmann points
out that most religious authorities and governments around the globe and
throughout religious history have tried to regulate and constrict sexual practices.
In this sense, he says, the coming of the Information Age has changed nothing.41

In coming to present his case on Christianity in this respect, Portmann takes
an original and amusing route. He notes that, by definition, all Christians share
a desire to get to heaven. At the same time, almost all human beings burn with
sexual desire. This sets a stage for a drama where the two passions have been
pitted against one another.42 The drama is a product of disembodied theological
ideas and not of some inherent clash between the two desires themselves. As
Portmann mockingly explains: Catholic theology holds that our cosmetically
restored bodies will no longer be vulnerable to lust in heaven. Missing organs
will be reinstated, meaning that men who have made themselves “eunuchs for
the kingdom of heaven” will become anatomically correct again. Why bother,
one might wonder, if there is to be no lust. Apparently, Portmann says, taking
his irony further, the penis must have an important aesthetic role to play in the
next world. Whether circumcised penises are more decorative than others
remains open to debate, it seems safe to assume, though, that discarded
foreskins will reunite with their members. Thus, Portmann concludes, there will
be countless attractive bodies in paradise but no yearning to explore them. That

39 Portmann 2003, xii.
41 Portmann 2003, 67.
42 Portmann 2003, 201.
Portmann’s irony is sharp but well aimed. Gay, approaching these issues from a different angle, comes to pointing at a very similar discrepancy. He draws his readers’ attention to the seminude illustrations of Christ: in a Catholic girl’s bedroom one finds a crucifix, on it a naked Christ stretched out on a cross, positioned so that Christ could see the girl and she could see him. Parents who arranged this no doubt wished to remind their daughter of Christ’s death – just before her eyes closed she could meditate on that event. However, Gay says, this does not change the fact that the crucifix represents a near-naked man. With all the resulting erotic connotations.

Gay’s observation is no longer just an amusing (or irritating) irony. It reflects a deep confusion in Christianity about bodiliness, the erotic and their relation to the Divine. The Muslim attitude, according to Portmann, is in these matters somewhat more unambiguous. In fact, many Muslim thinkers view the West’s sexual revolution as an inevitable reaction to the attempts by the Christian churches to suppress, demonize and make shameful a God-given urge. Portmann points out that, according to Muhammad, marital sex is meant to be enjoyed – by the husband and wife alike (this is important – religious sexual regulations are often phallocentric and misogynistic). Muhammad especially encouraged foreplay and even referred to intercourse without foreplay as a form of cruelty to women. Nor does Islam set limits on the kind of sex married couples can enjoy. All kinds of intercourse, including oral sex, are permissible.

As to Judaism, Melissa Raphael argues that it sacralizes sexual pleasure as a religious joy whose intimacy is both a symbol and enactment of the covenantal intimacy with God. Similarly to Islam, Judaism emphasizes that sexual pleasure is meant to be mutual. However, Raphael warns, the relevant discourse still usually issues from a masculine perspective. Also, the theological meaning of sex is exclusively and normatively heterosexual and marital. Moreover, Judaism seems to be suspicious of romantic love and the purpose of its discourse on sex is not primarily to enhance its pleasures but to prohibit illicit (that is, non-marital) sexual relationships.

The last remark aside, Raphael affirms that in Judaism sexual love and affection within marriage are a means to human fulfillment. Judaism is largely free from asceticism and there is virtually no tradition of vocational celibacy. Marital sexual relationships are a central element within the divine economy of the holy. This clearly demonstrates the rabbis’ appreciation of sexual pleasure

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43 Portmann 2003, 6.
45 Portmann 2003, 74.
as a human good and a holy mystery irrespective of its primary purpose as a means to procreation.  

In the light of Judaism and Islam the Christian confusion about the sexual and bodily becomes even more conspicuous. No wonder, then, that in our era of freedom of opinion, as Portmann notes, with few exceptions, believers no longer go to war or protest over transubstantiation – they nowadays fight over issues of sex and gender. Sex bothers believers as differences in dogma no longer can.  

As Robert Goss aptly notes, emphasis on sexual shame has dominated Christianity nearly its whole history. Often to justify misogynistic and erotophobic theologies that failed to acknowledge the original blessings of both sexuality and human embodiment. Recent debates have led to several positive developments. However, Goss argues, contemporary Christianity has still hardly achieved its cultural puberty around sexuality (this being attested to by its continuing attempts to put sexuality “back in the bottle”), especially over issues of sexual and gender diversity.  

Mark Jordan explicates this by pointing out that, typically, the official documents of Catholicism propose norms for human sexuality that are based on schematic, idealized views of both sexuality and marriage. They restrict sexual activity to marriage via an appeal to only marital love being exclusive, enduring and transcendent in its complementarity and fertility. What kind of a statement is that, Jordan asks? Certainly not a statement of statistical fact. It is, at best, the statement of a utopian norm, derived from selective readings of nature, the Scriptures, and Catholic traditions.  

What is needed to cure this situation, according to Goss, is a *re-embodying* of spirituality, a redefining of the divine to include the erotic dimensions of love and life, a liberation of God from erotophobia and a freeing of God from traditional antise Xual theological constructions.  

§ 2. Robert Goss on celibacy: a preliminary interpretation of the mystico-erotic link

Now that I have briefly discussed the general Christian confusion about the erotic and sexual and pointed out that this results from ignoring the fundamental bodiliness of human perception of the world, intriguing questions arise as to the people who actively suppress their bodily “ticking” – ascetics. Ascetic practices usually involve giving up sexual expression, in the name of a “higher cause” as

47 Raphael 2000, 56.
48 Portmann 2003, 89.
49 Goss 2002, xiii.
Portmann puts it. This brings me back to the link between MSCs, erotic states and bodiliness – albeit in a “retrograde” manner. Because the “higher cause” behind giving up sexual expression is enhanced spiritual contact with the Divine. If giving up sex should enhance one’s “spiritual perceptions”, then this would be another confirmation to the hypothesis that the two are fundamentally continuous.

Sexual asceticism, says Portmann, enjoys an exalted status in many spiritual traditions. It is honored in Hinduism and Buddhism. Various Greek thinkers (e.g., Pythagoras and Socrates) revered abstinence as well. Gay also notes that the wish to transform the power of sexuality into a “higher” kind of power is of ancient vintage. For example, semen has since times immemorial been identified as a magic fluid. It is a theme that permeates Indian thought: semen is a substance associated with life, procreation and ecstasy, yet is “expended” in orgasm. Hence, conserving it ought transfer those qualities of this “life force” to oneself.

As it turns out, though, such self-serving “conservation of semen” may not, after all, be very effective in increasing one’s spiritual “receptivity” – precisely because it is self-serving. The evolutionary origin of spiritual states is in reproductive biology. Reproductive behaviors are about communication and transcending the self (i.e., not coddling it). The link between the bodily “ticking” and spirituality reflects this and is about much more than “conserving semen”. This is best explained via the confessions of Robert Goss. These confessions also provide a preliminary theological interpretation of the discussions above.

Goss begins his autobiographical reflections by noting that he really, truly loved Jesus and wanted to follow and be at one with him. Growing up as a Catholic, he had known from early on that he was not attracted to women and not interested in marriage. Religious life or celibate priesthood therefore seemed good options. He notes that his erotic desires for males contributed to but were not the sole reason for becoming a Jesuit priest.

While already in celibacy, he says, he started to have visions of naked Jesus – a muscular, handsome bearded man – embracing him. This lead him to strong sexual arousal. He confesses envisioning burying his face in Jesus’ hair-matted chest, again finding himself fighting off sexual fantasies. Passionately (and in a somewhat frustrated manner), he exclaims – Catholic asceticism is aimed at repressing sexual impulses, maintaining flaccid penises and creating lifeless bodies. But at the same time, Catholic piety stimulates an erotic love for Jesus. Catholic asceticism introduced a monastic discipline of the flaccid penis while Catholic piety transformed ascetic practices into an erotic stimulation of the

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52 Portmann 2003, 67.
53 Portmann 2003, 66.
penis. Goss notes that it took him several years to sort out the contradiction between the asceticism of the flaccid penis and a piety stimulating the penis.56

Having made this statement, Goss then reveals, in plain English, to the layperson the background to which this contradiction and denial of the need for loving, real contact leads. He calls it the gee, I was drunk last night and don’t remember what I did syndrome. This denial mechanism, he reflects, allowed his Jesuit partners to deny their human need for sex and love, bodily affection and warmth. This denial mechanism, he says, distanced sexual partners from one until the next encounter. Then the cycle of human need for intimacy, covert sex and tremendous guilt and shame would repeat itself. As Goss notes, it offered the pretense of celibacy.57

Goss then comes to something that strongly supports my above ideas on the fundamentality of bodiliness – such sexual experiences, although institutionally frowned upon, countered the traditional dualist theologies and practices that opposed the body against the spirit. Later, Goss points out, some kind-hearted Jesuits mentored him to both sexual and spiritual maturity – by pointing out that the erotic can be a meditative gateway to the sacred. The body is not to be deadened but enlivened by its affectivity. The body is a sacramental locus of revelation and a site of spirit. He describes how these ideas helped him to experience the connection between body and spirit, sexuality and spirituality and the connection of the erotic with the Divine. As he notes, he came to know Christ in his intimate relationships and realized that orgasmic bliss had many of the subtle qualities of intense, sublime, nonconceptual contemplation of Christ.58

He concludes his autobiographical story by stating that the erotic is the embodiment of the spirit’s spontaneity. To eradicate sexuality would be, for us as bodily persons, to permanently block the spirit. Sexuality is neither destructive nor peripheral to spirituality. It is a means of communication and communion, it expresses the human drive to connect, both physically and spiritually.59

This latter conclusion represents a living monument to the arguments developed in chapter VIII. It also forms a preliminary theological interpretation of the MSC-orgasm link.60 Also, the motivatory quality of erotic love emphasized in chapter VIII as crucial for spiritual-mystical states is quite clear from these confessions. Hence, I would say that Newberg and d’Aquili are on the right track as they note that theology has been too preoccupied with the notion that God is the primary cause of the universe. It is time to invest more

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56 Goss 2002, 10.
60 A more fully developed version of this rudimentary interpretation will be provided in chapter XI.
attention to the notion of God as the ultimate love and goodness of the universe.\footnote{WGA, 178.}

Given all of the above, it is not at all surprising that mystical texts contain erotic metaphors. Kripal writes: prurient imagination or no, sexual metaphors (e.g., mystical marriage, betrothal, wedding ring, union, consummation, kiss, embrace, piercing, wound of love, conception) appear in Christian mystical literature with a remarkable consistency. He points out that, in this relation, it is also significant that, with the exceptions of Genesis and Psalms, in the Middle Ages no book of the Old Testament was commented on more frequently than the Song of Songs.\footnote{Kripal 2001, 70 (with a further reference to: Turner, D. Eros and Allegory: Medieval Exegesis of the Song of Songs. Kalamazoo [Michigan], Cistercian Publications, 1995).} In a way, sexuality and the erotic are a constitutive, bodily determinant of religious experiences. Therefore, attempts to describe “authentic” Christian experience exclusively in terms of “non-carnal”, agape-type love are ultimately doomed. God is both agape and eros. The evolutionary roots of Christian love are in reproductive behaviors. And a plant cut away from its roots will unavoidably wither and die. In this sense, it is fitting to conclude this chapter with a thoughtful point by Merlin Stone:

“In the worship of the female deity, sex was Her gift to humanity. It was sacred and holy. [...] But in the religions of today we find an almost totally reversed attitude. Sex, especially non-marital sex, is considered to be somewhat naughty, dirty, even sinful. [...] [R]ather than calling the earliest religions, which embraced [...] all human sexuality, “fertility cults,” we might consider the religions of today as strange in that they seem to associate shame and even sin with the very process of conceiving new human life. Perhaps centuries from now scholars and historians will be classifying them as “sterility cults.”\footnote{Stone, Merlin. When God was a Woman. New York and London, a Harvest / HBJ Book, 1978. Pp. 154–155.}
CHAPTER X. THE “SWORDS OF TRUTH” AND “WOUNDS OF LOVE”

A. IN MSCs, MEN, TOO, HAVE BREASTS

§ 1. The main point

According to the data found in embryology we have gotten the Genesis story all wrong. The Yahwist has pursued a patriarchal ideological agenda when stating that woman was made from the rib of man. It must have been the other way around. In her delightful book Sex and Cognition Doreen Kimura explains – the critical first step in the “getting” of a male is the formation of testes which produce the male sex hormones needed to finish the “job”, including the forming of the male genitalia. The “testes-determining factor” is likely carried on the SRY gene of the Y chromosome. If there are no male hormones, a female will form – interestingly, no special hormonal milieu is needed to yield a female. Kimura concludes that the “default” human form is female and that the male is a variation on the female.¹ This, as Crews intriguingly puts it, means that males are more like females than females are like males – female is the ancestral sex and male the derived sex.² It seems, then, that the Original Adam must have been a woman.³ A man is, quite clearly, taken from “the rib” of a woman, by – figuratively speaking – cutting one leg off of a perfectly good X to form a Y.

Why bring this up? Because what I shall be saying in the following touches on the sensitive issues of gender and sexual orientation. Since I am a white heterosexual male and since it is precisely white heterosexual males who are responsible for the creation of the misogynistic stereotypes still alive in Western societies today, I want to emphatically underline with the above that the male is a variation on the female and not vice versa. Also, I want to underline that I gladly celebrate gay, lesbian, queer and transsexual orientations. Thus, in arguing that religious traditions that conceptualize the Divine as male are problematic for heterosexual males – in casting a male mystic’s relationship with the Divine in a homoerotic light – I am not making a moral judgement disapproving of gay erotics.

The issues of gender and sexual orientation enter the present discussion because of the emphasis on the fundamentality of bodiliness. In continuity with the differences between male and female bodies, the human brain is in subtle aspects sexually dimorphic, too. Prenatal exposure to large quantities of testosterone results in irreversible changes in its “default female” form, especially in regions that contain large numbers of sex hormone receptors.⁴

¹ Kimura 2000, 17–18.
² Crews 1998, 757.
³ For a thorough discussion of these issues, see: Crews 1998, 757–761.
⁴ For a clear commentary, see: Kimura 2000, 107.
sexually dimorphic structures is the hypothalamus – a key “player” in the above discussions. Its sexual dimorphicity is, as Kimura notes, due to its importance in mediating the different sexual behaviors of males and females. For example, subregions of the preoptic hypothalamic nucleus have been shown to irreversibly enlarge under early androgenic influence. It is known that the size of the interstitial nuclei of the anterior hypothalamus depends on the organism’s response to androgens and is smaller in women. Surprisingly, the size of these nuclei also differs between straight and gay men, with gay men often showing parameters closer to those in an average female than those in an average male.\(^5\)

Importantly for the present discussion – if the hypothalamus represents an important link between MSCs and erotic-orgasmic states, then one should on these bases expect to find at least some gender-dependent differences between the MSCs of men and women – a prediction already briefly discussed in chapter VIII. Hypothalamic activity is significantly conditioned by the influence of sex hormones. A hypothalamus exposed to large quantities of testosterone will not respond similarly to an estrogen-dominated one. As pointed out in chapter VII, in imaging studies on orgasm gender differences have already come up and it has become clear that the role of the hypothalamus in orgasm is quite complex.\(^6\) Yet no gender differences are reported on MSCs. Thus, on the way towards a more structured understanding of MSCs, looking for gender differences (on the level of brain functioning) might be a fruitful “side-jump”.

Now, is there currently any way to substantiate the prediction that MSCs are gender (and sexual orientation) sensitive? There is. One finds – by comparing the literary inheritance of female and male mystics – that there is a curious one-sidedness in the mystico-erotic accounts. There are many descriptions of MSCs by females that are clearly heteroerotically structured. For example – Teresa of Avila describes her ecstatic union with the Divine in terms of a heavenly, fiery sword piercing through her.\(^7\) There are also many many descriptions of MSCs by male mystics that are clearly homoerotically structured. For example, St. John of the Cross describes, in roughly the same manner as Teresa, being wounded with a “wound of love”.\(^8\) But there are almost no accounts by male mystics that would be heteroerotically structured.

If one constrains the discussion to the three major monotheistic traditions that conceptualize God as male, then, of course, there is nothing very curious about it. If God is male, then any intimate, loving encounter between Him and His male adherents will automatically be cast into a homoerotically conceived “mould”. As Jeffrey Kripal has ironically noted, that a man’s soul is imagined

to be female in relationship to the Divine cannot hide the fact that what one finally has is a male mystic using sexual language to describe his uniting with a male divinity, a homoerotic symbolism. On this basis, Mark Jordan criticizes Christian churches for being at once the most homophobic and the most homoerotic of institutions – they condemn and yet instruct same-sex desire.

The truly amazing thing, however, is that a case can be made that even within religious traditions that conceptualize the Divine as female, the male adherents display a homoerotic “bias” – as if indentifying with the female divinity. I think that this has to do with the bodily and behavioral basics of MSCs and that it can be explained in evolutionary terms. But before going into that, let me flesh the problem out in more detail – with the aid of Kripal’s semi-autobiographical analysis of the matter.

§ 2. Jeffrey Kripal on men and bridal mysticism

Kripal starts his discussion from noting that the celibate structure of Catholicism, his “home” religion, carries a message that profound religious insights are reserved to those willing to give up sexual expression. This message is strengthened in that Jesus, too, seems to have favored the ideal for males to become “eunuchs for the kingdom of heaven,” that is, (symbolically) castrated, and in that Paul held virginity to be the most appropriate mode of being for this eschatological age. The influence of Neoplatonism on early Christian thought finally lead to the idea that the body is, basically, a hindrance to be delivered from. Consequently, much of the history of Christian spirituality represents an amplification of the ancient mystical practice of “conserving semen”.

Kripal says that as a mystically inclined person aspiring to become a Catholic priest, he saw no choice but to try to live up to that standard. And found that he could not. Because no matter how hard he tried he could not fit his heterosexuality with Christian mystical models. As he notes, he could understand Teresa of Avila’s erotic-co-mystical vision of a flaming angel plunging a fiery arrow “deep within” her until she moaned in an intense pain that was also unspeakably pleasurable. Teresa’s being a woman posed no obstacles for her religious imagination – her gender “fit” into the tradition’s image of the female soul as bride being penetrated by a masculine divine. However, Kripal confesses, he found no way to be at ease with how the male mystics described their encounters with the Divine. He rhetorically asks – what about Bernard of Clairvaux’s descriptions of being kissed or penetrated by Christ the bridegroom? Or about John of the Cross’ poetic discourse over his “delightful wound” – when the soul is transpierced with that dart, the flame gushes forth; and being wounded by this fiery dart, the soul feels the wound with.

9 Kripal 2001, 70.
10 Jordan 2000, 8.

Kripal’s point is not meant as a moral judgement over homoerotics. These examples serve to illustrate what upon thinking seems obvious: in a monotheistic tradition in which God is male, any erotically colored relationship with the Divine ends up being homosexually structured for males. Because Christian piety strongly encourages believers to seek loving communion with God, Kripal thus argues that while the tradition officially condemns homosexuality, it at the same time cultivates it. In substantiating the latter claim, he mockingly notes how both male and female Christians (not to mention the church) are imagined to “marry” Christ at death, how priests wear what he calls liturgical dresses and how worship is centered around eroticized adoration of the virtually naked body of a divine man. There is no place in such adoration for male heterosexuality, he says.\footnote{Kripal 2001, 149 (with references to: Eilberg-Schwartz, H. God’s Phallus and Other Problems for Men and Monotheism. Boston, Beacon Press, 1994. P. 99).}

Howard Eilberg-Schwartz has come up with a similar thesis on Judaism. Here, too, God is male. Israel is conceptualized as His bride. Hence, any male representative of that bride (and in a patriarchal tradition, it is the male who represents the collective) becomes cast in an implicitly homosexual role vis-à-vis God.\footnote{Eilberg-Schwartz, Howard. God’s Phallus and Other Problems for Men and Monotheism. Boston, Beacon Press, 1994. P. 195.} Kripal shares his feelings upon such discoveries (recall – he was aspiring to become a Catholic priest) – it felt as if ‘being called’ was synonymous with ‘being gay’.\footnote{Kripal 2001, 149–150.}

Now, it may seem that Kripal’s confusion results from mistaking metaphors for reality. Unfortunately, the problem cannot be “fenced off” this way. Metaphors are rooted in bodily functioning. MSCs are erotic not only metaphorically but quite literally. Moreover, Kripal is far from being alone in having noticed the issue. Portmann, for example, after pointing out the obvious cases of Teresa of Avila and Therese of Lisieux who both describe their burning desire for union with Christ, is especially intrigued by John Donne’s hunting poem
Batter My Heart, Three Person’d God in which Donne beseeches God to “ravish” him.16 The situation is all the more awkward because while in the case of female mystics their erotic visions associated with God and Jesus are easily “excused”, a male mystic’s sexually charged description of a mystical union with the Divine is more or less blasphemous in the Biblical sense (recall the story of Sodom in Genesis 19). Hence, the “metaphor defense” is a dead end.

How “fundamentally dead” it is becomes evident in Kripal’s discussion of the cases of Bernard of Clairvaux and, especially, Bonaventure. As Kripal notes, Bernard’s *Sermones super cantica canticorum* is a summa of medieval mysticism. In it, inspired by the opening line of the Song of Songs (“Let him kiss me with the kisses of his mouth!”) Bernard writes for pages on kiss being the most appropriate symbol for the soul’s union with God. Kripal notes that if one wants to close the eye on the homoerotic dimensions of a male mystic justifying kissing a male Christ, one must keep in mind that many of Bernard’s contemporaries did not share this squeamishness. Kripal calls his readers’ attention to a joke told about Bernard that is recorded in the clerical satire book *Trifles* by the 12th century priest Walter Map. Mediated by Mark Jordan, the joke goes as follows: Cistercian monks are talking piously about an incident in which Bernard tried to bring a youngster back from the dead by stretching out on him – unsuccessfully. Another clergyman, an anti-Cistercian, interrupts the pious story with feigned astonishment: he had often heard of monks laying themselves on top of boys, but usually both the monk and the boy got up afterwards.17

After discussing the joke Kripal convincingly shows that the “kiss metaphor” is not as “innocent” as one might want to think – on the example of Rupert of Deutz, in whom the “metaphor” evolves into a clearly homosexual experience. Kripal quotes him as follows: “When I quickly entered [the altar], I took hold of him whom my soul loved. I held him, I embraced him, I kissed him for a long time. I felt how deeply he appreciated this sign of love when in the midst of the kiss he opened his mouth so that I could kiss more deeply.”18

Finally, Kripal argues (putting the final “nail in the coffin”), in order to complicate things even further and call for a truly embodied reading of mystical texts, one should keep in mind that Bonaventure, one of the tradition’s great mystical theologians, was quite clear in that the ecstasies of male mystics often produce real sexual fluids: “[I]n spiritualibus affectionibus carnalis fluxus liquore maculantur” (within the spiritual affections, they are stained with the liquid of the carnal flow). Homoerotic or heteroerotic, Kripal says, the spiritual affections are associated with sexual sensations that can have real, physiological, fluid analogues. The term ‘metaphor’, he reflects, does not even begin to

suggest what is actually at work here. I cannot but agree with Kripal’s latter point, especially if I recall the case of the Catholic girl of the main introduction of this volume.

§ 3. The final “twist”

The foregoing is worked out on the example of Catholicism. However, there are good reasons to consider it representative of the situation in all three major monotheistic religions. Seeking mystical union via traditions that view God as male is, for heterosexual males and homosexual females, unavoidably associated with a cognitive and affective dissonance. A dissonance determined by chromosomes, hormonal balance and their related sexual orientation.

Looking at the matter from the angle Kripal suggests, I do have to admit that the idea of mystical union would for me, a heterosexual male Christian, be more easy to “digest” if on the altar paintings I would find – instead of a beautiful, empathic-looking figure of an (almost) naked man – a beautiful, empathic-looking figure of a seminude female. If I put myself in the shoes of a woman who has for years been looking for a spiritually mature male companion, yet has always ended up with beer-guzzling, TV-addicted football fans and imagine what would Jesus signify in that situation, then it is clear that the gospel “fits” into that world differently from that of a male. The message cannot be severed from its form nor from its context. The spiritual is continuous with the erotic. Andrew Wright puts it splendidly – in water, one cannot separately feel the taste of either oxygen or hydrogen, yet nevertheless both are necessarily present in H2O.

Should one, then, try “fixing” the situation by adopting the idea offered by some feminist thinkers – that the Father and the Son ought to be complemented (or even replaced) by another pair – the Mother and the Daughter? As it turns out, while relativizing exclusively patriarchal God concepts is a well justified enterprise (considering the misogynistic stances of the past) by itself, it does not fix the problem in the case of MSCs. Curiously, even in traditions that conceptualize their divinities in feminine categories, the male adherents tend to display a female identification in engaging the divine. In other words, the same male homoerotic aspects are also present in cults of female goddesses. The general schema is remarkably like that described for Christian bridal mysticism – the male, passively acting mystic is “penetrated” by a divine agent.

In clarifying this issue, Kripal’s autobiographical analysis comes in handy once again. Unable to find a way to deal with the homoerotic dimensions of bridal mysticism for males, Kripal turned to Hinduism. The Hindu goddess traditions can be explicitly heterosexual and deeply mystical at the same time.

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Kripal notes that he was struck in particular by the Hindu Tantra. He saw it as the mirror opposite of Christian bridal mysticism in that it allowed a male aspirant to preserve his masculine identification in his relation to the (feminine) divine. Finally a mystical tradition that “made sense” for a heterosexual male and in which males had erotic encounters with females, not other males.\textsuperscript{21}

Kripal thus began to study the Hindu Tantra. And, to his deep disappointment, found Ramakrishna, another male mystic “becoming a woman” in order to engage male divinities in erotic encounters. In short, he says, he was back to the very homoeroticism he thought he had left behind. He discovered that the heterosexual symbols and rituals that had drawn him to Tantra Ramakrishna himself rejected. As to the remaining heterosexual elements, Kripal learned that mystical encounters with the goddess are understood to involve great risk and Tantra itself is described as something dangerous and terrifying. It is, Kripal says, as if the male Tantrika must fight for this heterosexuality against great odds. In addition, the heteroerotic Tantric traditions are considered to be radically heterodox and esoteric in going against the public, orthodox culture. Once again, then, Kripal notes, mystical heterosexuality does not fit the religious norm.\textsuperscript{22}

The pattern of religious heterosexuality being perceived as heterodox and homoeroticism as orthodox emerges, according to Kripal, also in the case of Bengali Vaishnavism in which the ultimate goal of the aspirant is to share in the bliss of Krishna’s love play with Radha. The key question is how. In the orthodox tradition, the male devotee can never take on the persona of Krishna – this would render him guilty of the “pride of being male”. He can participate in Krishna’s eternal “play” with Radha only through a feminine identification – by becoming a sakhi, a female attendant of Radha. Hence, Kripal says, the popular folk saying in Bengal that \textit{except for Arjuna and Krishna, everyone has nipples}, that is to say, we are all women in relation to the divine.\textsuperscript{23}

The above suggests something truly amazing – for males, MSCs seem to be unavoidably homoerotically structured. If so, then the homoerotic “bias” in the descriptions of MSCs by males is not a direct result of conceptualizing God as male. If so, then the relation between a subject’s gender and the erotic orientation of her MSCs must depend on third factors. My hypothesis is that this factor is found in the basic bodily and behavioral substrate of MSCs – a substrate that has evolutionarily been derived from that involved in sexual responses – and that it is because of the particularities of this substrate that both males and females assume the position of “the entered” in their mystical encounters. As will become clear shortly, this may also explain why the existing imaging studies on MSCs have not yet run across notable gender differences in the neural correlates of such states.

\textsuperscript{21} Kripal 2001, 151–152.
\textsuperscript{22} Kripal 2001, 152–153.
B. A BODY-BASED HYPOTHESIS
TO EXPLAIN THE BIAS

§ 1. Instrumental vs. receptive phases of consciousness

I speculate that gender differences do not show up in imaging studies on MSCs because in both male and female practitioners mystical union relies on a neural substrate more resembling to that associated with the female than to that associated with the male sexual response. For males, this would mean different patterns of activity within the hypothalamus and other sex hormone receptor containing structures (when compared to “normal” male sexual response), changed testosterone-to-estrogen and sympathetic-to-parasympathetic ratios etc. These changes might result in behavioral and perceptual patterns associated more with the opposite gender.\(^\text{24}\) Hence, then, the feminine identification of male mystics.

In coming to explain what I mean it is useful to start from Arthur Deikman’s functional analysis of meditative states.\(^\text{25}\) Deikman’s approach is based upon distinguishing between two basic phases of consciousness — instrumental and receptive. Instrumental consciousness is the manipulative, active, “Yang-type” state of consciousness from which one operates when, say, driving a car through heavy traffic.\(^\text{26}\) Neurologically, it would probably be the function of the dominant hemisphere and its ANS correlate would be the sympathetic-aminergic response. In essence, any state that involves actively intervening into or acting upon the environment can be described as instrumental.

Receptive consciousness is the type of consciousness involved with taking in from and perceiving the environment (rather than acting upon it).\(^\text{27}\) As an example of a receptive state, Deikman offers the state one is in when indulging in a hot tub.\(^\text{28}\) One might hypothesize that this type of consciousness resides in the nondominant hemisphere. On the autonomic level, receptive states would be associated with the parasympathetic-cholinergic response.

\(^{24}\) That something like this might, indeed, be involved becomes evident from an intriguing report by Tobias Esch and George Stefano – falling in love leads to a surprising pattern of release of testosterone. Its concentrations vary in opposite directions in the two sexes. Intriguingly, men in love demonstrate decreasing testosterone levels, but women produce more testosterone (Esch & Stefano 2005, 184). It is as if in love males come hormonally closer to females and vice versa. Recall that MSCs depend on the motivatory sequence resembling erotic love. Hence, such hormonal shifts in relation to MSCs would not be surprising.


\(^{27}\) Deikman 2002, 78; 80–82.

The main differences between instrumental and receptive phases of consciousness can be summarized as follows:\(^{29}\)

<table>
<thead>
<tr>
<th></th>
<th>Instrumental Consciousness</th>
<th>Receptive Consciousness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intent</strong></td>
<td>To act on the environment</td>
<td>To receive the environment</td>
</tr>
<tr>
<td><strong>Self</strong></td>
<td>Object-like, localized, self-centered</td>
<td>Undifferentiated, world-centered</td>
</tr>
<tr>
<td><strong>World</strong></td>
<td>Emphasis on objects, distinctions, linear causality</td>
<td>Emphasis on process, merging, simultaneity</td>
</tr>
<tr>
<td><strong>Consciousness</strong></td>
<td>Focal, sharp perceptual boundaries, formal dominates sensual</td>
<td>Diffuse, blurred perceptual boundaries, sensual dominates formal</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Language</td>
<td>Communication Music, art, poetry, dance</td>
</tr>
<tr>
<td><strong>Evolutionary importance</strong></td>
<td>Survival of the self (individual)</td>
<td>Evolutionary importance Survival of the species</td>
</tr>
</tbody>
</table>

The importance of this schema for the present discussion consists in the insight that MSCs are characteristically receptive states. In fact, Deikman argues that all authentic spiritual states are fundamentally receptive in that they involve a shift in intention away from controlling and acquiring and toward acceptance and observation.\(^{30}\) As he puts it, “At its most basic, the spiritual is the experience of the connectedness that underlies reality. The depth of that experience depends on the capacity of the individual to set aside considerations of self, thereby gaining access to connection.”\(^{31}\) This seems to be a sound conclusion. Think, for example, of Jesus’ words in Gethsemane, “[R]emove this cup from me; yet, not what I want, but what you want” (Mark 14:36).

In other words, MSCs can be viewed as intensely receptive states during which the ego does not exert active, full control over the psyche and during which one is actively open to the “wholly Other”. This idea is in line with classic views on the nature of MSCs – William James has also noted, in presenting his famous four-partite definition of mystical experiences, that one of the distinctive features of MSCs is that they are passive (i.e., receptive). Although one can consciously facilitate their generation, one cannot actively elicit them.\(^{32}\)

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\(^{29}\) The table is based upon: Deikman 2002, 80–82.

\(^{30}\) Deikman 2002, 78. This may hold not only for spiritual states. Think, for example, of claims made by poets, composers and writers that they are not really creating poems, pieces of music or novels – they are, so to speak, receiving them from the “ether”. In other words – they feel that the poems and pieces of music are already somewhere “out there” and they are merely the receivers picking the “signal” up.

\(^{31}\) Deikman 2002, 84. Deikman’s italics.

An interesting implication of this line of argumentation is that Ultimate Reality – however it would be conceptualized by a particular tradition – cannot be encountered in instrumental consciousness at all. This implication starts to get intriguing when one relates Deikman’s dual schema to similar schemas developed by other thinkers. Ashbrook and Albright, for example, make explicit what one can only “faintly scent” behind Deikman’s ideas – that the differences between the two basic types of consciousness are related to the hemispheric lateralization of functions. Making this link, as Albright and Ashbrook note, is a “slippery” enterprise (in that it involves drawing metaphorical and analogical associations). However, they say, in analyzing complex issues (such as human consciousness) it provides a convenient and workable strategy for sense-making.33

Now, consider the following excerpt from Ashbrook and Albright’s table that is designed to characterize the nature of the consciousness each hemisphere generates and their metaphorical associations:34

<table>
<thead>
<tr>
<th>Left hemisphere</th>
<th>Right hemisphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expression</td>
<td>Perception of patterns</td>
</tr>
<tr>
<td>Linguistic</td>
<td>Kinesthetic</td>
</tr>
<tr>
<td>Propositional</td>
<td>Visual</td>
</tr>
<tr>
<td>Logical</td>
<td>Synthetic</td>
</tr>
<tr>
<td>Verbal</td>
<td>Visuospatial</td>
</tr>
<tr>
<td>Knowing by argument</td>
<td>Knowing by experience</td>
</tr>
<tr>
<td>Technical reason</td>
<td>Ecstatic reason</td>
</tr>
<tr>
<td>Agency</td>
<td>Communion (relatedness)</td>
</tr>
<tr>
<td>Power</td>
<td>Love</td>
</tr>
<tr>
<td>Digital communication</td>
<td>Analogic communication</td>
</tr>
<tr>
<td>Sun</td>
<td>Moon</td>
</tr>
<tr>
<td>Light</td>
<td>Dark</td>
</tr>
<tr>
<td>Yang</td>
<td>Yin</td>
</tr>
</tbody>
</table>

One can easily see that Deikman’s concept of instrumental consciousness is a seamless fit to the “Yang-type”, left-hemispheric “approach to reality”. And the concept of receptive consciousness clearly reflects the “Yin-type”, right hemispheric functions. The two schemata are complementary. But if so, then Deikman’s concept of receptive consciousness automatically acquires a “female polarity” (the associations with the principle of Yin, darkness and the Moon) – albeit on a purely metaphorical level. Ashbrook and Albright’s further characterization of left and right hemispheric “approaches to reality” lends further support to this reading – they describe the left-hemispheric consciousness as having a “spire-like” and the right hemispheric consciousness a “dome-like” quality.35 This is quite intriguing, given that MSCs are states of profound

34 Based on: Ashbrook & Albright 1997, 126.
receptivity and given the feminine identification of male mystics discussed above.

The argument I want to make from this is that the “femininity” of receptive, right hemispheric states in these schemas is, in the particular case of MSCs, not only symbolic – it has a biological, evolutionarily conditioned basis. The capacity for MSCs evolved from states associated with sexual response. But the male sexual response is different from the female sexual response. In humans, the difference is less marked (bigger brain, more freedom!). But in animals it is quite clear. And animal responses are evolutionarily continuous with the human. In rats, for example, the male sexual response is characterized by what is referred to as mounting behavior. The distinctive feature of the female sexual response in rats is lordosis. Mounting is “instrumental” (in Deikman’s categorization) – an active intervention. Lordosis is “receptive”. Hence, in rats one can posit the following correlations in sexual response: mounting-instrumental-male; lordosis-receptive-female. To the extent the origin of loving interactions can be traced into sexual behavior, this suggests that in many species “erotic love” is for male individuals associated with instrumentality and for female individuals with receptivity.

The latter point might sound sexist. I therefore hurry to add that it is not uncommon for female rats to also mount and for male rats to display lordosis. The main idea, however, is that since human experience is fundamentally embodied and since the body “remembers” its evolutionary history – the receptivity necessary for the generation of MSCs is associated more with the type of parasympathetically conditioned (dorsal vagal complex mediated) “immobilization” characteristic of sexual response in female rats than with the sympathetic “mounting” characteristic of sexual response in male rats.

NB! I am talking about the particular case of MSCs only! The argument developed below is not to be understood to mean as if all receptive states were dependent on the neural substrates of female sexual response.

Lordosis is a mating posture that in rats is characterized by immobilization, rigidly extended hind legs, elevated rump and diverted tail (Komisaruk et al. 2006, 235–237). For a thorough commentary, see Komisaruk and colleagues’ text.

There are clues that, to some extent, this might hold in humans, too. If one compares Holstege and associates’ PET results on the male orgasm (Holstege et al. 2003) with Georgiadis and colleagues’ PET results on the female orgasm (Georgiadis et al. 2006), then the most striking difference is that while the male orgasm is mainly characterized by activations, the female orgasm is better characterized in terms of deactivations.


Again, I am only referring to MSCs. MSCs biologically rely on sexual responses. In their case, engaging the context of animal sexual behavior is justified. But it is not justified in the case of receptive states unrelated to sexual responses.
§ 2. From rats to humans

There are ways to support the receptivity-parasympathetic-female and instrumentality-sympathetic-male correlations in human sexual responses as well. For starters, it seems that human males tend to “treat” their genitalia instrumentally – the *phallus* is expected to *perform* (hence the success of drugs such as Viagra). Seldom is it experienced as a means for relating and/or communion. In fact, Goss argues that males have an instrumental understanding of sexuality in general. The genitalia are perceived as “separate” from the body, as “tools”. This results in a phallocentric perspective in which there is little room for embodied pleasure and which is under the “tyranny of ejaculation”. 41 As to females, Joe Kramer writes amusingly, “Most women are more parasympathetic; they’re more relaxed, and that’s why they can have multiple orgasms and go much longer. The heart is involved with the parasympathetic, which includes things like getting a soothing massage or lying in a hot tub or cuddling with a lover. Men have to learn the skill of integrating the parasympathetic more.”42

Naturally, the latter is not a statement of scientific truth. However, Kramer’s easy-going and loose statement can be backed up to a rather surprising degree. And a good thing about it is that it affirms a female *superiority* and is very far from degrading the female in any way. Barry Komisaruk and colleagues have provided substantial evidence that in females – in addition to the neural “inputs” and “outputs” men and women share – there is an additional pathway from the internal sex organs to the brain via the vagus nerve. 43 From the viewpoint of the present thesis this is highly significant. I already pointed out that tracing the evolutionary history of the vagus nerve may help to explain the origin of emotion. 44 And the vagal-vaginal link can be used to clarify in what sense female sexuality is more “parasympathetic”, right hemispheric and hence more receptive than male sexuality.

The vagus nerve provides parasympathetic innervation to most internal viscera. 45 To say that the female sexual response is more parasympathetic, then, is a loose way of saying that there is an *additional vagal pathway* at play in females during sexual behavior – beside those shared by males and females. Thus, Kramer’s rather esoteric statement on female sexuality being more parasympathetic may actually carry out, although in technical nuances his wording is misleading. Moreover, the additional vagal link also backs up his further claims on females having a closer heart-genital connection. 46 As was pointed

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41 Goss 2002, 60.
43 Komisaruk et al. 2004, 84–85.
44 See the discussion of the polyvagal theory in Chapter VIII and: Porges 1998.
45 Starr & Taggart 1989, 340.
out in Chapter VIII, the vagus nerve also plays an important role in regulating cardiac function and its evolutionary history may explain the origin of love.47

The female-only vagal link could be used to argue for the possibility of qualitatively different types of orgasm in women – clitoral orgasm (that would closely resemble male orgasm because of involving the same neural pathways), vaginal orgasm and blended ones (unparalleled in males).48 This would be interesting in several ways since an orgasm mediated by the vagus nerve might be considered to be more “spiritual” – if one takes into account the functions and connections of the vagus. It may very well turn out that it is precisely this additional pathway that provides the best starting point for constructing an adequate evolutionary explanation of the human capacity for MSCs.

The lack of the vagal “element” in the male sexual response might account for the absence or weakness of the spiritual (receptive) dimension in males in relation to making love. This is what the Kramer’s suspected lack of heart-genital connection in males is all about. The added female-only component in the neurophysiological “upwiring” of sexuality is vagal (parasympathetic) and since the neural link is present via the uterus and vagina, it is characteristically female. Plus, since the link is present via the uterus and vagina, it is receptive and “Yin-like” par excellence.

Connecting this information with the above discussed idea that MSCs are processed via the right hemisphere is a bit more tricky. According to Motofei, parasympathetic responses are strongly influenced by testosterone and sympathetic responses by estrogens – in both females and males.49 At the same time, according to Simon Baron-Cohen, testosterone influences the right and estrogens the left hemisphere more.50 From this follows a conclusion that the right hemisphere is associated more with the parasympathetic and the left with the sympathetic system – a link d’Aquili suspected all along.51 If so, then the added vagal (parasympathetic), distinctly “wombly” element in the female sexual response relates more to the right than the left hemispheric consciousness (i.e., more to receptive than instrumental consciousness).

To summarize – on the basis of the foregoing it can be hypothesized that MSCs resemble the female (rather than male) sexual response which is more

49 Motofei 2008, 531.
50 Baron-Cohen, Simon. The Essential Difference: the Truth about the Male and Female Brain. New York, Basic Books, 2003. P. 99; 104–109. The idea goes back to Norman Geschwind’s fetal testosterone hypothesis that was developed to explain why regions of the right hemisphere are larger in males of many species than in females. It states that the growth rate of the hemispheres depends on the prenatal levels of testosterone: the more testosterone, the faster the right hemisphere develops and, correspondingly, the slower the left hemisphere develops (Baron-Cohen 2003, 99). For the original theory, see: Geschwind, Norman, Galaburda, Albert M. Cerebral Lateralization. Cambridge (Massachusetts), The MIT Press, 1987.
51 D’Aquili 1986, 156.
vagal, more right-lateralized, results in larger left (sympathetic-dependent) deactivations, is more receptive and is heart-related via the vagus nerve. It is not difficult to see, then, that the female-specific “vagal bias” hints at the dependence of MSCs on the neural substrate of the female (rather than male) sexual response. This explains the feminine identification of male mystics and leads to the estimation that females might have a physiological advantage in learning to attain MSCs. (Moreover, some intriguing predictions could be made. For example – if the above is correct, then hysterectomy – because it severs the vagal pathway – might lead to changes in spirituality. This should not be difficult to test using paper-pencil methods.) That the receptive states associated with the female sexual response and MSCs have a specifically “wombly” (and hence feminine) quality is why males run into cognitive and affective difficulties in relation to them. Simply put, males lack the bodily structures that would aid “making sense” out of experiential contents of the type involved in MSCs in a way that would not be homoerotically conceived.

§ 3. Gender, embodiment and mystical talent

At this point, two notes of clarification are needed. First, the above may leave an impression as if I were claiming that deeply receptive states presuppose one’s having a vagina and intensely instrumental states presuppose one’s having a phallus. This I am, emphatically, not claiming (it would be an absurd claim anyway). What I am saying is that having a female bodily structure (and a corresponding experiential history) may aid one in aspiring for and attaining MSCs. It is in this sense that the femininity of receptive states is more than a metaphor.

Second, the above analysis might leave an impression as if I were suggesting that males use mostly instrumental and women mostly receptive consciousness. Again, this is not what I am saying. I am only talking about basic sexual responses. There are lots of extremely instrumental females and a lot of very receptive males. However, I do insist that – perhaps due to the influence of testosterone on the brain during early developmental phases – men have more difficulty in making contact with and operating from their receptive consciousness. Exposure to large quantities of testosterone seems to result in a brain that has, on average, significantly worse interhemispheric connections. As Kimura notes, the posterior part of the corpus callosum and, especially, the anterior commissure has in males a smaller cross-sectional area. Interestingly, the brains of homosexually oriented males are, in such parameters, often closer to the female than to the male average. This may mean that gay males might find it more easy to be receptive. Hence a prediction that gay men may be more prone to having MSCs.

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53 Kimura 2000, 130.
One could say, then, that in a sense MSCs are “discriminating”. Due to the hormonally conditioned differences in the brain and the body one should expect that, statistically, females would have more MSCs than males. Some people, thus, are more talented at mysticism due to their better interhemispheric connections and/or their bodily structure. For average, heterosexually oriented males, this means trouble. First – due to the somewhat worse communication between their cerebral hemispheres, straight men have more difficulty at coming in contact with their receptive “side”. But second, due to its “wombly” quality, average heterosexual men are seriously abhorrent of receptive consciousness.

Now, this is clearly a culturally introduced attitude. Men are not born incapable of being fully receptive. There may exist a biological disposition favoring instrumentality in males (at least in sexual interactions) but the fear of effeminacy is culturally induced. Our culture favors attitudes such as men should be strong, men should not cry, men should be the ones chasing girls (and not vice versa), and – last but not least – in sexual encounters, men should be the active, instrumental “penetrators”. Due to the plasticity of human brain (neurons that fire together, wire together) the “circuitries” favoring instrumental consciousness is thus constantly reinforced and possible alternative circuitries are lost. This deepens the initial, hormonally and bodily based disadvantage of the male brain (in relation to the aptitude to enter MSCs and other receptive states) and results in a near-exclusively instrumental mind that will not, cannot allow males to be receptive. Because being receptive, from the perspective of a near-exclusively instrumental mind, would mean to cease to be male and to become female.

In a way, then, mystical states favor heterosexual females and homosexual males. It makes very little difference, whether the divinity, toward the union with whom the religious praxis is directed, is conceptualized as male or female. Thinking in sexual terms – even if that divinity were female, a unitary experience with her would still require that she be the active, “phallic” agent, the one with the divine “sword of truth” that she penetrates the mystic with and that leaves one with the fiery “wounds of love” discussed in the beginning of this chapter. Again, MSCs are receptive. One cannot (instrumentally) “make them happen”. One cannot “order” God to bless one with a mystical state. No matter how one conceptualizes the Higher Reality – as a wise old man, a trickster, a mother or a teenage lover – the internal logic of MSCs demands that the Divine be the active agent, whereas humans can only “lie there in awe”, to use a phrase by Mark Morford. And, since there is a link in the neural substrate of sexual and mystical states, a cognitive dissonance will necessarily emerge for heterosexual males, making it difficult to ever come to a unifying spiritual contact with the Divine.

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What needs to be done to “cure” this dissonance is not resorting to the traditional idea that human soul is female (regardless on one’s biological sex). This idea does not take into account the fundamentality of bodiliness and only deepens the destructive split between one’s hormonally conditioned, biological “ticking” and spirituality. Neither is there any use in reconceptualizing God to meet the direction one’s erotic preferences. What needs to be done is culturally untuning male gender identity from the tyranny of the phallus (and its nurtured exclusive instrumentality) that has produced the perverse, misogynistic and disembodied attitudes (and theological schemata) of the past. In achieving this, males will do well to finally stop “bossing around” and listen to the representatives of the ancestral sex – women.
CHAPTER XI. EMBODIMENT AND THEOLOGY

A. THE LESSON OF HUMILITY AND APPRECIATION

How can you possibly hope to ever encounter Higher Spirits if you despise and avoid their more humble comrades?

– Arvo Valton

We have travelled a ten-chapter-long journey in exploring the nature of mystical states in their relation to erotic experiences. Many (if not most) of the statements I have made along this way are deeply irritating and may even seem to be blasphemous from the perspective of a Christian believer. In this, final chapter of the present volume I therefore want to offer a kind of a “pastoral homily,” a positive religious interpretation of these irritating and disturbing statements.

To start with, I think that for those of us sharing a Christian worldview (myself included) the most important lesson to learn from the foregoing is that of humility and appreciation. We have, as human beings and religious believers, been too concerned with narcissistically marvelling at our being made in the image of God. This has resulted in our unjustifiably elevating ourselves out of the rest of creation and in our systematically ignoring how deeply creaturely we are. We are, after all, taken from the dust of the ground. That God breathed into our nostrils the breath of life to make us living beings does not change that fact. That the most sublime spiritual ecstasies of human beings are fundamentally continuous with the humble reproductive behaviors of our animal brothers and sisters on this wonderful planet should, therefore, make us stop in our tracks and rethink our position in God’s creation.

To feel offended by the links between spirituality and sexuality is to approach the matter from the wrong end. That human spiritual experiences are biologically continuous with the reproductive behaviors of our own and other species does not degrade the spiritual in any way. On the contrary – we should celebrate that our spiritual capacities are biologically continuous with the very mystery of conceiving new life, the processes through which life on the planet is sustained and renewed. It is intriguing, in this sense, that MSCs are metaphorically (and perhaps even physiologically) associated with the “wombly” – the very center of the life-giving mystery of conception.

Metaphors hinting at spiritual rebirth and the renewal of one’s life through conversion are at the heart of redemption-oriented religions (such as Christianity). The promises of afterlife, the hope for the approach of a New World, the notion of a new life through baptism – all reflect this. And in the natural world, such renewal and regeneration is accomplished via reproductive beha-

If one is looking for God’s “fingerprints” or divine renewal within the world, then the life-giving mysteries of the womb and sexual encounters are certainly among the best candidates. And the inherent link between sexual responses and spiritual ecstasies can then be interpreted as providing a clear clue that, far from pathological, mystical states are a part of the healthiest and most central natural processes involved with sustaining and regenerating life. There is a divine drive to connect, the mystery of conceiving new life, both spiritually and bodily, common to all living beings under the heaven. Therefore, the discussions on the existing biological links between sexual response and MSCs – far from “staining” the human response to the Divine – ought to be read as a celebration. Of God, the unity of life and embodiment. From the simplest living beings such as bacteria, via orchids and butterflies to the great apes and ourselves.

Thus, instead of feeling disturbed by the arguments made in the previous chapters, we ought to be “wonder-struck.” Instead of being irritated at human spiritual experiences being compared to, say, rats’ sexual behavior, we should look at rats’ sexual behavior with wonder and appreciate the divine mystery of the conception of new life it involves. Our autistic and narcissistic pride of being the only ones made in the image of God has brought us to the verge of an ecological disaster. It is about time that we changed our viewpoint and identified more with our more humble brothers and sisters in the world we share. As Beverley Clack puts this imperative, rather than distancing ourselves from the things of this world, we need to throw ourselves into this world – in order to save both the ecosystem and ourselves. In the image of God or not, created co-creators or not, we are still part of God’s creation and have to for once learn to fully appreciate and acknowledge it.

The true depth of our creatureliness (and its implication that we are not so incredibly different from God’s other children) is well conveyed by Susan Thistlethwaite. She points out that we share 90 percent of our genes with mice and 98.4 percent of our genes with chimpanzees. At the same time, chimpanzees share 97 percent of their genes with gorillas. Thus, chimpanzees have more in common genetically with humans than with gorillas. Human beings have approximately 30,000 genes. The eukaryote plant has 25,000 genes. How far are we genetically from, say, wild asparagus? Not all that far, as it turns out. Our only very significant and characteristic difference from God’s

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2 Keith Putt has used an intriguing phrase – the erotics of redemption. This phrase well summarizes the fundamental, seamless continuity between the bodily and spiritual regeneration (Putt, Keith B. Analogia civitatis et corporis: Speaking the Language of the Christian Cosmopolis. – Journal for Cultural and Religious Theory, Vol. 5, No. 1, December 2003, 153).

3 Clack 2000, 129.

other children is – ironically enough – sin. The fact that from the very beginning we have been wanting to be who we are not – gods.

Among other things, this misidentification is reflected in how humans have been arrogantly – as if from another level of being – discussing sexual drives in terms of “mere instincts”. The above points make it clear that such talk is utterly unjustifiable. Sexual behavior and erotic yearnings are just as much a matter of life’s divine mystery and beauty as are human spiritual insights and longings. Whenever one is tempted to label sexual behavior to be “merely instinctive” one ought to think of how animals can travel hundreds of miles through mud, snow and dangers in their yearning for a few moments of life-generating communion with a partner. Is it, after all, so incredibly different from the spiritual pilgrimages and yearnings pursued by human mystics? I find these parallels to be deeply moving and beautiful and very far from blasphemous.

Learning to celebrate such parallels brings us one step closer to an ecological world-view that we badly need to stop destroying and polluting our environment, a worldview that is less self- and human-centered and more other- and life-centered. And deeply embodied. The body and its yearnings to connect – both physically and spiritually – is, to use Goss’s words, not to be deadened and mistrusted but enlivened and celebrated as a sacramental locus of revelation. And this goes not only for human but also for animal, plant and one-celled bodies. We need to get rid of the blinders that we have created out of the idea of being the only ones on this planet who are made in the image of God – blinders that have allowed us to turn the Earth into a waste dump and kill and terrorize the members and populations of every species (including our own) in God’s creation. It is time to break out of the cocoon and learn to transcend our culturally nurtured egomaniacalism and anthropocentrism.

This is a world-view that we should have learned a long time ago – from the life and teachings of Jesus Christ. That the Christian perspective suggests that the Ultimate Truth has incarnated as a bodily being ought to be enough to be appreciative and wonder-struck by the bodily and earthly and to realize that the bodily and the spiritual are fundamentally continuous. The model of spirituality Jesus enfleshed is highly telling in this sense. His concern for children, the powerless, the poor and the disabled is a living manifestation of the imperative to serve (and not rule over) those weaker and more humble than oneself. As McGraw rhetorically asks – is Christ worshipped because he claimed to be the son of God or because he taught and lived the ideal of love and forgiveness? Paradoxically, the way to true connection with the Divine, instead of “looking up” in an arrogant attempt of divination (based upon a contradistinction of oneself against the more humble) is found in “looking down” into the creation and lovingly acknowledging its unconditional value. In learning to be a humble servant, not a tyrannical “king of nature.”

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6 McGraw 2004, 123.
As already noted, the result of ignoring our place in nature – which is to be attentive “gardeners” of God’s vineyards – and our psychotic ignorance of our true identity has resulted in an ecological near-disaster and in societies that revolve around devising ever new means by which to postpone “sobering up”. It is about time we woke up and looked at the world through a renewed pair of eyes. It is about time that we straighten out our utterly distorted and psychotic senses of self and finally acknowledge that – at least during the time we have on this planet – we are a part of our environment. And not all that central a part for that matter. In coming to a more humble, more ecological and more adequate self-image, we ought to follow Jesus’s example – in pursuing what in Christian theology is called kenosis.

### B. KENOSIS – A MODEL FOR “SOBERING UP”

In coming to explain what I mean and how it can help cultivating a more balanced and accurate view of our human selves vis-à-vis both our environment and God, allow me to start from a famous Zen story called *A Cup of Tea*.

“Nan-in, a Japanese master during the Meiji era (1868–1912), received a university professor who came to inquire about Zen. Nan-in served tea. He poured his visitor’s cup full, and then kept on pouring.

The professor watched the overflow until he no longer could restrain himself. “It is overfull. No more will go in!”

“Like this cup,” Nan-in said, “you are full of your own opinions and speculations. How can I show you Zen unless you first empty your cup?”

The point of the story is that in order to truly learn anything, one first needs to get rid of one’s prejudices. A similar emphasis on the need to empty one’s mind is consistently found in most of the world’s major religious traditions, the recurrent theme being that until the “vessel” is empty (of ego-centered intentions), it is not going to be filled with the Divine. In other words, a precondition to true spirituality is letting go of one’s “normal” egocentric outlook on life. Not surprisingly, the idea is found in Christianity as well – in the concept of kenosis (or self-emptying). However, it comes in a rather cryptic and theory-laden “package.” Saint Paul writes to Philippians:

“(5) Let the same mind be in you that was in Christ Jesus, (6) who, though he was in the form of God, did not regard equality with God as something to be exploited, (7) but **emptied himself**, taking the form of a slave, being born in human likeness.

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And being found in human form, (8) he humbled himself and became obedient to the point of death – even death on a cross.” (Philippians 2:5–8)

This passage has traditionally served to argue for Christ’s essentially divine nature. In such arguments, the self-emptying is attributed to Christ the pre-existent, divine Logos who is incarnated in Jesus the man. However, I find this interpretation both dubious and counterproductive. Meelis Friedenthal and I have argued for the view that what Paul is trying to say with this passage is simply that Jesus took no egocentric, narcissistic pride in being made in the image of God (as most of us Christians traditionally have), preferring to squarely face the fundamental temporality and bodiliness of being human. In offering such a view we were not trying to overthrow the traditional interpretations. Neither did we want to deny Jesus’ divinity. The idea was to point at the possibility that kenosis might not be best conceptualized in terms of a unique, one-time divine event but in terms of something experiential, i.e., something at least in principle achievable to anyone – since Jesus was a human being.

In thinking along these lines, Friedenthal and I are not alone. For example, Patricia Terrell talks about kenotic states of consciousness that have a formative quality and that reflect God’s dynamic love. More importantly from the perspective of the present volume, though – Trevor Greenfield writes that the continuing justification for holding Jesus to be a seminal figure in history has tended to be derived from what has been understood as the uniqueness of his person – through his relationship to God. Jesus is seen to be a man who, more than any other, lived for God, a man who, through his total God-centeredness, became the “God-man.” As Greenfield notes, Jesus’ life is understood in terms of a kenotic denial of self – to the point that when one observes Jesus, one sees through him and beyond to God.

Greenfield then proposes that if Jesus’ uniqueness is anchored in his willingness for self-denial that results in his becoming “transparent” so as to allow God to be seen through him, then it may be useful to distinguish between kenosis as a theological concept and a way of life. In such a schema – as a way of life, kenosis can be (and is) practiced by many seeking a spiritual path through life. And the uniqueness of Jesus’ kenotic experience for Christianity can then be theologically conceptualized as lying in its degree (i.e., not in its kind). In other words, one could think of Kenosis (with a capital K) – attainable

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12 Greenfield 2001, 5f.
only to extraordinary individuals) and kenosis (“lesser”, more mundane kenotic states attainable to anyone), whereas the difference between the two is a matter of degree and not an essential one.\(^\text{13}\)

I find Greenfield’s basic distinction between kenosis as a way of life and kenosis as a theological concept enormously fruitful. It allows one to bring an otherwise airtight theological concept down to the experiential world of us modern humans and try living it out in our own lives. However, I disagree with Greenfield in his seeing kenotic experiences as involving a mere denial of one’s self. One can deny one’s self by, say, deciding not to eat ice cream even though one desperately wants to. In this case the wanting ego itself is left completely unchanged. This is not what kenotic experiences (whether intense or more humble) are about. The real issue is undoing the customary, ego-centered sense of self.

Intense kenotic states, I would argue (one the basis of Paul’s above passage), are characterized by one’s significantly altered perception of one’s self. And not simply altered but altered in the sense of one’s having “done away” with pride and egocentrism. I emphasize that the question here is not simply of intellectual rethinking or willed denial. The question is in acquiring an altered perception of one’s self. As everyone knows, even old habits die hard. Then how about undoing habitual patterns of perception – especially those that relate to one’s precious little darling ego! Bringing something like that about presupposes gradually rewiring some of the most strongly established synaptic connections in the brain.

Given this, I suggest that kenotic experiences are better analyzed vis-à-vis mystical states than willed self-denial. Recall that Newberg and d’Aquili’s neuropsychological model of MSCs explains the numinous impact of mystical insights largely via the neurologically conditioned transformations in one’s perception of one’s self. These transformations are rooted in the PSPL becoming deprived of neural input to a significant degree – a state in which the brain has no “landmarks” to distinguish between the self-related and world-related stimuli. Newberg and d’Aquili propose that such a state would result in a subjective sensation of either that one is everything or/and a “no-thing” – a sensation of the intimate interwovenness of the individual self with everything else that exists. And the experience would be just as real as any ordinary sensory perception, because it would be “made real” for the brain in exactly the same way as are ordinary perceptions.\(^\text{14}\)

D’Aquili and Newberg’s proposed phenomenology of MSCs is in good accordance with Paul’s understanding of kenosis. It is also harmonious with John’s account on Jesus’ view of himself. Consider, for example, the *egō-éimi-*logions or the phrase “the Father and I are one” (John 10:30). In fact, it even casts some light on the possible experiential content behind Paul’s mysterious words to Galatians, “I have been crucified with Christ; and it is no longer I who live, but it is Christ who lives in me. And the life I now live in the flesh I live by faith in the Son of God, who loved me and gave himself for me” (2:20).

\(^{13}\) For a detailed discussion of this idea, see: Karo & Friedenthal 2008, 830–831.

Looked at this way, kenotic states can be interpreted as involving one’s first-hand realization – it is entirely possible to experience the world via a consciousness that is not centered around the ego and still function as a normal human being. To someone with a kenotic self-perception it would be obvious that, as human beings, we are so fundamentally integrated with our (biological, cultural, spiritual) environment that any line we should draw between our precious individual self and the “outside” environment is arbitrary at best.

Such “ego-deprived” self-perception is not easily learned, considering the degree to which Western culture is individualistic and personal achievement oriented. Brain cells that fire together, wire together. A cultural background that values personal achievement, continually reinforces the neural circuitries that mediate our ego-awareness. But this is no excuse for not even trying to relativize the ego’s tyrannical dominance. As Joanna Brück has elegantly shown, the modern understanding of self is a product of a patriarchal, oppressive, individualistic, dominance-and-power-oriented culture. And – as argued above – this modern understanding has brought us to the verge of an ecological disaster. So, whether one does it in an attempt to imitate Christ in self-emptying or simply to gain a more balanced and healthy outlook on life, it is imperative that we try. It does not have to be a dead-serious, grave and morbid attempt to “kill the ego” once and for all. It can be done playfully, by testing out different approaches. After all, even just playing with different ideas helps to relativize one’s habitual patterns of thinking.

The first thing in developing a more life- and world-centered, ecological, kenotic self-perception is to note that, as Todd Feinberg has aptly noted, the boundaries of the self are intriguingly malleable. Like an amoeba, the self displays an ability to change its shape, alter its margins, reform and regenerate new parts as needed and expand. Our sense of being a self is constituted of embodied perceptions. The main “vessel” for the ego-awareness is our neurally represented body image. This image has its history – the way I perceive of my body (and, therefore, of myself) right at this moment is the result of my brain’s developmental history. On the other hand, the neural representation of the body is the result of the history of my interactions with the environment – I know that this is my hand, because it hurts if I happen to stick it into fire.

However – and this is what Feinberg’s point is all about – in some cases the situation is not so clear-cut. Is a bursal prosthesis a part of one or not? Or, as to the “pain logic” – it hurts more to see one’s child get hurt than to get hurt oneself. By consciously taking note of such aspects one starts to expand her self-perception, moving step by step towards a more inclusive, more ecological view of both oneself and the world. The ultimate result of such expansion

would be what I have previously called the Ecological Self: a sense of self that incorporates the whole ecosystem as part of the self. Think, for example, of the popular saying *you are what you eat* and compare it to Jesus’ phrase *this is my body* in Mark 26:26. 18

To experience such an altered sense of self, one would have to unlearn some of her habitual patterns of perception – one would have to quit *objectifying* her environment in order to realize that a self can only exist in a communion with everything that exists. Just as a living brain is a community of neurons – each of which has a “consciousness” of their own 19 – in which the higher cognitive functions emerge as a result of mutual interactions between individual neurons, an ecological self is established through its interaction with everything that exists, starting from the community of cells that constitute our physical bodies and on to the outside world (which is no longer “outside” when an ecological perspective is realized – on one or another level we *are* one with nature).

It can be argued that, in a way, expanded, more ecological states of relativized ego-awareness are more *natural* than the traditional Western ego-dominated consciousness. We are all intimately intertwined with everything that exists. We need intimacy with other people to grow up to be normal human beings, we need air to breathe, water to drink. In fact, as 90 % of the human body consists of water, it would – quantitatively speaking – be more appropriate to claim that we are water than to argue that we are separate individuals.

In that sense, then, it could be said that developing an ecological sense of self is a “return to innocence”, a return to the original integrity of a human self with the whole of creation. This can be shown within the context of the story of Fall – from the original, ecological state of personally felt integrity with everything that exists one is lead to a perpetual, ego-dominated state of isolation, both from God, other people and Mother Earth. Jesus, then – to use Paul Knitter’s words – is the one who empties himself, thus enfleshing our right relations with each other and with God, the message being that we should de-center the self from any privileged place of permanence. Recognizing the illusion of self-absolutization, persons are called to relinquish any privilege that would “elevate” a self at the expense of others. 20

18 Paradoxically, an ecological sense of self is also kenotic. Consider Austin’s explanation: “Let us suppose that the brain’s “mirror” systems were to lose all sense that anything about their shiny reflecting surface might ever have imposed a *barrier*. Suppose further that all representations would open up and become free which had previously limited the personal self to concepts of only what went on inside its own skin. Now, whatever remained in awareness could coalesce – *in one experience* – with *each and every perceptual representation* of the world outside” (Austin 2006, 269).


C. EVERYDAY MYSTICISM

The above considerations bring me to making explicit what has been implicitly suggested throughout this whole volume – mysticism is not simply an intriguing topic for discussion – one should try it out. The call to break out of the Western-typical egomaniacal sense of self clearly reflects it. Since we all share the same biology, everyone is capable of mystical states. From the more “mundane” mystical moments experienced during orgasms, through romantic love to extraordinarily intense MSCs. I consider cultivating and deepening one’s mystical “skill” not only a valuable “extra” in life but also a way of both personal development and gaining a renewed outlook on life. As Matthew Fox and Rupert Sheldrake have argued (in presenting their concept of practical mysticism) – it takes discovering the mystic inside every one of us, the vulnerable child wanting to play with the universe to respond playfully and pleasurably to life. That is what mysticism is all about.

Moreover, Fox argues that mysticism is “practical” in terms of aiding one in maintaining a healthy psyche and keeping in contact with the mysteries and beauties of Mother Earth and the universe in our consumerist and media-swamped culture. As to the health aspect, Lee and Newberg’s recent review on the effects of mystical practices on mental health bears the suggestion out. It does seem that mystical practices have beneficial effects on health. Contrary to Freudian views, it is currently acknowledged that MSCs do not represent emotional mistakes or pathology, they are associated with neurological events, which, while unusual, are not outside the range of normal brain function. This suggests, as Newberg and d’Aquili remark, that the remarkable tenacity of religion and mystical practices is rooted in something deeper, simpler and healthier than weak-minded denial or sheer psychological dependence. Considering that MSCs are continuous with the (obviously healthy!) states of erotic love and orgasmic bliss, this should not be entirely surprising.

As to the second aspect in Fox’s argument – that mystical practices help one in maintaining a healthy contact with reality – it was already pointed out above that breaking out of one’s self-centered “shell” results in a more realistic and more mature outlook on life and its unity. It is certainly true that in our consumerism-oriented and TV-swamped societies everyone would gain from learning to be mindful of the beauty and wonders of nature and the un-

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21 A very similar idea, albeit on different grounds, has recently been defended by Newberg and Waldman (see: Newberg, Andrew B., Waldman, Mark Robert. How God Changes Your Brain. New York, Ballantine Books, 2009).
25 WGA, 7.
26 WGA, 129.
conditional value of our fellow beings, be they orchids, bees, humans or the Divine Other.

When it comes to what the notion of everyday mysticism would practically mean, then perhaps the best way to look at the matter is found in Newberg and d’Aquili’s discussion of what they term the aesthetic-religious continuum. 27 In this concept, they map transcendent states on a continuum that starts from normal baseline consciousness, goes via various aesthetic states (e.g., one’s enjoying of a musical composition), through “transitional” states of romantic love, via experiences of numinosity and trance states to the properly mystical. 28 The mentioning of erotic love as transitional in this context is not coincidental. As shown above, love and orgasmic states are neurologically linked with the properly mystical. The common denominator of all of the states in the continuum, as Newberg and Waldman note, is one’s “losing oneself” in the experience – in all of these experiences, albeit to varying degrees, one feels more connected to the object of one’s attention (whether that is a lover, nature, the universe or God) than during baseline states. 29

Recall that both mystical practices and erotic love represent versions of what Goss calls the drive to connect – both physically and spiritually. 30 In this sense, it seems reasonable to appeal to the notion of connection in mapping transcendent states.

On our way to our “private everyday mysticism”, why not start from attentively noting the spiritual dimensions in the experience of having sex? In 1976, Ellen Belle Vance and Nathaniel Wagner published a paper in which they studied gender differences in how people experience orgasm. 31 The descriptions of orgasm mediated in this study contain several elements similar to those met in the legacy of the great mystics. Here are some phrases and keywords from Vance and Wagner’s collected orgasm descriptions that relate to mystical states:

1. a sudden feeling of lightheadedness followed by an intense feeling of relief and elation;
2. a sense of euphoria followed by deep peace;
3. a loss of real feeling for the surroundings except for the other person;
4. total oblivion to sensation, then a tremendous expulsion of the buildup with a feeling of wonderfulness and relief;
5. a relief of all tensions, filled with ecstasy.

It is easy to see how parallel words to those typical of descriptions of MSCs emerge. Words like relief, elation, euphoria, deep peace and phrases such as “total oblivion to sensation” and “loss of real feeling for the surroundings” are also frequent “guests” in the MSC descriptions. Why not start from taking notes from one’s own experience and then continue up the “continuum” – through

27 For example, see: WGA, 113–117.
aesthetic states and one’s feelings for fellow human beings to, ultimately, a sense of unity with Gaia herself? To discover the Ecological Self and be once again that vulnerable child wanting to play with the universe and to respond playfully and pleasurably to life – to repeat Fox and Sheldrake’s beautiful words.\footnote{Fox & Sheldrake 1996, 27.} The more so because “whoever does not receive the kingdom of God as a little child will never enter it” (Mark 10:15).

We are all capable of experiencing, at least partly, the Ecological Self. By practicing a little of everyday mysticism we can reembody the nature, come closer to the truly Divine and become deeper and more appreciative of our intimate relationships. Step by step, starting from noticing and being mindful of the tiny mystical moments each human being has every day. Because again, to come back to the motto of this chapter, “How can you possibly hope to ever encounter Higher Spirits if you despise and avoid their more humble comrades?”\footnote{Valton 1987, 153.} How can one truly appreciate spiritual states if one cannot and will not appreciate simple, everyday bodily epiphanies?

I would like to conclude my reflections on the evolutionary origin of MSCs and their bodily substrates with a half-ironic but deeply thoughtful proposition made by Mark Morford of the San Francisco Chronicle in his magnificent (but quite provocative) column “Notes and Errata”.

Mocking Lloyd’s theory that the female orgasm is an embryological byproduct of the male orgasm,\footnote{Lloyd 2005.} Morford repeats her conclusions that science cannot explain why women have orgasms, that there is no evolutionary need for the female orgasm, that it serves no known biological purpose and that it is not for procreation. So why do women get them? Morford then lashes out his “wild card” – what if the female orgasm is, quite simply, the Great Mystical Link that connects and communicates between heaven and Earth, mind and body, soul and sky, man and God? Maybe it does not need a biological purpose. Maybe it has a \textit{spiritual} purpose? Based on this idea, Morford heatedly concludes: deny the power of the mystico-erotic spiritual experience at own peril, looking to science to explain away the mystery and watching the spirit wither away. That the female orgasm is useless fun with no evolutionary purpose? Hardly, he says. The female orgasm is \textit{proof} of evolution. Of spiritual evolution. And if we lose our grip on that, we will be in deep trouble indeed.\footnote{Morford 2005. For the full online version of the article, please refer to the website – www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2005/05/27/notes052705.DTL&feed=rss.morford (accessed 02/06/2009).}

With this, I rest my case.

\begin{itemize}
\item \footnote{Fox & Sheldrake 1996, 27.}
\item \footnote{Valton 1987, 153.}
\item \footnote{Lloyd 2005.}
\item \footnote{Morford 2005. For the full online version of the article, please refer to the website – www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2005/05/27/notes052705.DTL&feed=rss.morford (accessed 02/06/2009).}
\end{itemize}
GENERAL CONCLUSION

The main goal of the present thesis was to explore and map – both on scholarly and spiritual levels – the suspected neuropsychological links between mystical states of consciousness and human sexual response (especially orgasm). I undertook to determine whether or not these links can be understood in terms of MSCs being evolutionary byproducts of orgasm. And, if possible, to raise a testable, refined hypothesis as to the nature of the links under scrutiny.

From the scholarly perspective, the results of mapping the neuropsychological links between MSCs and orgasm are as follows.

- There are clear neurological parallels between sexual orgasm and MSCs on the level of the ANS. Both types of states can be characterized as involving 3rd stage autonomic “tuning”. In both cases, the ANS is “pushed” onto the 3rd stage level of functioning via rhythmical stimulation that is intensified during each subsequent cycle because of the involvement of the “staircase” phenomenon in the process.

- There are also obvious parallels between the neural processing of MSCs and orgasm on the level of the limbic system. Based upon studies on temporal lobe epilepsy, one can quite firmly assert that MSCs and orgasm have the very same “foci of origin” – the amygdala, hippocampus, hypothalamus and their surrounding structures. It also seems to be the case that the neural dynamics behind MSCs and orgasm are quite similar – the generation of both types of states likely involves the gradual spreading (via the “staircase” phenomenon) of synchronous discharges from their original focus all over the brain.

- On the level of neocortical functioning the parallels start to become fuzzy (this is exactly what one might expect, too, because, clearly, MSCs and orgasms are not the same thing – the analogy has to fail on some level). For example, in the case of the centrally important problem of whether or not there are parallels in parietal activity during MSCs and orgasm the outcome of analysis depends directly on which particular studies one “picks out” for comparison. This ambivalence is considerably reduced if a distinction is made between the motivatory and consummatory sequences involved in each case. Upon making such a distinction a pattern emerges – most parallels between orgasms and MSCs run via their respective motivatory sequences. Hence, in mapping the links between orgasms and MSCs it seems to be fruitful to proceed by references to what in humans is known as erotic love.

In bringing these parallels into an evolutionary framework and determining whether they can be understood as supporting the idea that the capacity for MSCs is an evolutionary byproduct of orgasm my conclusions are as follows.

- MSCs cannot be held to be direct evolutionary byproducts of orgasm. Rather, both orgasm and MSCs (as states of consciousness) represent specific varieties of 3rd stage, motivationally interrelated states enabled by
the evolution of the distinctly mammalian nervous system. However, it does seem plausible that the evolutionary origin of transcendent states (including MSCs) is traceable back to mating and parenting behaviors, both of which demand an individual’s temporarily “by-passing” self-protective functioning. But this link should not be conceptualized in terms of byproducts, especially of orgasm specifically. The concept is too rigid and does not allow for a structured enough approach. The evolutionary “kinship” of MSCs and orgasm is better understood via the concept of exaptation.

- In devising a more structured model, rather than starting from orgasm specifically, one should include the whole cycle of sexual response. Especially, the role of common motivational drives is to be emphasized. Minimally, a suitable model of the neuropsychological and evolutionary links between MSCs and orgasm has to allow for distinguishing between the neural elements directly involved with attaining an orgasm or an MSC and the motivational sequences promoting their seeking. Since my analysis in chapter VIII meets this condition I believe that my offered position represents a refinement of Newberg and d’Aquili’s basic position.

As to the goal of raising a testable hypothesis on the intersections and links between MSCs and orgasm – the arguments presented in chapters VI-VIII allow one to hypothesize that that MSCs can be distinguished from other spiritual and religious states on the basis of their involving a specifically erotic, hypothalamically mediated motivational sequence. The hypothesis can be tested by using already existing experimental protocols. If the hypothesis should bear out, then not only is one closer to a more refined understanding of the link between MSCs and sexual response – one is also one step closer to a biologically based categorization of spiritual and religious experiences.

When it comes to outlaying the spiritual, religious and theological implications that the above considerations carry, then the following conclusions should be highlighted.

- The bodily and the spiritual are fundamentally continuous. Striving for and resorting to disembodied and erotophobic religious or theological ideals (both sexual and spiritual) results in a schizophrenic split between what is spiritually experienced in MSCs and what is theologically believed. This split is traceable throughout the whole of Christian history and has allowed for the rise and persistence of violent, misogynistic and shame-dominated piety and theology.
- Overcoming this split presupposes a “re-embodying” of the divine, affirming the body as a sacramental locus of revelation and celebrating its drive to connect – physically as well as spiritually. Because of the existing neuropsychological links between the erotic and the spiritual any attempt to keep the two safely apart will lead to confusion and spiritual conflict.
- From the Christian perspective, the discussed links between the spiritual and the sexual teach a lesson of humility and appreciation. That the most sublime
spiritual ecstasies of human beings are continuous with the humble sexual responses of quite unpretentious species makes it clear how deeply creaturely we are as human beings. That MSCs are directly related to sexuality is to be celebrated and not resented. The links between spiritual and sexual encounters, far from “staining” the spiritual in any way, provide evidence that MSCs are a part of the most healthy and transforming mystery on the planet – the truly divine mystery of conceiving new life.
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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ANS</td>
<td>the Autonomic Nervous System</td>
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<td>BA</td>
<td>Brodmann’s Area</td>
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<td>BOLD</td>
<td>Blood Oxygenation Level Dependent signal</td>
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<td>EEG</td>
<td>Electro-Encephalo-Graphy</td>
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<tr>
<td>fMRI</td>
<td>functional Magnetic Resonance Imaging</td>
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<td>HMPAO</td>
<td>Hexa-Methyl Propylene Amine Oxime</td>
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<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
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<td>MSC(s)</td>
<td>Mystical State(s) of Consciousness</td>
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<td>Pre-Frontal Cortex</td>
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<td>PSPL</td>
<td>Posterior Superior Parietal Lobule</td>
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<td>rCBF</td>
<td>regional Cerebral Blood Flow</td>
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<td>ROI</td>
<td>Regions Of Interest analysis</td>
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<td>SMM</td>
<td>Sense-Making Methodology</td>
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<td>SPECT</td>
<td>Single Photon Emission Computed Tomography</td>
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<td>SPM</td>
<td>Statistical Parametric Mapping</td>
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<tr>
<td>TLE</td>
<td>Temporal Lobe Epilepsy</td>
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<td>WGA</td>
<td>Newberg, d’Aquili and Rause’s <em>Why God Won’t Go Away</em></td>
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All Biblical quotations refer to the New Revised Standard Version.
SUMMARY IN ESTONIAN

EROS JA MÜSTIKA
Kas müstilised teadvusseisundid on seksuaalsete reaktsioonide evolutsioonilised kõrvalproduktid?


See seisukoht omab väga kaaluksid religioosseid implikatsioone, mistõttu näib oleval enam kui põhjendatud nii nende implikatsioonide lahtikirjutamine uslikku inimese vaatepunktist kui ka lähtemõõtke käigu neuroloogilise põhjendatuse kriitilise uurimine. Niisiis on käesoleva uurimuse eesmärk eesmärgiks anda d’Aquili ja Newbergi seiskuholale kõige kaasaegsemate neuroteaduslike ja asjade vaatepunkte, keerukatele, kus sellega (spekulatsiooni tasandil esitatud) seiskuhaast on võimalik arendada välja tõsiselt võetavat hüpotees ning kaardistada selle tagamaad religiooses maailmapildi jaoks. Mulle teadaolevalt on käesoleva uurimuse näol tegemist esimese süsteemilisest käsitlusega antud teemal.

Väitekiri on kolmeosaline. Neist esimene (peatükid I–III) on tervenisti pühendatud teemakäsitluseks sobiliku metodoloogilise ja metoodilise raamistiku väljatöötamisele. Et uurimisküsimuse lahendamiseks on tarvis tuua ühe nime all kokku väga erinevatest uurimisvaldkondadest pärit andmekollund ja teooriatähted, ei ole antud juhul võimalik võtta muutmata kujul kasutatud eriti olulised parallele ja viiside uuesti komplekteerida. See seisukoht omab väga kaaluksid implikatsioone, mistõttu näib oleval enam kui põhjendatud nii nende implikatsioonide lahtikirjutamine uslikku inimese vaatepunktist kui ka lähtemõõtke käigu neuroloogilise põhjendatuse kriitilise uurimine. Niisiis on käesoleva uurimuse eesmärk eesmärgiks anda d’Aquili ja Newbergi seiskuholale kõige kaasaegsemate neuroteaduslike ja asjade vaatepunkte, keerukatele, kus sellega (spekulatsiooni tasandil esitatud) seiskuhaast on võimalik arendada välja tõsiselt võetavat hüpotees ning kaardistada selle tagamaad religiooses maailmapildi jaoks. Mulle teadaolevalt on käesoleva uurimuse näol tegemist esimese süsteemilisest käsitlusega antud teemal.

Töö teine osa (peatükid IV–VIII) hõlmab müstiliste ja orgasmiliste teadvusseisundite võrdlemist püest kõrvalneemal, mõistetest ja peamiselt organismin, mis on mõistitavalt veidi keerukam. Tegemist on nii sisuliselt kui vormiliselt väitekirja kõige kaaluksama osaga, kuna just see käitab enesest uurimisprobleemi sisuliselt lahendust. Siin vaatlen süvitsi neuroloogilisi parallele müstiliste ja orgasmiliste teadvusseisundite vähi ning uurin, mil määrat neid parallele võiks käsitleda kinnitavana seisukohta, et inimlik võime müstilistele kogemustele on orgamsfenoemena evolutsiooniliseks kõrvalproduktiks. Töö teine osa rõõmu testitava hüpoteesi püstitamisega vaadeldud seoste kogumõõttestamiseks.

Töö teine osa (peatükid IX–XI) on selle teema seismulikus, mida esitatud seiskukohad religiooses maailmapildi raamatus tähendavad. Tegemist ei ole range teoloogilise interpretatsiooniga, pigem vaadeldud seoste reflektiivse tundmiseks.
lahtimõtestamise ja arendamisega arutluse metatasaril. Teatud mõondustega võiks öelda, et kui töö teine osa sattub eneses müstiliste ja orgamisliste seisundite seose teaduslikku, intellektuaalset kaardistamist, siis kolmas osa püüab seda seost kaardistama spirtuaalselt, religioosse (eriti kristliku) maailmavaate seisukohalt. Pean väärtikirja seda osa küllaltki olulisese, kuna religiooniteemaliste neurologial põhinevate mütekäikude arendamisel unustatakse pahatihti nende inimeste mõtted-tunded, kellele need mõttekäigud enim korda lähevad – usklikud inimesed.

Peatükiti on väärtikirja sisu järgmine. I peatükis esitan ma üksikasjaliku ülevaate selle “metodoloogilise väljakutse” laadist, mida antud teema analüüs eneses sattub. Vaatluse all on küsimus, kuidas erinevaist diskursustest pärit ja erinevate metoodikate abil saadud andme- ja mütekilde ühendada ning mis tingimustel, kas üldse ja kui, siis mis mahus see võimalik on.

II peatükis võtan ma – piltlikult öeldes – esimeses peatükis skitseeritud metodoloogilise väljakutse vastu ja konstrueerin metodoloogilise lähtelause, mis ühelpoolt sobib antud teema käsitlemiseks, kuid on teiselpoolt hästi rakendatav ka paljude teiste religiooni ja teaduse dialoogi kuuluvate huvimoodustuse käsitlemiseks. Seda metodoloogilist raamistikku kirjeldab kõige paremini kollaazhi mõiste. Et erinevaist diskursustest pärit mõistetest ja andmeid ei ole võimalik kadudeta omavahel “risttõlkida” (et tuua need ühise nimetaja alla ja siis rakendada nende käsitlemiseks mõnd standardset meetodit), siis on mõistlik jätta need sellele kujule, milles need vastavast diskursusest leitakse ja tuua need kokku kollaazhi põhimõttel. Saadav tervik ei ole sel juhul kõnekas ja uudne mitte niivõrd esitatava andmete ja mütekikude poolest, vaid pigem kompositsiooni kaudu – viisi kaudu, kuidas “kunstnik” kättesaadavad, erilaadset fragmendid ühel “lõuendil” tervikuks komponeerib ja neid omavahel seostab. Seesuguse “andmekollaazhni” puhul ei ole vajadust kasutatavaid andmekildi ja teorioiafragmente eelnevast ühisnimetaja alla tuua ja seeega on võimalik metodoloogiliselt järjepidevaks jäädes võtta käsitluse alla ka teemasid, mis muidu jääsid andmete fragmentaarsuse ja omavahelise võrreldamatuse tõttu akadeemilise uurimise alt välja.

III peatükis komplekteerin kirjeldatud metodoloogiselt alusetest sobivad metoodilised tööriistad analüüsi tegelikuks läbiviimiseks, defineerin ja kirjeldan täpsemalt väärtikirja lähteandmeid, andmekogumise, -valiku ja andmeanalüüsi viisi ja printsipje nne.

IV peatükik annab üksikasjaliku ülevaate müstiliste seisundite neuralsetest korrelaatsioonidest nii nagu neid on kirjeldanud Eugene d’Aquili ja Andrew Newberg. Vaatluse all on nii nende käsitluse ajalooline taust, põhielemendid, müstiliste seisundite olemust kirjeldav teoreetiline mudel, selle mudeli testimiseks sooritatud eksperimentid kui ka peamised kriitilised väljaötlemised, mis d’Aquili ja Newbergi müttekäikude vastu on esitatud. See peatükik annab järgmistes peatükides arendatavale võrdlevale analüüsile lähtelause ja kõik ülejäänud peatükid kulgevad sisuliselt dialoogis siin esitatud seisukohadega.

V peatükik alustan orgasmi ja müstiliste seisundite võrdleva analüüsiga. Vaatluse all on autonoomse närvisüsteemi tasandil täheldatavad paralleelid.

VI peatükis on vaatlese all müstiliste seisundite ja orgasmi paralleleid temporo-limbilisel tasandil. Peatüki esimese poole näol on tegemist nõus struktuur-funktionsoom-tüüpi analüüsiga. Need on selles mõistes piiratud artutusviis, et eeldab ajufunktsooniid võrdlemisi täispide lokaliseeritust. Seejuures viab seesugune artus väljendatult tasakaalustamist. Vastavad täänedused on esitatud: (a) peatüki teises pooles, kus võrdlenel eelnene struktuur-funktionsoom-analüüsi tullemusi temporaalasagra epilepsia uurimisel saadud andmetega; (b) VII peatüki mis tasakaalustab tulemuse funktsionaalse tomograafia meetodeid saadud andmete abil. VI peatüki järelduest on, et: (a) nii müstiliste seisundite kui ka orgasmi genereerimisel mängivad võtmeroli ühed ja samad limbilise süsteemi struktuurid: hüpotalamus, amigdaloideka ja hipokampus – koos nendega lähedalt seotud temporaalasagra struktuuridega; (b) mõlema seisunditüübi genereerimisel on tegemist ka põhiioontes sarnase neuraalse dünnaamikaga – algfaasis on mõlemal juhul tegemist piiratud neuronitegruppide sünkroniseeritud laenglemisega, mis hilisemates faasides haaran järk-järgult üha suuremaid piirkondi ning lõppfaasis peaaegu kogu aju. Seesugust järk-järgulist levitust saab kirjeldada juba nimetatud “trepifenomeni” kaudu.


VIII peatükk on eelkõige pühendatud vaadeldud seoste evolutsioonilisse kontekstis toomisele. See otsib vastust küsimusele, kas täheldatud enam või vähem ilmsed parallele müstiliste ja orgaamiliste seisundite vahel saab tõlgendada nii,
nagu oleksid mästilised seisundid orgamistile evolutsioonilised kõrvalproduktid. Minu üldjärelduseks on, et ehkki evolutsiooniline seos on tugevasti olemas (eelkõige mästilistele ja orgamistilele seisunditele ühiste motivatoorsete "ahelate" kaudu), ei ole otstarbekas käsitleda "ahelate" sisul tuleb mästiliste seisundite evolutsioonilise algupäära kirjeldamisel lähtuda seksuaalsete reaktsioonide kogu tsüklist ja mitte üksnes orgamist. Liatigi ei ole kõrvalprodukti konseptsioon ise sugugi parim viis mästiliste seisundite algupäära kirjeldamiseks, kuna eeldab, et need neuraisalad struktuurid ja juhtteed, millel sekundaarsed funktsioonid (antud juhul võime mästiliste seisunditeks oletatavasti "parasiteerivad", ei ole ise ei oma struktuurilt ega primaaarselt funktsioonilt vaadeldava evolutsioonilise ajaperioodi jooksul oluliselt muutunud. See tingimus ei ole orgamistile ja mästiliste seisundite seose puhul täitetud. Näib olevat mugavam ja loomulikum vaadelda nii orgamist võime kui ka mästiliste seisundite võime evolutsioonilise algupäära küsimust nn eksapatsioonio-konseptsioonist (mis viitab nii struktuurialatele kui funktsionaalsetele muutustele) lähtudes. Peatüki lõpuks suitsitan neilt argumentidel testitava ja täpsustatud hüpoteesi mästiliste seisundite ja seksuaalsete reaktsioonide seose kohta (vt järeldused, allpool), viies nii lõpule väitekirja peamise uurimisülesande lahendamise.

IX peatükis alustan käsitletud seoste religioosse mõtestamisega, lähtudes seejuures eelkõnelust ilmsiks saavast asjaolust, et spiritualised ja kehalis kvaliteedid-elamused on omavahel sügavas kontinuitedis. Kontinuuteen on sedavõrd fundamentaalne, et viimisel on ka kõige abstraktsed teaduslikud teooriad oluliselt kehali (ja seeläbi ka erottamise, "värninguga") ning kehali määratud. Näitan, kuidas selle kontinuuteeni eiramine ja püüdlus "puhta" (s.o kehali) spirituaalsuse poole on kristlikus mõlemises ja vagaduses tekkinud sügava ja eksistentsiaalse lõhe spirituaalselt kogetu ja teoloogiliselt usute vahele. Osutan ka viisidele, kuidas sellest lõhest üle saada.


XI peatükis kujutab enesest eelkõige hingehoidlikku homiilit, mille eesmärgiks on lahendada mingilgi määradal seda ebamugavustunnet, mida kristliku maailmavaate esindaja kõigi ülalkirjeldatud seisukohtade juures võib tunda. Lähtun siin peamiselt kaheste aspektist. Esiteks – seksuaalsete reaktsioonide ja spiritualised ekstaasise fundamentaalse kontinuudi tuntamine on tervistav seiks, et aitab üle saada aastasadade jooksul juurdunud (ja väga destruktiivsete) mentaliteedit, et inimene kui ainus imago Dei’d kandev loodu on kuidagivis ei kvalitaatiliselt erinev ja seetõttu "kõrgemal" ülejäänud loodu. See aitab uskujal oma spirituaalsust looduse ja oma kehaga taasühendada. Teiseks

Et enamikku väitekirja lõppjäreldustest sai peatükide sisututvustuses juba mainitud, ei ole siinkohal enam mõtet kõiki tõö kokkuvõttes äramärgitud järeldusi korralda. Seetõttu piirdun vaid kõige olulisemaga.


- Seesuguselt positsioonilt saab püstitada testitava hüpoteesi, mille kolhoisel muutunud seisundide eristuvad teistest spirtuaalsest ja religioosest seisunditest selles kaudu, et evivad oma motivatoorses “ahelas” spetsifilises spirtuaalises, hüpotalamuse kaudu vahendatud elemente. Seda hüpoteesi saab testida juba väljatöötatud eksperimentaalsete protokollide abil, kasutades näiteks funktsionaalseid magnetresonanttomograafi. Kui see hüpotees peaks eksperimentaalsete uuringutele säästlikas osutuma, siis lisaks müstilistele kogemustele ja orgasmse seose kinnitamisele sõltab mõlemal juhul sarnaste motivatoorsete aspektide paakks see ka huvitavat lõpuleviivit spirtuaalsuse ja religiooses kogemuse klassifitseerimiseks bioloogilistel alustel.

- Kristlikust perspektiivist kujutavad täheldatud paralleleid müstiliste ja orgamsiliste seisundite vahel esesest head öppetundi. Et inimolendite kõige erakordsemad spirtuaalsed kogemused on sügavas kontinenteedis üsna
pretensioonitute loomaliikide seksuaalreaktsioonidega teeb nähtavaks, kuivõrd sügavasti kuulub inimene kokku kogu muu looduga ja kuivõrd väär on sellelt seisukohalt inimese (tihti Piibli abil õigustatud) pretensioon olla “looduse kuningas”. Seejuures asjaolu, et müstilised seisundid on otse seotud seksuaalsusega, tuleks pühitseda ja mitte häbeneda. Sest see sees näitab, et spirituaalne ekstaas kuulub olemuslikult meie planeedi suurimasse, ülimalt elutervesse ja tõeliselt jumalikku müsteeriumi – nimelt sellesse, mille kaudu sünnib uus elu. Olgu siis spirituaalsel või kehalisel tasandil.
APPENDIX

Figure 1: The left cerebral hemisphere\textsuperscript{1}

Figure 2: The right cerebral hemisphere, viewed from its inner surface\textsuperscript{2}

\textsuperscript{1} Austin 2006, 74. Reprinted with a permission by The MIT Press.
\textsuperscript{2} Austin 2006, 74. Reprinted with a permission by The MIT Press.
Figure 3: Brodmann’s numerical brain map – outer view

Figure 4: Brodmann’s numerical brain map – inner view

3 Austin 2006, 147. Reprinted with a permission by The MIT Press.
4 Austin 2006, 147. Reprinted with a permission by The MIT Press.
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