COMENIUS UNIVERSITY IN BRATISLAVA
FACULTY OF MATHEMATICS, PHYSICS AND INFORMATICS

COGNITIVE SCIENCE AS A BASIS OF INTEGRATIVE SCIENCE

DIPLOMA THESIS

2015 **MGR. BC. DALIBOR JURÁŠEK**

COMENIUS UNIVERSITY IN BRATISLAVA
FACULTY OF MATHEMATICS, PHYSICS AND INFORMATICS

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DIPLOMA THESIS

Study program:	Cognitive Science (Single degree study, master II. deg., full time form)
Field of Study:	2503 Cognitive Science
Training work place:	Department of Applied Informatics
Supervisor:	doc. Mgr. Sebastjan Vörös, PhD.

Bratislava 2015 **Mgr. Bc. Dalibor Jurášek**

Univerzita Komenského v Bratislave
Fakulta matematiky, fyziky a informatiky

ZADANIE ZÁVEREČNEJ PRÁCE

Meno a priezvisko študenta: Bc. Mgr. Dalibor Jurášek
Študijný program: kognitívna veda (Jednoodborové štúdium, magisterský II. st., denná forma)
Študijný odbor: 9.2.11. kognitívna veda
Typ záverečnej práce: diplomová
Jazyk záverečnej práce: anglický
Sekundárny jazyk: slovenský

Názov: Cognitive science as a basis of integrative science
Kognitívna veda ako základ integratívnej vedy

Cieľ: 1. Preskúmať paradigmu súčasnej vedy a jej limity.
2. Zhrnúť existujúce alternatívy, podať ich syntézu v hlavných bodoch a tým načrtnúť integratívny prístup k vede.
3. Začleniť tento nový prístup v širšom filozofickom pohľade.

Anotácia: Vedecké objavy posledného storočia ukazujú, že v súčasnosti prevládajúca vedecká paradigma zrejme nebude schopná podať kompletný výklad sveta. Vo viacerých oblastiach vedy sa preto rodí alternatíva, ktorá by súčasný prístup začlenila a rozšírila. Práca sa snaží podať zhrnutie súčasnej paradigmy, jej limitov a načŕta, ako by alternatíva k nej mohla vyzerať.

Vedúci: doc. Mgr. Sebastjan Vörös, PhD.
Katedra: FMFI.KAI - Katedra aplikovanej informatiky
Vedúci katedry: prof. Ing. Igor Farkaš, PhD.

Dátum zadania: 27.11.2013

Dátum schválenia: 11.02.2015

prof. RNDr. Pavol Zlatoš, PhD.
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THESIS ASSIGNMENT

Name and Surname:	Bc. Mgr. Dalibor Jurášek
Study programme:	Cognitive Science (Single degree study, master II. deg., full time form)
Field of Study:	9.2.11. Cognitive Science
Type of Thesis:	Diploma Thesis
Language of Thesis:	English
Secondary language:	Slovak

Title: Cognitive science as a basis of integrative science

Aim:
1. To explore the current paradigm of science and its limitations.
2. Sketch the existing alternatives, provide their synthesis in main points and thus outline an approach to integrative science.
3. Frame this new approach in a broader philosophical perspective.

Annotation: Scientific discoveries of the last century indicate that the currently prevailing scientific paradigm is unlikely to paint a complete picture of the world. In consequence, an alternative that would accommodate and broaden the current approach has been emerging in several fields of science. This work attempts to provide a summary of the current paradigm, its limitations and what the alternative could look like.

Supervisor:	doc. Mgr. Sebastjan Vörös, PhD.
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Abstrakt

Jurášek, D. (2015). Cognitive Science as a Basis of Integrative Science [Kognitívna veda ako základ integratívnej vedy – diplomová práca]. Univerzita Komenského v Bratislave, Fakulta matematiky, fyziky a informatiky.Vedúci práce: doc. Mgr. Sebastjan Vörös, PhD. 65 s.

Súčasná veda vychádza prevažne z paradigmy predpokladajúcej, že všetko je v podstate hmotné a riadené deterministickými alebo náhodnými interakciami. Tento prístup dosiahol úspechy v mnohých oblastiach, ale v troch čelí zásadným problémom: pochopenie vedomia; integrácia poznania do holistického pohľadu; a zodpovedanie "veľkých otázok". V tejto práci navrhujem metódu výskumu v prvej osobe založenú na zvyšovaní úrovne vedomia trénovaním určitých mentálnych schopností, vrátane zvyšovania citlivosti vnútorného vnímania a rozvoja schopnosti udržať bdelé, kritické vedomie v rôznych zmenených stavoch vedomia (napr. lucídne snívanie). Táto metóda by mohla pomôcť prekonať obmedzenia súčasnej paradigmy: umožnila by nám systematicky sledovať určité vedomé javy a experimentovať s nimi; mohla by nám poskytnúť vhľady, na základe ktorých by sme zjednotili naše parciálne teórie; a potenciálne by nám mohla poskytnúť kvalitatívne iný typ porozumenia, ktorý je možný až na vyšších úrovniach vedomia, napr. pri mystických zážitkoch. Pozorovania a zistenia získané touto metódou by boli intersubjektívne overiteľné výskumníkmi, ktorí prešli potrebným výcvikom a mnohé z týchto vhľadov by sa dali overiť a upresniť metódami klasickej vedy. Zjednotenie výskumných metód prvej a tretej osoby by tvorilo základ integratívnej vedy, ktorá by nám umožnila lepšie pochopiť nás, prírodu a svet.

Kľúčové slová: integratívna veda, výskum prvej osoby, rozvoj vedomia, materializmus, paradigmatická zmena

Abstract

Jurášek, D. (2015). Cognitive Science as a Basis of Integrative Science [diploma thesis]. Comenius University in Bratislava, Faculty of Mathematics, Physics and Informatics. Thesis Supervisor: doc. Mgr. Sebastjan Vörös, PhD. 65 p.

Contemporary science is predominantly based on a paradigm which assumes that everything is essentially material and governed by deterministic or random interactions. This approach has achieved successes in many fields, but faces substantial problems in three areas: the understanding of conscious phenomena; integration of knowledge into a holistic view; and answering the "big questions". In this work, I propose a method of first-person research based on advancing one's level of consciousness by training certain mental faculties. These include heightening the perceptiveness to inner experience, and developing the ability to retain a lucid, critical, self-aware consciousness in various altered states of consciousness (e. g. lucid dreaming). This method could help solve the limitations of the current paradigm: it would enable us to systematically observe and experiment with certain conscious phenomena; it could provide us insights that would help us unify our partial theories; and possibly grant us a qualitatively different type of understanding by reaching higher states of consciousness, such as mystical experiences. The observations and findings based on this method could be verified intersubjectively by researchers who have undergone the necessary training, and many of the insights could be verified and further specified by third-person research. A unification of first- and third-person methods would form a basis of integrative science which would help us better understand ourselves, nature and the world.

Keywords: integrative science, first-person research, development of consciousness, materialism, paradigmatic change

Preface

People have always tried to gain knowledge about the world around them and make sense of it. Many pursuits in human history have tried to do this, among them mythology, religion, philosophy and science. The general outlook on the world, our relationship to it, and how we discover it, however, has undergone substantial changes in the course of human history.

Up until the early modern period, the prevailing worldview taught that the world was *alive*. All of its components had an innate purpose; animals, planets, even plants had souls; the whole universe was developing and evolving towards a final goal; the world spirit was experiencing itself, constantly learning and improving; the great chain of being was in operation, humans but one link of it.

The vision of how we come to explore and know the world corresponded to this worldview. We were an organic part of the cosmos – in each of us dwelled a *microcosmos* which reflected the whole *macrocosmos*. By reflecting on and experiencing this inner world, understanding and knowledge were formed. Interaction with the outer world was, of course, important, but presented a means to guide us to the truth inside. Rigorous measurements and experiments were done; but these were rather reflections of ideal forms which could be *directly experienced*, felt inside as an intuitive understanding, insight, revelation.

Beginning with the scientific revolution of the 16th century, this old view of nature and discovery began to be challenged. Technology started improving considerably, and new devices and instruments for exact measurement became available. Science started orienting itself more on what is factographic, directly perceptible by the senses, and less on insights. Questions, which before had been relegated to the domain of speculation or subjectively felt revelations, could now be solved empirically, and many others fell out of the scope of science. Science got separated, conceptually, from philosophy and religion. In 1798, Diderot declared in the *Encyclopédie* that "The age of religion and philosophy has yielded to the century of science".

With this, the vision of the world started becoming more and more physicalist in nature: first, the planets lost their souls; then, animals became automata; finally, in the 20th century, human free will was vanquished. In contemporary science there is no spirit; no purpose; no direction; no freedom; only

cold masses of matter moving in dead space, obeying objective, unchanging laws, and some blind chance – in direct opposition to what we started with.

The above description is an oversimplification, but I want to point out two distinct principles. We can sense two opposing worlds in them, two worlds the roots of which we can experience somewhere deep in the core of our being. Also today, scientists marvel at the perfection of the universe, from the structure of DNA to the beauty of remote galaxies. But these are not part of science *per se*: the core of science is about collection and analysis of data acquired by rigorous, repeated measurements; it has little to do with lived experience. Or so goes the current paradigmatic consensus.

But there is an important question – what if these two worlds can be united? What if we can *experience* knowledge in the form of insights, and these in turn might help us direct the outer measurements? What if our emotions can help us guide our reason in a way that unites both? What if, by cultivating certain inner practices, we could develop the ability to understand the world at a deeper level, and systematically explore the implications of this knowledge? These are the questions I am asking in my diploma thesis: the very nature of science, and the very nature of human knowledge.

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Introduction

The main thesis of my work is simple: given the present scientific evidence, the strictly material explanation of the world is merely an assumption. While it is able to account for many phenomena, it does not follow directly from the facts, and leaves many important things unexplained. This does not mean it is necessarily wrong, or that any other approach is necessarily right. But two things follow: we should sincerely and explicitly admit it, and we should devote effort to finding an alternative – a scientific one – that could complement our current approach.

I argue that a good alternative approach is the first-person study of consciousness, mainly: developing the abilities of lucid, critical, self-aware consciousness in various altered states of consciousness. Previous research has shown that in some states before considered inaccessible to such consciousness, for example dreaming, consciousness with critical thinking and conscious control can in fact be retained (e. g. lucid dreaming). But we don't know the extent of this ability: in what other states normally not consciously experienced (e. g. deep sleep) can we retain a lucid, critical self-awareness of ourselves, required for scientific enquiry? What do we experience in these states, and what could we achieve there if we understood them?

There are several reasons why such an approach is likely to be beneficial. First, some crucial questions unexplained by current science have to do with consciousness, so such a program is a natural extension of previous research attempts. Second, the history of scientific ideas shows that the most important insights usually come unexpectedly, likely from deeper layers of the psyche. If we would be able to penetrate these layers with lucid consciousness, we could perhaps be more creative and gain better insights. We could then critically assess these insights with our current, third-person methods. Third, by uniting the first- and third-person views, science would become more integrative. It would be deeply personal, *lived*, while at the same time remaining rigorous and skeptical (providing scrutiny by the third-person methods).

I advance my thesis in a number of chapters. In the first chapter, I outline the main characteristics of the paradigm of current science. In the second chapter, I deal with its most important problems and limitations. In the third chapter, I sketch its alternative: integrative science, combining first- and third-person inquiry. In the conclusion, I summarize the topics explored.

The writing of this work would not be able were it not for many interesting and enriching discussions with a number of people. I would like to express my thanks to them here: Sebastjan Vörös, Urban Kordeš, Michael Schlattl, Peter Marman, Tomáš Gál, and others. I hope we will have many ideas and experiences to share and exchange in the future.

I am well aware that some arguments mentioned in this work are incomplete and would need to be elaborated further. I am also aware it is even more important to do so because many of the topics I have dealt with are rather at the fringe of what is considered scientifically conventional. I hope to do so in a future work, and I ask the reader for understanding because of the technical and personal conditions under which this work was created. I will be happy to answer any questions via e-mail (jurasek.dalibor@gmail.com) or personal communication.

1 The paradigm of current science

> "I believe in the material universe as the only and ultimate reality, a universe controlled by fixed physical laws and blind chance. I affirm that the universe has no creator, no objective purpose, and no objective meaning or destiny. Life and consciousness are totally identical to physical processes, and arose from chance interactions of blind physical forces. Like the rest of life, my life and consciousness have no objective purpose, meaning, or destiny. I believe that all judgments, values, and moralities, whether my own or others', are subjective, arising solely from biological determinants, personal history, and chance. Free will is an illusion. (...) I maintain that the death of the body is the death of the mind. There is no afterlife, and all hope for such is nonsense."
> Charles Tart, "The Western Creed"[1]

Each inquiry proceeds from some starting assumptions, and science is no exception to this principle. A set of basic assumptions, which are readily, often implicitly, accepted in any given scientific inquiry is called a *paradigm*. Thomas Kuhn (Kuhn, 1962) was the first to use this term in this sense. He argued that most of science is done within the confines of a certain set of theoretical and methodological assumptions – a paradigm, and that these sets of assumptions change in time. The paradigm generally determines on what topics the research should focus on, what kinds of questions should be raised and what kinds of answers should be sought after, how we should proceed methodologically, and how the results should be interpreted. In this chapter, we will explore the paradigm dominant in current science.[2]

How do we outline a general "paradigm of science"? Today, more than ever, science is not a unitary entity: it consists of many fields differing in methods, assumptions and interpretations. Disagreements

[1] Charles Tart is a psychologist and critic of materialism. This somewhat parodic text is used in an experiential exercise Tart does on his workshops. He lets people recite the sentences of "The Western Creed" with their hands on their hearts, trying to identify themselves with them, and afterwards discusses with them what emotions this brought about.

[2] I am inspired by Kuhn's concept, but I use the term "paradigm" in a broader meaning. According to Kuhn, each science (biology, psychology…) has a certain paradigm and they may or may not be compatible. As I explain in the text, I will be interested in something of a meta-paradigm: what the paradigms of various disciplines have in common today.

and discussions are ongoing at every level. Henriques (2011), for example, lists six mutually incompatible major paradigms only in psychology (psychoanalysis, behaviorism, cognitive psychology, humanistic psychology, evolutionary psychology). What "paradigm" are we talking about, then? Aren't there many?

To be sure, there is much pluralism in science today. The important thing, however, is the proportion and influence of certain ideas, their impact on what is happening in the world. And if we look at today's science *as a whole* – articles published in prestigious journals, the opinions of respected scientists, the usual presentation of research to the media, projects preferred by granting agencies – some clear trends emerge. Certain questions are almost never raised, certain avenues of research are almost never followed, some topics elicit emotional reactions, the interpretation of findings automatically takes certain turns, and future research suggestions are in turn based on those interpretations.

It is these *prevailing trends* I want to describe. We can find almost any idea published today, but most of them have little impact. In this sense, they are not important for our present discussion. Instead, I want to sketch the *main principles* behind *almost all* of the current top scientific research: those with most influence on society, education, public policy and further development of science itself. Though exceptions exist – and I briefly mention them – they are relatively rare, weak-voiced and, most importantly, they do not form a *coherent alternative that could stand up to the current paradigm*. They come out as small, isolated islands against an ocean of materialism.

There are two main assumptions of what I will call "the current paradigm" or "the paradigm of present science" that concern what the world is like – all is material, and there are no purposes. Let us start with the first assumption.

1.1 Everything is material

The goal of science it to study the world in an objective way, using intersubjectively reproducible observations. According to the current paradigm, only matter is amenable to such a form of inquiry. Other phenomena: God, souls, angels etc., cannot be measured and have no influence on material bodies; if they had, they could be studied as material phenomena. Consistent with this assumption, causes and explanations are sought in terms of material objects: brains, bodies, hormones, cell dynamics, or elementary particles.

There are two caveats here. The first is the problem posed by the existence of consciousness. While many philosophical positions exist (Chalmers, 1997), within the present paradigm consciousness is viewed as a specific property or epiphenomenon of highly complex matter. Even though it may not be considered fully material in all its attributes (e. g. it is experientially subjective), it is considered to arise from purely material processes, and is thus *essentially* a material phenomenon.

The second caveat is the question what is matter. Are physical forces material? Are electromagnetic fields material? What about waves and elementary particles? This is a tricky question because quantum mechanics has radically changed our view of matter. In fact, modern physics rarely uses the term matter. I choose not to deal in detail with the definition of matter. For the purposes of our work, it suffices to differentiate things typically material, such as brains, bodies, elementary particles, and things typically immaterial, such as souls, spirits or God.

Strictly speaking, most scientists would not claim that immaterial things cannot, or do not exist, but they would say it is impossible to study them scientifically. As Carroll (2009) writes: "Natural science doesn't deny the existence of the supernatural or the transcendent, but it does deny that reference to such metaphysical notions to explain anything in the natural world is science rather than philosophy." On the other hand, little or no attempt is made to think about whether this is definitively the case, or whether, perhaps, a scientific method of detecting these phenomena *would* be possible. It is simply assumed to be impossible, and thus for practical purposes this stance is virtually the same as the claim that everything that exists is material.

To conclude: in the current paradigm, phenomena are explained in terms of material bodies. If they cannot be explained, scientists expect that discovery of future material phenomena will provide an explanation. Even though some questions remain unclear (the status of consciousness, what exactly is matter), explanations such as free will, living purposes, spiritual influences, are not considered scientific because of *a priori* reasons, and an alternative method is not sought.

1.2 There are no purposes

According to the present paradigm, only two causal factors can bring change to the world: mechanistic natural laws, and chance. Although complex systems and living beings may seem to have goals, intentions and beliefs containing purposes and consciously act to fulfill them, these do not have any

causal power themselves. They can be reduced to, and fully explained by, mechanistic laws and chance indeterministic interactions between basic physical entities or complex emergent phenomena. But neither of these behave purposefully in an objective sense.

From this it also follows that there is no purpose in the universe – in any part of it – and that there is no purpose *of* the universe itself. It just unwinds, according to physical laws, and its future states are determined partly by past states and partly by chance. But this chance is blind; it is not the case that "chance" events could is some cases be coordinated in meaningful ways under the aegis of an immaterial purpose or intention. Nature is mechanical – deterministic, with some random processes – and so are people, and so is the world itself. There is no meaning, no value, no intention. Though we can speak of them and study them, all these terms are just derived constructs with no *real* base in how the world is. As Richard Dawkins states: "The universe we observe has precisely the properties we should expect if there is, at bottom, no design, no purpose, no evil and no good. Nothing, but blind, pitiless indifference." (Dawkins, 1995, p. 132)

From this point of view, there is no difference whatsoever between terms such as „emergentism“, „holism“ and „top-down causation“: they are not different in the sense that they do not entail a purpose that is independent of the material configuration and can influence it.

There are a few exceptions to this assumption, mainly in the area of free will. A number of respected philosophers and scientists openly advocate the notion of conscious free will (Libet, 2009; Baumeister, Masicampo, Vohs, 2010; Mele, 2014). On the other hand, they usually don't follow this reasoning much further – to its obvious metaphysical aspects. Any formulation of a purpose independent of matter, determinism and chance – vitalism, morphogenetic fields, collective unconscious, etc. – is considered largely discredited in mainstream science.

1.3 Summary

In current science, there is a prevailing paradigm present which assumes that everything is essentially material, and governed by either deterministic or wholly random interactions; there is no purpose in the universe that could not be reduced to them. While exceptions to these principles exist, they are rather weak-voiced, and do not form an integrated, coherent alternative to the current paradigm. The current paradigm substantially influences society, public policy, the opinions of students, and the future developmental directions of science itself.

2 The limits of the current paradigm

> "Experimenters search most diligently, and with the greatest effort, in exactly those places where it seems most likely that we can prove our theories wrong. In other words we are trying to prove ourselves wrong as quickly as possible, because only in that way can we find progress."
>
> Richard Feynman

In the previous chapter, we have outlined the paradigm of present science: that the world is material and contains no intelligent causes or purposes. In this chapter, we will take a look at some of its limitations. As we will see, several substantial topics remain wholly or largely unexplained because of the a priori assumptions of the paradigm. They often have to do with consciousness, and many of them are of paramount importance to how we view ourselves, our society and the world. Thus, the current paradigm influences not only the academic world, but our society at large.

I should start by saying that the current paradigm is right in many ways. Many things are material and many processes unwind mechanically or randomly. We can learn a lot about the world by separating it into discrete, measurable concepts and observing them in the laboratory. This approach has helped us reach achievements such as space travel, surgery, modern computing, or virtual reality.

On the other hand, there is a number of areas where the approach of the present paradigm has been less successful, and we encounter substantial difficulties. First, the present paradigm offers only a partial understanding of various conscious phenomena, and misses some substantial explanations. Second, it shows a limited capability of integrating low-level data and partial approaches to more holistic views. Particularly in social sciences and humanities, this lack is rather disappointing. Third, it lacks the conceptual terms to deal with "big questions": basic questions of why and how the world is, such as why is there something and not nothing, or why consciousness exists. In the following sections, I will deal with each of these three problems.

2.1 Conscious phenomena

2.1.1 Source and causal power of consciousness

Under the current paradigm, consciousness arises from or is identical to brain (or other material) processes, and has no causal power in itself. While there are several views on how exactly the relationship between consciousness and matter is defined (eliminativism, reductionism, epiphenomenalism), we can treat them together because they all fall within the current paradigm. They rule out the possibility of consciousness having any causal power itself.

The contemporary paradigm has its historical predecessors. The French physician Julien de La Mettrie put it bluntly in his book *Man a machine* (1748): "Let us then conclude boldly that man is a machine, and that in the whole universe there is but a single substance differently modified." The French physiologist Pierre Cabanis (1802) wrote that "the brain secretes thought like the liver secretes bile" and Thomas Huxley (1874) likened the consciousness of animals to the steam-whistle of a locomotive engine. At the time, these proclamations were on the level of philosophical opinions, because detailed scientific evidence was unavailable.

Many modern scientists have reiterated these claims, this time presenting them as results of meticulous research. For example, V. S. Ramachandran (2003) stated (emphasis added):

> "Even though it is common knowledge these days, it never ceases to amaze me that all the richness of our mental life – all our feelings, our emotions, our thoughts, our ambitions, our love life, our religious sentiments and even what each of us regards as his own intimate private self – is simply the activity of these little specks of jelly in your head, in your brain. *There is nothing else*."

For other scientists and philosophers making similar claims, see (Crick, 1995, p. 3; Zeki, n. d.; Wegner, 2002; Persinger, 2007; Montague, 2008; Chivers, 2010 (quotes Patrick Haggard); Pinker, 2011; Harris, 2012).[3] In fact, there are two aspects to this claim: brain is the source of consciousness, and brain is the only causal force in regard to consciousness.

[3] Again, there are differences between these authors. which roughly correspond to the three aforementioned positions: (a) eliminativism – only brain states are real, (at least some) mental phenomenaare not real and further research will prove this; (b) reductionsm – mental phenomena are real, but they are essentially idetical to, and

Principally, there are three arguments to support this:

1. There is a correlation between brain processes and mental processes, indicating they are somehow connected.
2. If brain processes are altered (by brain damage, drugs, or other physical influence), mental processes are altered, indicating a causality from brain to mind.
3. We can often predict the purportedly free and conscious decisions of people from brain activity, or influence them by influencing brain activity, even without people realizing it.

Countless studies provide support for these three points (first: Met zinger, 2000; Newberg, 2010; De Graf, Sack, 2014; second: Stanger, 2006; Franks, 2008; Gould, 2010; third: Libet et al., 1983; Amman, Gardenia, 1990; Haggard, Elmer, 1999; Soon et al., 2008; Fried et al., 2011). Based on these arguments, it is concluded that only brain processes are causally efficacious, and that conscious experience is just an epiphenomenon.

While this is a possible interpretation, we need to be aware that it does *not* logically from the existing research. Sheldrake illustrates it clearly in his TV receiver metaphor (Sheldrake, 2012, p. 177; emphasis added):

> "The difference (...) can be illustrated by analogy with a television set. The pictures on the screen depend on the material components of the set and the energy that powers it, and also on the invisible transmissions it receives through the electromagnetic field. A skeptic who rejected the idea of invisible influences might try to explain everything about the pictures and sounds in terms of the components of the set – the wires, transistors, and so on – and the electrical interactions between them. Through careful research *he would find that damaging or removing some of these components affected the pictures or sounds the set produced, and did so in a repeatable, predictable way. This discovery would reinforce his materialist belief.* He would be unable to explain *exactly* how the set produced the pictures and sounds, but he would hope that a more detailed analysis of components and more complex mathematical models of their interactions would eventually provide an answer."

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thus reducible to, brain phenomena (e.g. identity theory)` (c) epiphenomenalism – mental phenomena are real and differ from brain phenomena, but they are merely causally ineffective side effects of them. For the purposes of our present treatise, we can deal with all of these views together.

Being aware of this, let us briefly review the neuroscientific findings.

EEG preparatory potentials

Libet's experiment (Libet et al., 1983) is the first famous experiment on neuroscience of voluntary decision making. The subjects were instructed to move their hand whenever they "felt like" doing so while their brain activity was being measured by EEG. The subjects reported conscious awareness of the intention to move approximately 200 ms before the movement was initiated. In all cases, however, this awareness was preceded by a build-up of readiness potential (*Bereitschaftspotential* (Kornhuber, Deecke, 1965)), a neuronal activity in the motor cortex area, beginning 150 ms – 500 ms before the conscious awareness. (It was not clear from the experiment whether every occurrence of the readiness potential led to movement, because only the EEG data preceding the actual movements were collected. Thus, readiness potential might have sometimes appeared, but not lead to movement, and these occurrences would not be recorded.) Libet's finding has since been replicated by several researchers (Haggard, Eimer, 1999; Sirigu et al., 2004).

But what do they actually mean? Libet himself was convinced that free will is not ruled out by his experiment. Instead, he argued that free will could operate as a "free won't", where actions are "suggested" unconsciously, but can be vetoed by conscious will (Libet, 1999). Subjects in his experiment sometimes reported they felt an urge to move their hand, but chose not to, and vetoing spontaneous urges is a part of everyday experience. In a later experiment, Libet demonstrated that the readiness potential can indeed be vetoed (Libet, Wright, Gleason, 1983), although the experimental setup was a bit different than in the previous experiment. The subject was instructed to prepare to move and then abort the movement preparation, thus they knew in advance that they were in fact not going to move their hand. In any case, the readiness potential was present, suggesting it was rather a preparatory activity, and not automatically leading to movement.

Mele (2015) argues that simple reaction time studies show that the readiness potential is not a decision, but rather a part of a process that may eventually lead to a decision. In go-signal studies, subjects are instructed to react as quickly as possible after a signal (sound or visual cue) is presented. In one such study, the average time between the go signal and the muscle motion was 231 ms (Haggard, Newman, Magno, 2010). In other words, these quick decisions are made approximately at the time where Libet's (Libet et al., 1983) subjects became conscious of making the decision. Also, there is not enough time for the readiness potential to build up in the short time between the go signal and actual movement.

More recently, Sirigu et al. (2004) found that, under some conditions, patients with parietal lobe damage did not show readiness potential prior to movement. Trevena and Miller (2010) have shown that the readiness potential precedes not only the decision to move, but also the decision not to move, although the task was somewhat different than in Libet's experiment. Yet, what these newer experiments show is that the readiness potential is not a clear indicator of whether a movement will be made; it is likely more a preparatory activity than the decision.

fMRI predictions

Another type of studies is to measure the brain activity of decision-making subjects by functional magnetic resonance imaging (fMRI), and see if some patterns are predictive of their decisions. A study by Soon et al (2008). found that "the outcome of a decision can be encoded in brain activity of prefrontal and parietal cortex up to 10 s before it enters awareness". In this experiment, the subjects were instructed to press one of two buttons – one at their right hand, the other at their left, whenever they "felt the urge" to do so. Based on post-hoc analysis of brain activity before the button pressing, the authors were able to predict which hand the subjects will use in up to 60 % of the cases, up to 10 seconds before the reported conscious awareness of the decision (for a replication see Bode et al. (2011)). Soon et al. (2013) have achieved similar results when subjects were faced with a more abstract decision: whether to add or subtract in an upcoming task.

Being able to statistically predict the decision up to 10 seconds before conscious awareness of it is, on the one hand, quite impressive. On the other hand, it is still a leap of faith to assume that brain is the only causal factor involved. Many psychological variables, such as personality traits, are predictive of certain behaviors at a higher level than 60 %, yet nobody claims they are the only causal factor involved. Also, many decisions happen within a much shorter timeframe than Soon's 10 seconds. Often, the stimulus we react to is not even present 10 seconds before we make the decision. So it is clear that the brain activity measured by Soon et. al. cannot be the only causal factor in such decisions. Similarly as in the case of readiness potentials: this preparatory brain activity is likely to have an impact on the emergence of the decision, but it is not its sole determinant.

Conclusiveness of the evidence

To conclude our short treatise, these studies undoubtedly show that unconscious brain processes are involved the decision making. But this is no surprise. Such ideas have been with us since at least Freud, and many psychological experiments have shown this before brain scanning technologies even existed. Prima facie, a sincere look at ourselves clearly shows that we clearly do not know all the

determinants of our behavior, neither can we influence all of them. What significant difference does it make whether potential brain correlates of such processes are discovered? The real question is not whether our behavior is partially or largely unconsciously determined; it is whether, based on our present evidence, we can claim that unconscious brain processes are its *sole* determinant.

There is a number of complex processes where, prima facie, consciousness or intention seems to be at least a contributing factor (not ruling out unconscious co-determinants): decision making, placebo effect, psychotherapy, planning, etc. As of today, we have not been able to reductionistically explain any of them. We are far from being able to provide a full-fledged reductionist account of even simple acts such as moving one finger. While it is possible that future research will indeed bring such accounts, given our present knowledge, such claims are premature.

Yet, consider the quite unequivocal statements of some neuroscientists:

> Sam Harris (2012): "Free will is an illusion. Our wills are simply not of our own making. (…) How can we be 'free' as conscious agents if everything that we consciously intend is caused by events in our brain that we do not intend and of which we are entirely unaware?"
>
> Francis Crick (1995, p. 3): "'You', your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."[4]

Of course, the fact that our present technologies don't allow us to fully predict such a complex system as the human psyche doesn't mean that it is unpredictable in principle. But the absence of significant portions of explanation should make us open toward other approaches. As Wallace (2000, p. 25) notes:

> "…never in the history of modern science have instruments or methods been devised to detect the presence of nonphysical influences of any kind. Research in modern biology and the brain sciences is conducted with the assumption, hardly ever questioned, that there are no nonphysical influences in organic evolution or in human affairs. So the fact that scientists have not discovered any such influences should hardly come as a surprise."

[4] While Crick calls this "the astonishing *hypothesis*" (emphasis added), thus admitting it could theoretically be wrong,

I agree that a negative argument – that we cannot fully account for or predict the human psyche in material terms – is *not* sufficient. It is possible that future research will show that material processes are, indeed, sufficient to wholly predict and explain mental processes. But until we have clear evidence in favor of this claim, we should not overextend our knowledge, and a priori discard other possible avenues and methods of research.

2.1.2 Unconscious dynamics

Emotional and other conscious experiences often follow complicated dynamics. Our awareness of emotions, thoughts and mental processes going on within our psyche can change dramatically. Some mental contents can become conscious and others can be moved away from conscious awareness, often without the person being aware of why this shift has occurred or whether it has occurred at all. These transformations sometimes follow complex emotional dynamics, such as projection, repression and re-integration, which were first formulated by psychoanalysis, but have lately been, to a certain extent, confirmed experimentally (Baumeister, 1998; Westen, 1999).

At the present, we are not able to explain these phenomena in terms of brain and other material processes. While it is not ruled out we will be able to do so in the future, at present this is merely an assumption. It seems quite unlikely that if all events are either random or deterministic, some, but not others, should be consciously experienced, and that this should change according to complex, meaningful patterns of emotional dynamics.

2.1.3 Lucid dreaming

Typically, dreams are chaotic and unclear. With the ability of lucid dreaming, however, one may become fully conscious in dreams, retaining one's self-conscious identity, continuity with and memory of waking life, critical rationality and moral character (Marman, Hornák, 2013). The lucid dreamer can be active in dreams and experiment with them.

While little research in this field has been done scientifically, it indicates the existence of interesting phenomena. Researchers of lucid dreaming (La Berge, 1985; Páleš, 2012) have noted that the dream scene often changes in reaction to what kind of emotion the dreamer is experiencing, and that this can be to an extent manipulated by conscious effort. Interestingly, some archetypal patterns seem to appear in lucid dreams. Positive emotions with a moral connotation, such as benefaction or repentance bring

about scenes of flying, celestial bliss, healing springs and flowery meadows. On the other hand, self-centered emotions such as lust or greed are followed by scenes of darkness, choking, drowning and muddy waters (Páleš, 2012). Can these observations be reproduced? Why would such a consistent, archetypal logic be present in dreams? Are such emotional rules intercultural? All of these questions remain unanswered, and, if we confine ourselves to the present paradigm, are likely to remain so indefinitely.

Dreams pertaining to the first type, with elements of transcendental experience, are especially interesting. LaBerge (1985) presents an example of one of his dreams:

> "I found myself driving in my sports car down the dream road, perfectly aware that I was dreaming. I was delighted by the vibrantly beautiful scenery my lucid dream was presenting. After driving a short distance farther, I was confronted with a very attractive, I might say a dream of a hitchhiker beside me on the road just ahead. I need hardly say that I felt strongly inclined to stop and pick her up. But I said to myself, 'I've had that dream before. How about something new?' So I passed her by, resolving to seek 'The Highest' instead.
>
> As soon as I opened myself to guidance, my car took off into the air, flying rapidly upward, until it fell behind me like the first stage of a rocket. I continued to fly higher into the clouds, where I passed a cross on a steeple, a star of David, and other religious symbols. As I rose still higher, beyond the clouds, I entered a space that seemed a vast mystical realm: a vast emptiness that was yet full of love; an unbounded space that somehow felt like home. My mood had lifted to corresponding heights, and I began to sing with ecstatic inspiration. The quality of my voice was truly amazing—it spanned the entire range from deepest bass to highest soprano—and I felt as if I were embracing the entire cosmos in the resonance of my voice. As I improvised a melody that seemed more sublime than any I had heard before, the meaning of my song revealed itself and I sang the words, 'I praise Thee, O Lord!'
>
> Upon awakening from this remarkable lucid dream, I reflected that it had been one of the most satisfying experiences of my life. It *felt* as if it were of profound significance."

Another example of a lucid dream with transcendental aspects is given by a user at the *Dream Views* forum:

> "I realized I was dreaming and began to fly. I was peacefully soaring over low rolling hills when I suddenly shouted, 'I want to see God!' A curious fact is that I don't recall any preliminary reflection, thought or intent to say this. I just simply blurted it out.
>
> As I came up over the crest of a hill, I saw before me a vast plain which extended to the far horizon. In the distance stood a huge tree, alone, striking me by its singularity. Being lucid, I immediately sensed that this is where I should fly. As I approached the tree, slowing my speed of flight, its topmost tender branches, as though stirred by a slight breeze, opened to form a lush green cup. I effortlessly descended into it. The branches gently closed around me. While held in their embrace, I was overcome by emotion and the overwhelming realization that I am unconditionally loved. Although no words were heard or spoken, I awakened with the certain knowledge that this Love abides with us always, and we cannot, for any reason, be separated from it."

Again, can similar observations be reproduced? What do they mean? Today's psychology hardly even has terms for such experiences and emotions, and only a few researchers on the edge of mainstream or outside of it are interested in researching them. (I will deal with this a bit more in the section on mystical experiences in the next chapter.) And there are more questions that need to be answered: What can we do in dreams? Can we become conscious in even deeper phases of sleep, or in other states normally deemed inaccessible to conscious experience? And what *could* we do there? All of this awaits further research.

The possibility of becoming fully conscious in dreaming or even deep sleep does not make much sense within the paradigm. It should rather not be possible, and if, as it seems, emotional operations with lasting consequences can be performed there, as LaBerge (1985) and others have noted, it is even less comprehensible. Needless to say, there is currently no reductive explanation for these phenomena. While it is not impossible that one day we will have such an explanation, today we are far from it.

2.1.4 Holotropic states of consciousness

Lucid dreams are just one example of an altered state of consciousness that the current paradigm has trouble explaining. Another example are *holotropic states of consciousness*, termed and researched by the Czech psychiatrist Stanislav Grof. Holotropic states of consciousness are a special type of altered states of consciousness, where consciousness is fundamentally changed, but not grossly distorted.

Rationality is largely preserved, and unusual images, emotions and thought enter conscious awareness. The person may experience other dimensions of reality, see various scenes from the realms of animals, plants or the whole cosmos, or experience a whole range intense feelings from violent rage and dreadful terror to ecstatic bliss and heavenly love. Most importantly, these experiences are intimately connected with the person experiencing them and have a curative and transformative potential. Deep insights are often reported.

Grof has been working with holotropic states of consciousness for more than 40 years. He began with therapy sessions under mild doses of LSD to elicit these states, and later he devised a method combining breathing exercises and music to avoid the need of administering drugs. The cases he describes are often fascinating, and I will reproduce one of his accounts. Grof begins with describing the problem of a patient (Grof, 2012, p. 93):

> "Norbert was complaining about a sharp, chronic pain in his shoulder and chest muscles, which inflicted enormous suffering upon him and was afflicting his life. Repeated medical examinations including roentgen did not reveal any organic cause associated with this problem, thus all attempts at curing the condition were failing. A series of procaine injections provided only short relief, for the time of their action."

Experiencing such problems, Norbert decided to try out holotropic therapy with Grof. Grof describes how the session progressed (Grof, 2012, p. 93):

> "At the beginning of the holotropic breathing, Norbert was impulsively trying to leave the room, because he could not stand the music and had the feeling he was being 'killed'. Great effort was needed to convince him to stay in the process and try to learn about the reasons of his problem. In the end, he agreed and for almost whole three hours, he was suffering acute pain on his chest and shoulder, which were gradually rising to the point of being unbearable. He was struggling fiercely and strongly, as if his life was threatened, which was manifested by coughing, suffocation and a whole scale of loud screams.
>
> After this wild episode, he became calm and relaxed. With great surprise he realized that this experience unblocked the tension in his shoulder and muscles and rid him of all pain."

The session looked quite terrifying from the outside view. The most interesting part, however, was what Norbert was experiencing on the inside (Grof, 2012, p. 93-94):

> "In his testimony, Norbert stated that his experience was composed of three layers, and all of them had to do with pain in the shoulder and were accompanied by suffocation. At the most recent level he experienced a childhood situation during which he almost died. When he was around seven, he was playing with his friends on a beach, where they were digging a tunnel. As soon as the tunnel was ready, Norbert crawled inside to explore it. But as the other children were playing around, the tunnel collapsed and buried him. Until he was rescued, he almost suffocated.
>
> When his holotropic experience deepened, he found himself in a terrifying memory of his own birth, which was very complicated, because his shoulder was for a long time trapped behind his mother's pubic bone. This episode shared with the previous one a combination of suffocation and sharp shoulder pain.
>
> During the last part of the breathing, Norbert's experience dramatically changed. Suddenly, he spotted a lot of military uniforms and horses around and realized he was in a battle. He was able to identify it as one of the battles of Cromwell's England. In one moment, he felt a sudden pain and realized his shoulder got pierced by a spear. Afterwards, he fell down from the horse and felt how his chest crushed by hooves.
>
> Norbert's consciousness got separated from the dying body, ascended above the battlefield and from this perspective, was observing the whole scene. After the death of the soldier, in whom he recognized himself in a past incarnation, his consciousness returned to the present and reconnected with his body, which was after many years of suffering relieved of all pain. The relief brought by this experience turned out to be permanent. The pain has not returned, although more than 20 years have already passed since this unforgettable seminar."

During his career, Grof witnessed dozens of similar cases (Grof, 1980; Grof, 2012). They usually progressed through three typical stages: a childhood memory (postnatal layer), a memory of birth (perinatal layer), and a memory of what seemed to be a past life (transpersonal layer). All three stages shared a common thread in that they were related to a psychosomatic symptom, and reliving the experience, very vividly and intensely, resulted in the relief or curing of the symptom.

But is this possible? According to mainstream science, it is impossible to remember one's birth due to infantile amnesia, which likely has an underlying neuronal mechanism (Josselyn, Frankland, 2012), not to mention past lives and similar phenomena. In some instances, verification may be possible, e. g. when the patient gives some specific details they couldn't otherwise have known. But we don't have to consider these experiences veridical to study them. Regardless of their "veridical status" – i.e. whether they are actual memories, hallucinations, or unconscious projections – they seem to be important both in our knowledge about human psychology and its relation to somatic symptoms and medicine.

Currently, there is no explanation as to how they work within the current paradigm, although transpersonal and spiritual explanations have been proposed (Grof, 2012). Little or no mainstream research has focused on Grof's and other similar techniques, and this by itself is telling. While it is not ruled out that some day in the future we will have an explanation of the mechanism of holotropic experiences within the paradigm, this is an assumption.

2.1.5 Out-of-body experiences

Out-of-body experiences (OBE's) are another type of altered states of consciousness. In such experiences, the person has the impression they have left their body and are able to observe the world from a vantage point inconsistent with the location of their physical body (Blanke, Arzy, 2005). They can happen under extreme stress, or when exposed to grave danger to life or during clinical death (near-death experiences).

Some out-of-body experiences are apparently hallucinations. They can be induced in various ways including drug administration or direct stimulation of certain brain centers (Alvarado, 2000; Blanke et al., 2002). The OBE's so induced are typically short and conscious awareness during them is rather bland and dull. Observations they provide usually do not correspond to what can be confirmed later by sensory means.

Other OBE's, however, are more long-lasting, lucid and controlled. It is not uncommon that in such cases, people claim to observe something they could not have obtained by normal sensory means. Of course, science cannot be built up on anecdotal reports. But it should explore them in an open and critical way, and try to understand and reproduce them. Few people have had repeated out-of-body experiences the course of which they were able to control to a significant degree, a necessary

requirement for experimentation. It is from these people that we might perhaps learn more about OBE's. Probably the best example from our civilization is Robert Monroe.

Robert Monroe (1915 – 1995) was a successful businessman and an atheist when in his 40's he suddenly began having spontaneous OBE's. Later, he learned to control the ability to some extent and was often able to produce an OBE willfully. Monroe was a critical observer who made his own experiments with OBE's and wrote three books about them. Here is an example of one of his amazing journeys (Monroe, 1971):

> "**March 5, 1959: Morning**
> In a motel in Winston-Salem: I woke up early and went out to have breakfast at seven-thirty, then returned to my room about eight-thirty and lay down. As I relaxed, the vibrations came and then an impression of movement. Shortly thereafter, I stopped, and the first thing I saw was a boy walking along and tossing a baseball in the air and catching it. A quick shift, and I saw a man trying to put something into the back seat of a car, a large sedan. The thing was an awkward-looking device that I interpreted to be a small car with wheels and electric motor. The man twisted and turned the device and finally got it into the back seat of the car and slammed the door.
> Another quick shift, and I was standing beside a table. There were people sitting around the table, and dishes covered it. One person was dealing what looked like large white playing cards around to the others at the table. I thought it strange to play cards at a table so covered with dishes, and wondered about the overlarge size and whiteness of the cards. Another quick shift, and I was over city streets, about five hundred feet high, looking for "home". Then I spotted the radio tower, and remembered that the motel was close to the tower, and almost instantly I was back in my body. I sat up and looked around. Everything seemed normal.
>
> Important aftermath: The same evening, I visited some friends, Mr. and Mrs. Agnew Bahnson, at their home. They were partially aware of my "activities," and on a sudden hunch I knew the morning event had to do with them. I asked about their son, and they called him into the room and asked him what he was doing between eight-thirty and nine that morning. He said he was going to school. When asked more specifically what he was doing as he went, he said he was tossing his baseball in the air and catching it. (Although I knew him well, I had no knowledge that the boy was interested in baseball, although this could be assumed.)

> Next, I decided to speak about the loading of the car. Mr. Bahnson was astounded. Exactly at that time, he told me, he was loading a Van DeGraff generator into the back seat of his car. The generator was a large, awkward device with wheels, an electric motor, and a platform. He showed me the device. (It was eerie to see physically something you had observed only from the Second Body.) Next, I told about the table and the large white cards. His wife -was excited at this one. It seems that for the first time in two years, because they had all arisen late, she had brought the morning mail to the breakfast table and had passed out the letters to them as she sorted the mail. Large white playing cards! They were very excited over the event, and I am sure they were not humoring me."

Monroe did many such experiments and tried to critically assess whether unconscious pre-knowledge or expectations could have influenced what he had seen. Is it possible that he at times truthfully saw something during an OBE which he could not have seen by sensory means? According to the current paradigm, this is impossible. Showing the existence of such a phenomenon would be a major breakthrough in science. Of course, we cannot take Monroe's testimony for granted – it is possible he is making it up. But he was trying to do experiments on his own, and willing to cooperate with scientists. Despite this and although Monroe's first book came out more than 20 years before his death, no mainstream scientist tried to test him for his abilities. Only parapsychologists did a few experiments with him, but, as far as I know, they were concerned with brain waves and not the veridicality of his perceptions while out-of-body.

Apart from Monroe, there are other reports of people making successful observations during an OBE which were later confirmed (Crookall, 1972; Moody, 1975; Sabom, 1998). Controlled experiments, however, have been mostly unsuccessful (Blackmore, 2010). Of course, if OBE's really enabled one to leave the physical body, this would be a state of consciousness most people are not used to. Thus, without training, it is not surprising that people would not be able to observe their surroundings lucidly and truthfully. This ability would need to be trained rigorously, and methods of training it would have to be developed before we can make the final verdict. Testing people with no systematic training and/or artificially induced OBE's is not sufficient to explore the nature of the phenomenon comprehensively.

2.2 Integration of knowledge

In science today, we have a huge number of specific findings, hypotheses, and partial theories, but we lack a *holistic*, *integrative view*. The most telling examples of this are found in social sciences and humanities. In psychology, for example, we have hundreds of constructs which evidently overlap, but we don't know how to integrate them. There are several mutually incompatible approaches to studying the human psyche, each partially valid, but substantially incomplete (cognitive psychology, behaviorism, depth psychology, humanistic psychology, evolutionary psychology, neuropsychology). Again, we don't know how to integrate them, a situation many psychologists find worrying (Sternberg, Grigorenko, 2001; Bačová, 2009; Henriquez, 2011). Similar trends are found in sociology, politology, cognitive science, and other disciplines.

The present paradigm provides us with good methods of acquiring large amounts of highly specific technical data. But how are we to proceed after acquiring the data? And which data are we even to collect? Without a well-grounded holistic approach, the combinatorial explosion is enormous. We simply cannot test all possibilities. What we thus need is not more specific data, but a good way of integrating them. One can hardly disagree with Wilber (2003):

> "An integral approach is based on one basic idea: no human mind can be 100% wrong. Or, we might say, nobody is smart enough to be wrong all the time**.** And that means, when it comes to deciding which approaches, methodologies, epistemologies, or ways or knowing are 'correct', the answer can only be, 'All of them'. That is, all of the numerous practices or paradigms of human inquiry — including physics, chemistry, hermeneutics, collaborative inquiry, meditation, neuroscience, vision quest, phenomenology, structuralism, subtle energy research, systems theory, shamanic voyaging, chaos theory, developmental psychology — all of those modes of inquiry have an important piece of the overall puzzle…"

The trick is to pick, assort, and combine what is efficient from all walks of science and human enquiry. But how are we to do this within the current paradigm, according to which the relevant scientific method is to empirically test all possibilities – which is practically and technically impossible? And while it is incorrect to say there is *no* integration in science, it is fair to say there is *little* integration. While some level of generalization is accepted, it is only after extensive and replicated empirical testing that this becomes accepted. While the separation of variables is quite possible in small or non-

living systems (physics, chemistry), with living systems, and specifically humans and human culture, it is not a viable option.

We need good *insights* which would show us what data we need to focus on and how to put it together. We, in fact, always use some insights, theories, hypotheses, but this process is largely unconscious, intuitive. With deeper insights – ones I suggest are possible with integrative science (cf. next chapter) – this process would simply become more effective. As Henriques put it "if we can effectively map the forest then the careful scientific work we do examining the trees will be much more meaningful" (Henriques, 2011, p. x).

2.3 The big questions

2.3.1 Why does the world exist?

"The first question which we have a right to ask", wrote Leibniz in 1714, "will be, 'Why is there something rather than nothing?' For nothing is easier and simpler than something." (Leibniz, 1714, p. 210) It is truly very remarkable that *anything* exists at all. We live in world with stars, planets, flowers, trees, animals, people and their culture, while it could equally well have been the case that nothing would exist at all. How is this possible?

Within the paradigm, we can meet with two types of answers. The first is to say that the very question "Why is there something instead of nothing?" is unscientific. How would we answer it? What measurements could help us clear it? Perhaps, philosophers and theologians can discuss various possibilities, but this question is not amenable to empirical study, thus, it cannot be answered in terms of science, and should not be asked. This argument was formulated explicitly by the logical positivists (Ayer, 1952). A slight variation of this view is that any possible answer would be incomprehensible to the human intellect – indeed, why should it be comprehensible? Both views imply that the question is, and will always be, out of the scope of science.

Such approaches, however, are not very common among scientists today. Few would condone them directly. Most hope that modern science, mainly physics, will enable us to solve the question of the origin of the world. The most popular physical (attempt at an) explanation is the "Universe from nothing" theory (Krauss, 2012). According to this theory, matter has positive energy, and gravity has negative energy, meaning the overall energy of the universe is zero. Thus, it seems quite plausible that

the universe could have "come from nothing". Krauss, however, notes that this "nothing" is not really "nothing", but a "boiling, bubbling brew of virtual particles that pop in and out of existence" (Flatlow, 2012). Various quantum fluctuations are going on, and it is tenable in some mathematical models of modern physics that a fluctuation would ensue randomly that would lead to the universe we see today (He, Gao, Cai, n. d.).

These explanations are interesting and fascinating. It is very difficult to prove them, but, more importantly, they do not, in fact, answer the question asked in the first place: why is there something and not nothing? They don't explain the origin of the "boiling, bubbling brew of virtual particles that pop in and out of existence", the quantum fluctuations and laws governing them. They do not show why anything could, should or would exist in the first place (Albert, 2012; Horgan, 2012).

Indeed, if the assumptions of the current paradigm hold true, and all things have to be caused mechanically or come about randomly, it seems impossible to formulate any answer that would answer our question. For any first cause would have to be self-caused, and likely contain some transcendental purpose, but this is impossible under the current paradigm. While it is often claimed that positing a first cause, be it God or something else, only replaces one mystery with another (Dawkins, 2006), the point is that a *qualitatively different* approach to *anything* that the paradigm can provide is needed if we are to *explain* the existence of anything. That is, even though the other explanations may not be sufficient, the present paradigm cannot even *formulate* an explanation that would be sufficient: it lack the concepts to do so.

To conclude, the question of "Why is there something instead of nothing?" is very difficult to grasp, and yet more difficult to answer. It is possible that it is really unanswerable, or that the answer is incomprehensible by the human intellect. But the fact that the current paradigm cannot account for the origin of anything because of conceptual reasons (its assumptions) is a point we should keep in mind when judging its overall explanatory power.

2.3.2 Why does consciousness exist?

In a previous section, we have dealt with conscious phenomena and pointed out that the present paradigm cannot give a complete account of how they function. While it can predict them partially, we are far from a complete or even comprehensive picture. But even though these question remain unsolved, they are the "easy problems" – *how* do mental and conscious phenomena function. Although

there is no such guarantee, it is conceptually possible that they will be explained within the current paradigm. Here, we take the question one step further: *why* does first-person, conscious awareness exist in the first place?

Nobody knows why consciousness exists. In a purposeless universe governed by mechanistic laws and pure chance, it shouldn't. It makes little sense that, all things being determined or random, some of those things should be *experienced in the first person*, that there should be *something like to be* the subject of that phenomenon (Nagel, 1974), have *qualia* (Jackson, 1982).

As David Chalmers raised it (Chalmers, 1995):

> "It is undeniable that some organisms are subjects of experience. But the question of how it is that these systems are subjects of experience is perplexing. Why is it that when our cognitive systems engage in visual and auditory information-processing, we have visual or auditory experience: the quality of deep blue, the sensation of middle C? How can we explain why there is something it is like to entertain a mental image, or to experience an emotion? It is widely agreed that experience arises from a physical basis, but we have no good explanation of why and how it so arises. Why should physical processing give rise to a rich inner life at all? It seems objectively unreasonable that it should, and yet it does."

This has been termed the "hard problem of consciousness". The solution of the hard problem should fill what Levine (1983) has called the "explanatory gap" between materialism and qualia. Both materialists and non-materialists have concurred that the existence of consciousness is one of the greatest mysteries, a big question "that we don't even know how to ask" (Trefil, 1997, p. 15).

What is even stranger, consciousness apparently emerged gradually through evolution: from simple sensations to complex thought, moral emotionality and self-reflection. Intuitively, it would seem that these capacities bring some important advantages to the organisms possessing them. But according to the present paradigm, this cannot be the case, because consciousness cannot have causal efficacy. As Sheldrake (2012, p. 113) notes: "Consciousness must do something if it has evolved as an evolutionary adaptation favored by natural selection; but it cannot do anything if it is just an epiphenomenon of brain activity."

There has been much discussion in science in what systems and under what conditions consciousness occurs (Llinás, 2002; Block, 1996; Atkinson, Thomas, Clleremans, 2000), how it evolved (Feinberg, Mallatt, 2013; Griffin, 2001), and how brain state changes are connected to changes in consciousness (Akire, Miller, 2005; Metzinger, 2000). But the hard question – *why* does subjective awareness exist in the first place – remain unsolved. Direct answers within the paradigm are that either the problem is misconstrued (Dennett, 1996), or that it will disappear as neuroscience will advance and we learn more about the "easy problems" (Dennett, 1991; Crick, Koch, 2002). However, even if we would fully explain how psychic *functions* work and exactly which material phenomena give rise to which mental phenomena, we would still not have explained *why* does the first person awareness exist in the first place. This question is in many terms akin to the previous one.

To summarize, even if the present paradigm were able to show *how* phenomena of consciousness arise (as dealt with in a previous section), it would still not be able to explain *why* it arises. It would have to state that it is simply the way the world is, that consciousness is a part of it, analogically to the answer to the previous question: it is simply the way the world is, that it exists. As with the previous question, perhaps, the question why consciousness exists cannot be answered, or even meaningfully asked. Or it can be asked, but the answer cannot be understood by our cognitive capacities (McGinn, 1999). But the current paradigm certainly cannot answer it, and we should be aware of this limitation.

2.4 Summary

The current paradigm has been largely successful in explaining material phenomena. It has, however, been less successful in other areas. We have dealt with three in this chapter: conscious phenomena, integration of knowledge and the big questions.

First, the paradigm offers only a limited understanding of phenomena pertaining to consciousness, particularly altered states of consciousness. While these phenomena can be partially predicted materially, we are far from a complete picture. It is possible that in the future we will attain a full explanation within the paradigm, but this is merely an assumption.

Second, the present paradigm produces huge amounts of specific and detailed data, but does little to integrate them into more holistic, coherent wholes. This trend is most pronounced in social sciences and humanities. While the idea of the integration of partial knowledge is not in contradiction with the

paradigm, the paradigm has no clear method how to do it: how to build a comprehensive, integrative theory.

Third, an area where the present paradigm cannot provide any answers at all are the "big questions": Why is there something and not nothing? Why is there conscious awareness? Not surprisingly, the questions are often considered unscientific or metaphysical. The present paradigm lacks the needed conceptual terms to tackle these questions.

All of these problems show that a substantial part of our knowledge of the world is missing, and that the present paradigm is likely incomplete. This in itself is not a fatal flaw – we can hardly expect of any paradigm to be all-encompassing. The question is, what to do with this realization. First, it should be openly stated and admitted, which is the opposite of what many scientists within the paradigm tend to do (remember the statements made by some of the leading neuroscientists). Second, we should seriously search for a *scientific* complement to the paradigm that would fix its problems and make it more complete. As we will see in the next chapter, several such proposals have already been made.

3 The alternative – integrative science

> "The best read naturalist who lends an entire and devout attention to truth, will see that there remains much to learn of his relation to the world, and that it is not to be learned by any addition or subtraction or other comparison of known quantities, but is arrived at by untaught sallies of the spirit, by a continual self-recovery, and by entire humility."
> Ralph Waldo Emerson, Nature

In the previous chapters, we have painted the currently dominant paradigm of science. We have noted its huge successes mainly in the realm of matter, but we were cautious to infer from that that it would be equally successful in predicting and explaining phenomena in the realm of consciousness. Indeed, we have discussed some key questions with regard to consciousness and have seen that the current paradigm, based on the actual state of knowledge, cannot satisfactorily account for them.

But a negative argument is not enough. It is true that the paradigm cannot account for some phenomena, but what if they are really incomprehensible in terms of human intellect? Or, what if the paradigm only needs more time, and will be able to explain them with better instruments and refined methodologies? It is not fair to criticize the paradigm, if we have no viable alternative at hand. Neither does it suffice to ascribe the holes in the paradigm to God, soul or spirits if we don't specify what they mean and how they can be studied. A God-of-the-gaps argument is not satisfying. To be able to engage in a serious and constructive discussion, *a consistent, provable and scientific alternative* has to be put forth. And this is exactly what I will attempt to do in the present chapter.

Before we start to sketch this alternative, I should clear what I believe to be its relationship to the current paradigm. As noted, the current paradigm is highly successful in explaining the world. Any new approach that might substitute it is not likely to *fully* discard it. Rather, it would simply *complement it and accommodate it in a larger, more integrative context.* Certainly, phenomena with radically different principles could be discovered, but rockets would still fly, surgeons would still operate, computers would still calculate and third-person experimentation would continue. What we know about the material world would not be "shown wrong"; our view of the world would just be enlarged. Thus the proposal of integrative science is not one of overthrowing, but broadening material science.

A loose analogy is the replacing of classical physics by quantum physics. In late 19th century, classical physics was enormously successful in explaining more and more about the world. Many scientists were convinced nothing substantial remains to be explored in physics. Ironically, in the next few years, physics underwent one of the largest revolutions in history: the discovery of quantum mechanics, which changed our view of physics substantially.

The point is twofold: although the classical paradigm could not account only for very small discrepancies in measurements, those, when studied systematically, revealed a whole new world, with qualitatively different principles; yet, the classical Newtonian physics remain a viable and practical theory for almost all everyday situations. The broadening of the current scope of science would go along similar lines. It would not be a rejection of material science – it would just reconsider its *overextensions.*

3.1 An outline of integrative science

3.1.1 Limitations of the current paradigm revisited

Before I start to sketch how integrative science could complement the current paradigm, let us first recapitulate the challenges that the current paradigm faces. First, it is not able to account for a number of conscious phenomena, especially altered states of consciousness. Second, being primarily data-driven, it lacks good methods of integrating various approaches and findings into a more holistic views. Third, it lacks a conceptual framework to explain the "big questions": Why does the world exist? Why does consciousness exist? We have covered these points in the previous chapter. Let us now take a look at some of the novelties that integrative science might bring, and try to elucidate how this could be of help in solving the problems of the current paradigm.

3.1.2 Methods of integrative science

The basic observation we have made is that within the current paradigm, we have a limited understanding of the phenomena pertaining to consciousness. For example, we cannot explain why Grof's patients get cured of a psychosomatic symptom following a strong experience including visions and purportedly reliving the experience of their own birth. We don't know what is going on during dreams and what consequences our actions during lucid dreaming have. Studying the brain and other

material correlates of these phenomena is one possible approach, but has not been shown fruitful in giving a comprehensive account of them.

This situation calls, quite naturally, for employing a different approach – a relevant method of studying first-person, conscious phenomena. Alan Wallace writes (Wallace, 2009, p. 14):

> "To discover the origins of any natural phenomenon, scientists have devised rigorous means of observing the phenomenon itself, conducting experiments on it when possible. This has been true for exploring the origins of all kinds of objects, from cells, on which experiments can be done, to stars, which can be observed but not manipulated through experimentation. The same is true for the psyche. To discover its origins, we must devise sophisticated methods for observing and experimenting on states of consciousness."

Just as third-person research requires specific methods and instruments, so also first-person research necessitates the use of a rigorous methodology and well-calibrated instruments. With third-person research, these instruments and methods are either material and improve the ability of sensory experience, such as telescopes, microscopes and brain scanners, or abstract, but objective, such as formal logic and statistical analysis. With first-person research, these instruments and methods are immaterial and improve the ability of experiencing inner process (emotions, thoughts, etc.), or heighten creativity and the ability to gain novel insights. While they are subjective in the sense of being privately experienced, there are methods that enable us to determine if they uncover something objective (see the subchapter on this, and further text).

How exactly would these first-person "instruments and methods" look like? One clear thing is that they would require a sustained cultivation of certain mental skills. To return to our two examples quoted before: to be able to determine what is going on in holotropic states of consciousness induced by Grof's method, we need systematic observations conducted by trained researchers. As in other areas of science, anecdotal reports or observations of untrained laymen can be an inspiration for, but not a substitute of, scientific research.

Similarly, to understand what consequences actions in dreams have, we need to be capable of cultivating the ability of lucid dreaming to experimentally manipulate them. In both of these cases, there is the prerequisite of retaining a lucid, critical, self-aware consciousness, because only such a level of consciousness allows for rigorous scientific enquiry. This can be called "advancing the level of

one's consciousness": the ability of translating the lucid faculties of the mind, normally available only during waking consciousness, to various altered states of consciousness.

It is an empirical question how far our level of consciousness can be "advanced" in this way. The existence of lucid dreaming is proved scientifically (LaBerge, 1985), but various traditions also talk about lucid deep sleep (the non-REM phases, where no vivid dreams are usually experienced), or even about a full continuity of consciousness (e. g. Steiner, 1904). Of course, this phenomenon has not been shown to exist scientifically, but I know of no scientific studies trying to tackle it. Interestingly, the most holistic and crucial insights, even those pertaining to the big questions are claimed to take place during these states of consciousness. (As we will see, there is scientific support to the idea that some altered states of consciousness have to do with insights and creativity.)

While such claims may sound far-fetched from the modern view of science, let us remember that lucid dreaming, a phenomenon now scientifically accepted, was not known to science until the 1980's. Yet, it is not the case that it was not testable scientifically. Claims of its existence were known: ancient spiritual traditions mentioned it, personal memoirs (e. g. Fox (1939)) and popular books (Garfield, 1974) were published, including methods how to develop this ability. Any scientist could test these claims, but science didn't pay attention to this phenomenon, and thus lucid dreaming was not "proved". It took LaBerge's enthusiasm in the 1980's and his original experiments to get acceptance for this phenomenon.

Today, the situation is analogous with lucid deep sleep and other more advanced states of consciousness: there are claims about their existence, with purported methods how to reach them, but mainstream science is not interested in them, because it is entrenched in the assumptions of the current paradigm. A further difficulty is that, according to these traditions, these states of consciousness are incomparably harder to reach than lucid dreaming. But their existence is an open question, and is surely not contradicted by our current scientific knowledge.

3.1.3 Economic aspect

One commonly mentioned argument is that of efficiency and economics. Our resources (money, time, energy) are limited, which narrows down the otherwise potentially infinite field of inquiry. Many questions may seem fascinating, but we simply cannot afford to study everything. Our choices should therefore be informed, pragmatic, and likely to bring concrete, measurable benefits. It is hard to answer

this question convincingly, as it is, in the end, always based on some values and assumptions. But I will state a few points.

First, how do we presently decide which choices are economically feasible? Of course, it is obvious that some proposals are patently extreme or absurd, but there is a huge grey area where we can't really be sure and have to rely on our intuition, regardless of any attempt to fully rationalize this process. But intuitions largely stem from our unconscious, an area we don't understand very well, precisely because we are conscious of only some layers of our psyche. Thus, integrative science, which might perhaps enable us to develop a more profound insight into the unconscious layers of the psyche, would likely provide a better understanding of our intuitions, and make us more rational in our decision making. This, in turn, would enable us to make better judgements as to which investments in science are truly significant and which not.

Second, there is a lot of literature on consciousness, altered states of consciousness and mystical experiences. By analyzing this literature, it is not difficult to separate the more sensational, commercial or naïve accounts, from the accounts of clearly more rational and critical observers, such as Wilber (1995), Steiner (1905) or Monroe (1971). As already mentioned, such people are often willing to participate in scientific research, but garner little interest from the scientific community. By such a pre-selection, we would increasethe efficiency of our decisions significantly.

Third, there is a large amount of very specialized, low-level data in today's science. Often, this data requires huge technological resources and has little practical applicability, at least in the short term. Let's take a look at a few random examples from a recent issue of British Journal of Psychology, a high-ranking psychology journal:

- Chewing gum moderates the vigilance decrement (Morgan, Johnson, Miles, 2013)
- Sexual distractors boost younger and older adults' visual search RSVP performance (Didierjean et. al., 2013)
- Increased facial width-to-height ratio and perceived dominance in the faces of the UK's leading business leaders (Alrajih, Ward, 2013)

Even if these findings could be practically applied – and I'm not saying they can't be – they would not instigate a giant breakthrough in human well-being and our view of the world. On the other hand, if we compare this with the new method of integrative science, based on the idea of advancing one's level of consciousness, this does not require any expensive software or hardware and can be done mostly by

sustained inner, mental activity. Yet, it can lead to major breakthroughs in how we view science, the world, and ourselves. And even if applying integrative science would bring no new empirical findings whatsoever – a highly unlikely scenario – most people would still agree that a heightened self-knowledge and cultivating mental disciplines is a desirable goal in its own.

3.1.4 Summary

To shortly summarize, in order to be able to attain a more integrative perspective, the research community, or at least a part of it, should cultivate certain practices that would "advance their level of consciousness": develop the ability of being lucid, self-aware and critical not only in waking consciousness, but in dreams and possibly other altered states of consciousness. In this way, the approaches of third-person and first-person – fact-gathering and interpretation; quantitative and qualitative aspects; mechanical, convergent thinking and creative, divergent thinking – would be contained within an integrative framework.

Such an approach could help us solve the above mentioned problems of the current paradigm. Firstly, and most obviously, it would provide us with new data about conscious phenomena, especially in domains with which the current paradigm has most trouble. Secondly, as we will see, there is some evidence that creative processes take place during altered states of consciousness, such as sleep. By becoming more self-aware during these altered states of consciousness, we could perhaps tap into creative processes more effectively and gain novel insights, allowing us to integrate our knowledge into a more holistic view. Thirdly, the deepest of these insights, gained in substantially advanced levels of consciousness, could perhaps give us answers (or glimpses of them) to the big questions.

In the following sections, I turn to each of these three contentions separately, and provide them with supporting evidence.

3.2 Complementing the current paradigm

3.2.1 Conscious phenomena: understanding them

While conscious phenomena have certain material correlates in brain and body states, they also have an experiential, first-person aspect. This aspect is important in explaining, or at least describing them, and therefore should be studied. As with other phenomena, science should not rely only on anecdotal

reports or observations of untrained laymen. These may form an inspiration for research, but do not substitute it.

Science should thus devise specific methods of studying first-person phenomena and experimenting with them. Some of these phenomena, however, are not accessible to untrained people (e. g. certain meditative states, lucid dreaming, etc.). Scientists studying consciousness should thus develop rigorous first-person methodologies to able to better explore the phenomenological, experiential side of these phenomena. Other authors have written on this issue extensively (Varela, Shear, 2009; Wallace, 2000, 2009), thus I will pay more attention to other implications of integrative science.

3.2.2 Integration of knowledge: the source of creativity and insights

Creativity has allowed us unprecedented progress in science, art, medicine, engineering and other areas. Despite the fact that our civilization leans on it heavily, we still have only a limited understanding of its nature and mechanisms. In this sub-chapter, I will hypothesize that creativity originates in the unconscious layers of the psyche and how this has to do with integrative science.

How does the creative process proceed? Wallas (1926) describes it in a 4-step sequence, a model still accepted today:[5]

1. *Preparation* – the individual focuses their mind on the problem, explores the dimensions of the problem.
2. *Incubation* – the problem is internalized to the unconscious mind, externally nothing seems to be happening.
3. *Illumination* – the creative solution reaches conscious awareness, the person gets an insight.
4. *Verification* – the idea is tested, modified and applied into practice.

The crucial step is incubation, where the creative insight, a rearrangement of sorts seems to take place. This process is unconscious and there is no agreement as to what mechanism underlies it. Creative solutions arriving spontaneously after one has stopped paying conscious attention to the problem are a

[5] Originally, there was a third step – between incubation and illumination. This was called "intimation" – the "feeling" that a solution will emerge shortly. This step is not so crucial and is usually omitted when describing Wallas's theory, so I exclude it as well.

common experience, and research shows that incubation indeed works (Dodds et al., 2004; Sio, Ormerod, 2009).

But what is the mechanism behind incubation? Why do thoughts get "rearranged" in the unconscious in such a way, that a novel insight is formed? Some have argued that incubation is simply a forgetting of the misleading cues leading to freeing from functional fixation and opening the mind to creative solutions (Smith, 1995). However, it seems unlikely that this is the whole story behind creativity, as we will see. Let us review a few interesting findings which show that the creative process is closely connected to altered states of consciousness.

3.2.2.1 Dreams and creativity

There seems to be a link between creativity and dreams. Many famous discoveries were purportedly revealed in dreams. Examples include Descartes' scientific method, the sewing machine, the structure of benzene by Kekulé (Theodore, 2009), or the periodic table by Mendeleev (Kedrov, 1957) (for more examples, see Barrett, 1993). In all of these cases, scientists claimed that they gained the inspiration directly from their dreams.

An interesting example is the Indian mathematician Srinivasa Ramanujan, considered one of the mathematical geniuses of the 20th century. He continually claimed he had gained his insights and inspiration from a Hindu goddess and had seen in dreams scrolls with inscribed mathematical formulae, which he had confirmed upon awakening (PaperVeins Musem of Art, n. d.):

> "Srinivasa Ramanujan was one of India's greatest mathematical geniuses. He made substantial contributions to analytical theory of numbers and worked on elliptical functions, continued fractions, and infinite series. Despite the lack of a university education, he became known in the Madras area in 1911 after the publication of a brilliant paper on Bernoulli numbers in 1911. In 1914, he was invited in to Cambridge University by the English mathematician GH Hardy who recognized his unconventional genius. He worked there for five years producing startling results. According to Ramanujan inspiration and insight for his work came to him in his dreams. A Hindu goddess, named Namakkal, would appear and present mathematical formulae which he would verify after waking. Such dreams often repeated themselves and the connection with the dream world as a source for his work was constant throughout his life."

In this particular case it seems paradoxical that a highly rational, logical activity such as mathematics would take place when the conscious mind is mostly inactive. Among other things, it shows us how little we know about what human mind really is and how it works.

But these are anecdotal examples, and it may be pointed out that people are also creative during waking, self-aware consciousness. It is perhaps the most common case. Is there any scientific evidence that sleep *specifically* promotes creativity?

The fact that sleep, especially REM sleep (the phase during which dreams occur), fosters insights and creativity is generally accepted in today's science. During sleep, memory association and integration takes place, preparing the ground for "seeing the big picture" and solving problems creatively. In the article *Sleep inspires insight*, published in *Nature*, Wagner et al. (2004) conclude that "sleep, by restructuring new memory representations, facilitates extraction of explicit knowledge and insightful behavior". A study by Cai et al. (2009) found that "compared with quiet rest and non-REM sleep, REM enhances the integration of unassociated information for creative problem solving". A review of the literature by Walker states that "sleep serves a metalevel role in memory processing that moves far beyond the consolidation and strengthening of individual memories and, instead, aims to intelligently assimilate and generalize these details offline". All in all, scientific evidence supports the view that sleep enhances novel and creative thinking.

But how are these processes experienced in the first person? One side of it is provided by many anecdotal reports, some of which I have noted above (for more examples from history, see Barrett (1993); for recent cases, see Barrett (2010)). Patricia Garfield explored creativity in her own lucid dreams and wrote (Garfield, 1974, p. 199-200; quoted in Barrett, 1993): "Once your dream state has provided you with your own poem, or painting, or solution to a problem, you know. Ever after you will be able to seek inspiration and help from your dream state. Those who do not believe in dreams (…) have only nonsensical ones." The question is this: if processes enabling creativity are going on during sleep, could we make better use of them if we were more conscious in sleep? Of course, this might be a phenomenon happening only to certain people, and only in certain dreams. But how can we find out if we don't take any steps to actively explore it?

3.2.2.2 Forgotten insights

Another interesting phenomenon is *forgotten insights*. People sometimes report having experienced a profound kind of understanding in dreams, which mysteriously vanishes upon waking up. LaBerge

describes the aftermath of his transcendental lucid dream described in the previous chapter thus (LaBerge, 1985) (second emphasis added):

> "Upon awakening from this remarkable lucid dream, I reflected that it had been one of the most satisfying experiences of my life. It *felt* as if it were of profound significance. However, I was unable to say in exactly what way it was profound, nor was I able to evaluate its significance. When I tried to understand the words that had somehow contained the full significance of the experience—'I praise Thee, O Lord!'—I realized that, in contrast to my understanding while in the dream, I only now understood the phrase in the sense it would have in our realm. It seemed the esoteric sense that I comprehended while I dreamed was beyond my cloudy understanding while awake."

From my interviews with lucid dreamers, such cases are not uncommon. Experienced lucid dreamers can choose in their dreams that they want to "learn the truth about themselves", "about the nature of the world" (in the dream described by LaBerge, he intended to seek "the highest"). Afterwards, they are often lead to strange places such as ruined cities or underground catacombs, where they feel a strong revelation has been provided. Upon awakening, however, only an indefinite feeling remains that something had been learnt, but lost. I am not familiar with any research into this phenomenon, so these are just illustrative anecdotal reports which would need to be explored further.

Similar cases may occur within normal dreams or to people taking psychedelic substances. James has also reported like experiences in his experiments with nitrous oxide (James, 1882):

> "With me, as with every other person of whom I have heard, the keynote of the experience is the tremendously exiting sense of an intense metaphysical illumination. Truth lies open to the view in depth beneath depth of almost blinding evidence. The mind sees all logical relations of being with an apparent subtlety and instantaneity to which its normal consciousness offers no parallel; only as sobriety returns, the feeling of insight fades, and one is left staring vacantly at a few disjointed words and phrases…"

The favored interpretation within the current paradigm would probably be to claim that these "insights" are simply illusions produced by the altered state of the brain, and involve no real knowledge. An alternative explanation, however, is that there might be, at least in some cases, real knowledge behind, but because people are not properly trained, they are unable to understand it during waking

consciousness. This possibility is testable, but it would require exactly the kind of research that integrative science suggests: advancing the level of consciousness.

3.2.2.3 Psychedelics and creativity

Psychedelic substances have long been used to foster insights and higher revelations. The world *psychedelic* itself means "mind-revealing", and psychedelic state has traditionally been viewed as "an expanded state of consciousness in which latent psychological material can emerge into consciousness and novel associations can form" (Tagliazucchi et al., 2014).

Some research on psychedelics and creativity was done in the 1960s. Researchers have noted telling similarities between the creative process on the one hand and altered states of consciousness on the other, for example Barron (1963):

> "[Creative people] deliberately induce in themselves an altered state of consciousness in which the ordinary structures of experience are broken down. The ordinary world may thus be transcended (…) Certain aspects of the creative process, although by no means the creative process as a whole, are analogous to the kind of breaking up of perceptual constancies that is initiated mechanically by the ingestion of the drug."

A pilot experiment was conducted in 1966 (Harman et al., 1966). 27 male subjects of various occupations were given 200 mg of mescaline sulfate, producing a light psychedelic state. Three creativity tests were administered before the administration of mescaline and during the psychedelic state. On all of them, significant improvements in performance were found. Subjectively, the participants have reported an improved ability to see problems in broad terms, heightened visual imagination and fantasy, enhanced fluency of ideation, increased ability to concentrate, and better access to "unconscious data". At the end of the experiment, the participants "were driven home about 6 PM, with a sedative which they could take if difficulty in sleeping occurred. In many cases they preferred to stay up as late as 4 AM, working out insights discovered earlier in the day."

After the 1960s, there has been a significant pause in psychedelic research. Recent studies have shown phenomenological and neurological similarities between REM sleep/dream state, and psychedelic states (Carhart-Harris, Nutt, 2014). Thus, similar creative processes may be taking place. According to one fMRI study (Petri et al., 2014), intravenous infusion of psilocybin dramatically changes the interaction patterns between various brain regions, and information changes take place between areas

which usually do not communicate. A more interconnected brain can provide potential for heightened creativity. Another (Tagliazucchi et al., 2014) found that the activity of brain areas involved in emotion and memory, such as hippocampus and the anterior cingulate cortex, becomes more synchronized, and produces a state similar to the one found in REM sleep.

3.2.2.4 Summary

To sum up, we don't know how creativity works and what is its source. Several lines of evidence – spontaneous, subconscious nature of insights and creativity and insights in dreams and under the influence of psychedelic substances – seem to indicate that the sources of our creativity may lie in the unconscious and altered states of consciousness, where unconscious content seems to enter consciousness more directly.

Integrative science could help us answer the question of the origin of creativity. It would allow us to explore layers of the unconscious and altered states of consciousness, but it requires that we are able to retain a lucid, self-aware critical consciousness in these states to fully make use of them, and be able to transfer these insights to normal states of consciousness. If creativity were shown to reside in these unconscious processes, we could, in turn, use such gained insights to make our third-person enquiry more effective and gain a holistic view of science.

3.2.3 The big questions and mysticism

3.2.3.1 The nature of mysticism

The term "mystical experiences" has many definitions (Vörös, 2013a). Here, I will view them in a very general sense: an intense experience of something divine, absolute or transcendental (for more detailed discussion of various conceptions and their implications, see Vörös (2013b)).

According to the prevailing scientific paradigm, it is hard to classify mystical experiences. Little attention is paid to them within mainstream science (see psychology textbooks: Hartlová, Hartl, 2000; Atkinson, 2007; Kassin, 2012). In the more moderate case, they are described as a specific type of emotions and thoughts, but their origin, meaning and link to other emotions, thoughts and personality is unclear. In the most radical case, they are considered to be a symptom of mental illness or linked to it. For example, Murray et. al. (2012) argue that Jesus had symptoms of paranoid schizophrenia and bipolar or schizoaffective disorders, and similar observations are made of Abraham, Moses and St. Paul.

Neither of these interpretations is satisfactory. The first because it shows that we don't really understand a crucial component of our human condition. The second claims that one of the cornerstones of human culture – centuries of inspiration in art, literature, philosophy, statesmanship – is based on the ravings of madmen. While this is, indeed, possible, a less extreme explanation, if it would sit well without scientific view of the world, would seem more in place.

Could the method of integrative science, described above, help clarify the nature of mysticism? Let's first note the observation of Grof (2012, p. 226):

> "Spiritual experiences, as any other aspect of reality, are amenable to systematic and unbiased scientific research. There is nothing unscientific about an open-minded and rigorous study of these phenomena and the challenge they present for the materialist worldview. Only such an approach can provide the answer to the fundamental question of the ontological status of mystical experiences: do they reveal the truth about certain basic aspects of reality, as *perennial philosophy* understands them, or are they a product of superstition, fantasy or mental illness, as contemporary materialist science views it? "

Mystical experiences are definitely altered states of consciousness. As we have mentioned above, one of the basic ideas of integrative science is to develop the ability of critical, lucid thinking in altered states of consciousness. By developing this ability, integrative scientists might perhaps directly experience mystical phenomena, while retaining their critical faculties and waking memory, and explore these states first-hand, even experiment with them. Of course, these observations could be verified by others who have achieved the same reaches of conscious development (see the section on objectivity below).

An obstacle in the scientific exploration of mystical experiences seems to be their ineffability. Descriptions of mystical states are notoriously vague and incomprehensible. Consider the description of "the experience of the Absolute" by Grof (2012, p. 323):

> "Those who have shared their experience of this ultimate knowledge are surprisingly in agreement with each other in their descriptions. They bear witness that the experience of the highest principle includes the transgression of all known boundaries of analytical thinking, categories of reason and all limitations which are imposed on us by the requirements of

> common logic. This experience is not restricted by any usual categories of three-dimensional space and linear time as we know them from ordinary life. Also, all conceivable polarities are included in it in an indivisible unity, and thus transcend all possible dualities."

To many, this is proof that mystical experiences are absurd and nonsensical. But can this apparent incomprehensibility be a result of not having had the appropriate experiences, and thus not being able to understand them? Consider this testimony of a congenitally blind man about colors (Edison, 2012):

> "Color. How does it work for me? What is it? I don't know. Being blind since birth, I have never seen color, I don't have any concept of what it is. I have never seen anything. There is this whole part of vocabulary, of language, that doesn't mean anything to me. Over the years, people have tried and tried and tried to explain color to me and I just don't understand it. (…) Blue – the water is blue, cold or ice is blue, the sky is blue. Now, how can the sky and ice be the same thing? That's weird to me. (…) The same color means two completely different things. I don't get it. "

In a similar fashion, imagine explaining to somebody who has never experienced taste what sour, sweet or bitter means. Or, to somebody who has never experienced love, or any similar emotion, what deeply caring for somebody means. In other words, certain types of experiences – whether we call them comprehension, insights or revelations – may be crucial in our understanding of certain phenomena. Since mainstream science has not dealt with mysticism very much, there is no clear apparatus for describing and studying it, no method, and scientists, not familiar with experiencing mystical states themselves, simply don't understand them.

Let us now take a small turn: as certain experiences enable us to understand the concept of color, are there experiences that would enable us to understand answers to the big questions? And could this knowledge be applied in practical life?

3.2.3.2 The big questions

Closely associated with mysticism are what might be termed the "big questions": Why does the world exist? Is there a purpose to human existence? Who are we? Where are we headed to? As we have already noted, the current paradigm lacks the conceptual framework suitable for tackling these questions. How can the origin of the universe, the existence of consciousness, or the nature of reality be explained in terms of matter, which is purposeless, and driven by mechanical forces or stochastic

processes? It is very likely it can't. In moral and aesthetic issues, relativism is inescapable within the paradigm. No wonder these questions are often termed unanswerable of even meaningless.

Could integrative science make a difference here? Previously, we have noted that the understanding of certain concepts may be dependent on having certain experiences: for example, we cannot understand the concept of color if we have never seen it. Now, let's add another layer: the ability of the subject to *understand* is largely determined by their mental faculties.[6] For example, certain kinds of understanding are unavailable to children, because their cognitive abilities are at the stage of what developmental psychologists call concrete operations. Their abilities of conscious understanding are limited, thus they cannot understand some highly abstract concepts, such as calculus or nuclear physics. The knowledge itself is objective, and exerts influence on them, but they lack the mental capabilities to grasp it. In order to acquire this knowledge the a child has to reach the next stage of development – the stage of formal operations (Torres, Ash, 2007).

Similarly, it is possible that some kinds of understanding are unavailable at the stage of formal operations, currently considered the highest stage of cognitive development (although, of course, also within this stage, cognitive capacities vary widely). It might be necessary to reach a yet higher stage of development to gain further insights and a qualitatively different level of understanding.

Scholars in transpersonal studies have noted that the stage of formal operations and the type of understanding that goes with it might be an evolutionary step, not the final stage, and higher levels of development, providing more holistic understandings are or will be reachable. These levels of consciousness are called transpersonal, transrational or postformal (Washburn, 1995; Wilber, 1995), indicating that they transcend, but in some way include, the rational, formal operations today considered the pinnacle of human thought (Torres, Ash, 2007). While predispositions for reaching these levels of consciousness differ vastly, for most people a sustained effort at developing them is required.

Is the transrational stage of consciousness a myth, or does it really exist? Does it provide a qualitatively new type of understanding, such as formal operations allow us when compared to concrete operations? Integrative science could help us solve this question. If researchers would work on transforming their consciousness, they could independently verify these claims and compare them intersubjectively.

[6] This contention may be put into question by some. I will not argue for it here, but hope to do so in a future, more detailed work.

An example is provided by Wilber and Walsh (2000). They enumerate some key concepts of Plotinus' philosophy, based on his mystical experiences, such "the Absolute One", "Nous", "World Soul", and argue that they seem unintelligible to modern science, entrenched in the stage of formal operations, because they don't match with anything that can be experienced in normal states of consciousness. Therefore, the advancement of one's consciousness to higher states (which they call causal, postformal or nondual) is necessary in order to understand these concepts (Wilber & Walsh, 2000, p. 320, emphasis added):

> "…if you have not transformed to (or at least strongly glimpsed) the causal and nondual realms (transpersonal and postformal), you will not be able to see the referents of most of Plotinus's sentences, or those of other transpersonal philosophies. They will make no sense to you. You will think Plotinus is 'seeing things' – and he is, *and so could you and I, if we both transform to these postformal worldspaces*, whereupon the referents of Plotinus's sentences, referents that exists in the causal and nondual worldspaces, become plain as day."

There is no reason why the big questions should be, in principle, incomprehensible or unanswerable. It is of course possible we will never be able to grasp them. But this question should be answered by research, not *a priori* assumptions. Integrative science provides us the basic framework and method to do this.

3.3 Objectivity

An important question is: having spoken about issues ranging from consciousness and dreaming to mysticism and the origin of the world, can the acquisition of such knowledge be called "objective"? I will deal with this question here only shortly. I am well aware of the fact that it is a complex issue, one that would deserve a detailed treatment. I hope to do so in a future work; here, I will outline three basic points.

First, an important method of integrative science is to develop self-aware, lucid consciousness to a greater extent than people usually have. This state of consciousness is crucial for the ability to conduct experiments, systematic acquisition of data and their critical examination. Thus, it provides a *more*, not less, objective approach to studying certain phenomena of consciousness in comparison with anything we have today.

Second, all observations gathered by the above mentioned ability can be verified intersubjectively by people who have acquired the necessary mental skills, from waking consciousness to the deepest mystical states. Wilber and Walsh thus speak about "a 'mysticism' thoroughly grounded in genuine experience and verifiable by all those who have successfully followed the requisite set of conscious experiments, injunctions and exemplars" (Wilber, Walsh, 2000, p. 314). By comparing the observations of different researchers under different and systematically varied conditions, it is possible to separate what is subjective, and what is objective (at least in the sense of being intersubjective).

This is analogical with sensory experience – which, at its core, is also a first-person experience. We know it is not 100 % reliable. Visual illusions, top-down distortions and hallucinations exist, but by systematic examination and intersubjective comparison, we are able to extract a basis largely independent of the individual observer.

As Wilber and Walsh (2000, p. 324) write, a complex understanding of consciousness in all its levels "demands that, at some point, researchers interested in these levels and their implications must transform their own consciousness in order to be adequate to the evidence. This is not a loss of objectivity but rather the prerequisite for data accumulation, just as we do not say that learning to use a microscope is the loss of one's objectivity – it is simply the learning of the injunctive strand".

Third, the observations and insights gained in altered states of consciousness can in many cases be verified or falsified by rigorous third-person methods. We mentioned several cases of insights occurring in dreams which were later verified upon awakening (Ramanujan's mathematical formulas, Mendeleev's periodic table, etc.). And these were cases of people who did not systematically work on advancing their level of consciousness. If we were to systematically devote to studying the above mentioned method and its results, the cooperation between the first- and third-person approaches could become even more fruitful.

3.4 The role of cognitive science and similar approaches

Cognitive science has good prerequisites to become a platform for the establishment and growth of integrative science. It is a relatively recent field situated amidst many disciplines: philosophy, psychology, neuroscience, artificial intelligence, anthropology, linguistics, to name the most prominent ones. Various approaches, first-person and third-person, qualitative and quantitative, humanistic and

naturalistic are forced to cooperate closely. Any side is unlikely to get the complete picture alone, and all could benefit greatly from a general framework of integrative science.

In fact, some of the founders of cognitive science have been strong proponents of uniting the first- and third-person approaches. The most well known among them is probably Francisco Varela, who said that "consciousness has the potential to do a major revolution in what science is all about" (Varela, 2012). Together with Jonathan Shear, he edited the seminal book *A View from Within* dealing with the idea of uniting first- and third-person approaches (Varela, Shear, 1999). Basically, Varela's approach has the following main points:

- first-person experience is a valid realm of inquiry, which we need to explore to understand consciousness and reality;
- we need new, specific methods of studying first-person experience;
- researchers should focus on cultivating some mental disciplines which will enable them to study first-person experience more effectively.

Other researchers have explored the realms of mystical experiences more openly. Emil Páleš is a Slovak scholar who began his career in artificial intelligence, but has since broadened his scope to encompass the study mysticism, altered states of consciousness, and finding a holistic conceptionof science. He has voiced suggestions of an integrative science, which he calls sophiology, based on gaining insights by a heightened sense of introspection, very similar to the concept presented in this work (Páleš, 2012; Páleš, 2015).

Grof, a Czech psychiatrist and transpersonal researcher, while he does not directly speak of integrative science, provides a framework for research consistent with it (Grof, 2012, p. 77-78, p. 82; emphasis added):

> "[E]verything that we can experience in our normal state of consciousness as an *object*, has in holotropic states of consciousness a corresponding *subjective* aspect. It is as if everything in the universe had an objective as well as a subjective side… (…) The aforementioned observations indicate that we can gain access to information about the cosmos in two different ways. Apart from the conventional observations based on sensory experience and subsequent analysis and synthesis of data in the brain, a radical alternative exists – the exploring of certain aspects of the world by *directly identifying with them* in holotropic states of consciousness."

The concept of integrative science described in this work is very broad and generally could encompass all of the above mentioned approaches, which share an important core: a rigorous study of first-person experience is needed to have a comprehensive picture of the world; to rigorously study first-person experience, the training of certain mental faculties is necessary. In the future, I would like to describe the method and compare it with existing approaches in more detail.

3.5 Summary

The current paradigm faces challenges mainly in three areas: it has a limited understanding of conscious phenomena; it has no comprehensive method of integrating knowledge into a holistic view; it has no conceptual means to deal with the big questions, such as why is there something instead of nothing or why does consciousness exist. However, it is not enough to simply point out these deficiencies; a comprehensive, consistent and testable alternative should be put forward instead.

A new method of exploring first-person experience could fulfill this role. The core of this method is advancing the level of one's consciousness: heightening conscious awareness of inner phenomena and developing the ability to retain lucid, critical self-awareness in altered states of consciousness, such as lucid dreaming and further. Such a state of consciousness is required for a scientific examination of certain states of consciousness, enabling systematic observations and experiments to be conducted.

In the realm of conscious phenomena, this method would enable us to gather more structured data about the experiential aspects of conscious phenomena, which in turn might help us better describe and predict them. Regarding the question of how to integrate data, this method could help us gain genuine holistic insights. Research indicates that altered states of consciousness (dreams, psychedelic states, etc.) tend to foster insights and reveal the "big picture view". These insights can, in turn, be verified by the third-person methods. If we were more lucid in altered states of consciousness, we could explore these processes more directly, and use them more effectively.

Finally, by advancing our level of consciousness, we could explore mystical experiences. It has long been noted by mystics that these experiences provide a qualitatively different type of knowledge compared to normal states of consciousness: knowledge giving answers to the aforementioned big questions. While descriptions of mystical experiences are often considered incomprehensible and unscientific, it is so perhaps because scientists usually do not have these experiences, and thus don't understand them. A serious and systematic study of mystical experiences could clear this thorny issue,

and the proposed method offers a comprehensive framework to do so. This could provide a solution to the third problem and help us find answers to the big questions.

All observations acquired by the method of advancing our current level of consciousness could be verified intersubjectively by people who have followed this training, and in many cases the insights could be confirmed by third-person research methods. Thus, the objectivity of the method would be analogous to objectivity provided by sensory experience. A unification of this method with the third-person research methods would form a basis of integrative science, providing a deeper understanding of ourselves, the world and nature than is offered by the present paradigm.

Conclusion

My thesis is about the nature of science: its scope, limitations, possibilities, and our role in it. The central idea is that current science has certain limitations which can be overcome by cultivating a new research method, based on advancing our level of consciousness. This transformation could provide us with insights we could verify in third-person research. This unification would provide a basis of integrative science, which could help us better understand ourselves, the nature and the world.

I began with the observation that contemporary science is predominantly set within a certain paradigm. This paradigm teaches that everything is essentially material and governed by deterministic or random, stochastic, interactions; there are no purposes that would not be reducible to them. While not all research is carried out strictly within this paradigm, it is the most influential in terms of impact on society, education and future development of science itself.

This paradigm has many advantages for studying material phenomena. It has achieved big successes in the fields of engineering, computing, medicine, and others. On the other hand, it has a number of notable shortcomings. First, it has a limited understanding of conscious phenomena. We can predict them only partially by material means and we are very far from providing a comprehensive account of them. Second, it produces a large number of concrete, technical data and specific findings, but provides little guidance in how to integrate them. Third, it cannot grasp and tackle the "big questions" – the very basic questions about the nature of the world and humanity, such as why is there something and not nothing and what is the purpose of human existence. Such questions cannot be answered in terms of matter, which is purposeless, and driven by mechanical forces or stochastic processes. Thus, some questions seem unlikely to be solved within the current paradigm, and some are impossible to be answered within it.

A complement to the current paradigm that could help solve these issues is a new method of first-person inquiry, based on advancing one's level of consciousness. This means developing the ability to retain a lucid, self-aware, critical consciousness in various altered states of consciousness (e. g. lucid dreaming). This method would help us learn more about conscious phenomena – simply by collecting more data on them, and enabling us to better experiment with them and do more systematic observations.

Moreover, the proposed method could give us far more fundamental knowledge. From our current research on creativity and insights, although these processes are not well understood, they are very likely to be enhanced in altered states of consciousness (dreams, psychedelic states, etc.). By advancing our level of consciousness, we could be more self-aware in these states, and enter them willfully to a greater extent. By this, we could acquire holistic insights that could help us integrate our partial approaches in sciences such as psychology, sociology or cognitive science. By advancing our consciousness, we could also systematically and critically observe mystical and spiritual experiences which purportedly provide insights into the big questions.

All observations acquired by the method of advancing our level of consciousness could be verified intersubjectively by people who have followed this training, and in many cases the insights could be confirmed by third-person research methods. Thus, the objectivity of the method would be analogous to the objectivity sensory experience provides.

Whether we decide to follow this path in science is ultimately our decision. All the experiences spoken of above – lucid dreaming, mystical and spiritual experiences – are *real* experiences, accessible to the human mind. Only by a systematic observation and examination of them can we find out if they provide real knowledge, or are just figments of the psyche, with no objective validity. But this research requires us to advance our level of consciousness to be able to examine these states directly. In the words of Ken Wilber: "If we do not do this, then we will not know this. We will be the Churchmen refusing Galileo's injunction: look through this telescope and tell me what you see."

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