

Francisco Varela and *The Gesture of Awareness*: a new direction in cognitive science and its relevance to the Alexander Technique^{*}

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Abstract

This paper converts the Oxford participatory lecture (2004) into a participatory reading experience which respects the psychophysical difficulties often encountered in reading or listening to theoretical discussions. This participatory process will have three components: psychophysical basic practice, intellectual experimentation, and social interaction. In particular, I am interested in finding a way to integrate intellectual concepts into an easily liveable experience. The act of reading will emphasize the problem of integrating language (the main intellectual tool we use for organizing our thinking experience) and our ongoing practice of the Alexander Technique.

I will show the relationship between the Alexander Technique and modern theories of consciousness. I hope that you will find, as I do, that something special is afoot, something very similar to the climate in which philosophers and scientists attempted to validate Alexander's work during the first half of the twentieth century.

1. Introduction

In the 1990s a highly respected neuroscientist, the late Francisco Varela, began to respond to an impasse in the field of cognitive science. He insisted that laboratory science had to develop methods for experimenting with and validating *awareness* of our *lived experience*, for without it we would never successfully create a full definition of *consciousness*. The simple word 'experience', which we use so often, divides modern science, as it has done since the seventeenth century.

In 1991 Francisco Varela and his colleagues wrote a courageous book entitled *The Embodied Mind: Cognitive Science and Human Experience*.¹ In 1996 Varela developed a new combination of Husserl's phenomenological philosophy (see Section 3, 'Consciousness: philosophy and psychology') and the experimental requirements of laboratory neuroscience, which he called *Neurophenomenology*.² In 1996 he and his French colleagues adapted Husserl's concept of '*epochè*' (stopping the flow of habitual thoughts and belief structures long enough to perceive the phenomena of the present moment.) to provide a three step formula for becoming consciously aware: *suspension, redirection, and letting go*.³

In Varela's 'Introduction' to *The View from Within*, of which he is a co-editor, he states, 'Our view is that the field of consciousness studies and cognitive neuroscience has been far too much under the influence of one particular style of philosophy of mind, cut off from other traditions that have made their specialty the methodological exploration of human experience.'⁴ Chapter 1, entitled 'Introspection', presents Carl Ginsburg's essay 'Body-image, Movement, and Consciousness,' which includes F. M. Alexander as one of the 'primary thinker-explorers of the twentieth century who were interested in finding practical ways to further human development.'⁵

^{*} This document is an updated version of a paper that will appear in the proceedings of the 7th International Congress of the F. M. Alexander Technique which took place at Oxford University, UK, August 2004.

Beyond clarifying the coincidence of Varela's three-step formula and what we recognize as familiar Alexander terminology, I would like to suggest that this new development presents an opportunity to us, as Alexander teachers, and that we may have a responsibility to meet these innovative scientists halfway. For those teachers interested in this path, the job remains to integrate skilful intellectual thinking into our Alexander practice. Our commitment must be to maintain an *embodied mind* no matter how challenging the information may be. I have organized this task into the following sections.

Section 2, 'Psychophysical basic practice' is a five-minute awareness exercise which will align our intellectual mind with the autonomic nervous system, thereby establishing the simplest form of mind-body association. My assumption is that we must achieve a balance between anxiety and relaxation as the foundation for any more sophisticated intellectual endeavours including Alexander *awareness, inhibition, direction, and giving consent*. It is the bare bones of organic congruence.

Section 3, 'Intellectual experimentation' will begin with a formula for approaching intellectual concepts while maintaining psychophysical balance. To this end, I have borrowed a phrase, 'I-Thou' from the philosopher Martin Buber,⁶ which simply means a sacred and respectfully engaged relationship. I shall use it in two senses, to establish an 'I-Thou' relationship

- a) between your intellect and your autonomic nervous system and
- b) between your sense of well-being and the participatory process of this conference paper.

I also suggest that we follow a key principle from Georgi Lazanov's *Accelerated Learning*⁷, which maintains that the human mind retains more intellectual material if it is permitted to *stop* every 20 minutes and *do nothing* for only two minutes. Alexander practice teaches us to *non-do* more frequently, and I will introduce a reminder throughout this paper within a cloud-like symbol of the parasympathetic nervous system which will also invite you to clarify your awareness, inhibition and direction:



We will then explore the relationship between intellectual disciplines and the Alexander Technique as we gently touch upon the following themes:

- **anatomy:** psychophysical congruence and the autonomic nervous system
- **philosophy:** an introduction to 'the deep trouble' of Western philosophy/science: *the mind-body problem vs. body--mind dissociation*
- **history:** a brief overview of 'consciousness' research in 1900 and 2000
- **cognitive science:** the implications of this newly created multi-disciplinary field
- **the remaining hard problem:** The reduction of conscious experience to a suitable model for laboratory research. A comparison of the methods of Francisco Varela and F. Matthias Alexander and their relevance to both Alexander teachers and cognitive scientists.

I will be adding these extra text boxes which offer you added instructions, comments on an exercise, clarification of a meaning, or a more in-depth view of a subject. Here is an example.

Perspective: If any of these intellectual themes are not of interest to you, skip on to another section which may spontaneously attract your attention. I have tried to design each section to stand sure-footedly on its own. Trust your own native curiosity.

In **Section 4, 'Social interaction'**, I will include ideas, objections, and suggestions that arose during the Oxford conference as we discussed the potential of including a module of cognitive science as a part of teacher training or postgraduate training. It is also an invitation for you to join in with your written response.



WELCOME BACK

2. Psychophysical basic practice

In *non-doing* we are immediately confronted with the fluid architecture of the Autonomic Nervous System (ANS) as well as the conscious and unconscious habits that often interfere with our voluntary intentions to *inhibit doing*. How this system operates, how it takes us by surprise, how it manifests our embarrassment, how it can leave us helpless in the face of performance anxiety, is the humbling mystery of another sort of *self*. In order to clear up this mystery, we must weather the discomfort of deliberately slowing our intellectual processing to a more organically congruent pace. More simply put, we must choose to realign our intellectual mind with the body, its organic host. Let us approach this process in a user-friendly way.

The aim of this exercise is to provide a lived experience of accessing the ANS in the most direct way we can: to observe a spontaneous exhalation. We are not to intrude upon our exhalation. When we are comfortably aware of this autonomic process, we will simply enlist one of the most extraordinary *thought experiments* that humans ever invented: the number. We will use four of them in our exercise.

Let us begin. While we are observing the existence of our next spontaneous exhalation we will attach the number **1**. As we continue in good relations with our breathing, we will attach the number **2** to the next exhalation ... and the next one with the number **3** and the next one that comes through easily will be the number **4**.

And now we will add another level of complexity by returning to the number **1** with the next exhalation and continuing to **4**.

Please experiment with this practice for five minutes and return here when you are ready.

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Perspective: You may have noticed some changes as you participated in this basic practice. Though words may not be sufficient to describe these potential changes, I will try to clarify the ones I am aware of. It is possible that when you first started counting, you experienced your exhalation as a physical movement and your numbering as a somewhat distant voice. As you continued the exercise, you might experience a spontaneous *sigh*; you might begin to feel the numbers as less analytic and more intimate thoughts. You might even begin to experience your mind as if it entered into the centre of your breath and that the numbering seemed to emanate from within the exhalation. You may have experienced any amount of variations of this sort of thing. I bring this to your attention because it is the simplest way to recognize *mind–body dissociation* as well as *re-association* which you will soon be reading about.

We have now focused the conscious mind in a *user-friendly* way on the ANS; we have added sophisticated intellectual tasks beginning with whole numbers, followed by more complicated concepts of sequence and cycle. These tasks act as basic *intellectual molecules*. If we cannot carry out this simple exercise, we are not likely to remain psychophysically congruent with any higher order of intellectual endeavour. Therefore, this is not a trivial exercise. In fact, it is the starting point of many high performance disciplines.

As Alexander teachers, we are versed in anatomy and understand how *awareness*, *inhibition*, and *direction* can improve our *use of self*. Yet, it is still possible for us to overlook or underestimate the subtle aspects of the ANS during the business of conscious voluntary movement and certainly during intellectual activity.

In F. M. Alexander’s research a key moment arrived when, having recognized his pattern of head–neck *shortening*, he could not get it to change by imposing a correction. Eventually he arrived at a revolutionary idea, that the problem he was trying to solve was generated by an incorrect mental attitude that was incapable of correction in its present state. In the early 1890s he was faced with a body–mind dilemma, an experience which today we recognize as a confrontation between a homeostatically maintained habit and a mental attitude that assumed he ought to be able to control any aspect of his behaviour. The revelation on which all his other discoveries were built was that he had to eliminate a mental attitude that was the cause of the problem rather than doing something more.

If change is perceived as a threat to the norm it will trigger the organic system’s survival/defense response. So, it follows that a bad idea or even a good idea will not be acceptable unless it has passed through a ‘friend-or-foe’ filter. The user-friendly protocol for entering efficient requests for change in the ANS seems always to include a form of *non-doing*. The obstacles to this protocol present themselves almost immediately when you ‘stop,’ as Alexander says you must, and experience the chatter of thoughts and the residue of muscular tension still going on.

Perspective 1: This non-intrusive approach was a radically new idea in the 1800s and is still a revelation in the twenty-first century. In 1900 a rather military mind-*over*-matter attitude was the usual method of imposing new physical or mental behaviours. The body was seen as the unruly object to discipline. F. M. Alexander was, as far as I know, the first person in the West to discover a technique of *non-intrusive pattern disruption* and re-education of habitual behaviour. That he was able to make his discoveries amidst his culture’s prejudices and to transmit them to his trainees was itself a miracle of inhibition.

Perspective 2: *Homeostasis*⁸ is a concept coined by Walter Cannon in the 1930s which identifies an organic systemic phenomenon: the body’s fundamental ability to maintain a biochemical norm. It has since been used to explain the transdisciplinary nature of embedded patterns to resist change, whether speaking of biology or organizational management. *Fight or Flight*⁹ was also coined by Cannon (1929).

Perspective 3: ‘Homeostasis is not to be *overcome*. It must be *negotiated*’ (Humberto Maturana).¹⁰

Perspective 4: Alexander’s ‘non-doing’ and his use of words like ‘allow’ and ‘let’ were exactly the conscious protocols necessary to negotiate the inherent resistance from a mind–body educated to speak harshly to itself.

It is in their similarity of methodology that the Alexander Technique, high-performance training like Stanislavski’s *An Actor Prepares*,¹¹ and even *Zen*¹² meditation practice all share a key negotiating strategy for neutralizing and correcting inappropriate mental attitudes: *non-doing*.



WELCOME BACK

3. Intellectual experimentation

As we approach the intellectual components, I invite you to begin with the I–Thou practice of simply seeing this page for a moment and returning to take care of yourself for a moment...continuing moment to moment directing attention outward and inward ...stopping only to improve your psychophysical comfort or to *do nothing*. You may even wish to experiment with your exhalation as an ‘I’ or a ‘Thou’. You can do the same with your eyes: seeing the page and shifting your focus to the background of your room beyond the page; seeing the page and shifting to the foreground of your chest. You can notice your head–neck relationship as you feel your sit-bones balancing your weight on a chair. At an intellectual level, you can do the same by noticing, as you read, which phrases tend to distract you from taking care of yourself and which actually assist you.

3.1. Psychophysical congruence and the Autonomic Nervous System (ANS)

We can approach the nervous system by first dividing it into its *voluntary use* and its *autonomic use*. The voluntary use occurs when you wish to turn the page, shift your weight, sit, stand, or put this paper down – all the while recalling that your neck might be freer and your head might enjoy remembering that gravity is a stimulus similar to scratching the head of a cat. The cat *uses* gravity and your hand to educate its nervous system to degrees of pleasure. On the other hand, the autonomic use of the nervous system determines whether a stimulus activates simple pleasure skills or survival strategies.

Perspective: There is only one human nervous system and it has three levels of communication. We will be looking at a simplified version that explains the logical positioning of the *autonomic nervous system*.

The first level consists of two parts: *the central nervous system* and *the peripheral nervous system*. The wording is misleading since it leaves the false impression that there is more than one nervous system. What is called *central* occurs in the brain and spinal cord, from which the *peripheral nerves* emanate and communicate with all the other parts of the body.

The second main level, the *peripheral communication* system, consists of the *somatic* and the *autonomic*.

The third level, the *autonomic* (ANS), is divided into the *sympathetic* and *parasympathetic* systems. The ANS will be our anatomical reference point during this participatory conference paper.

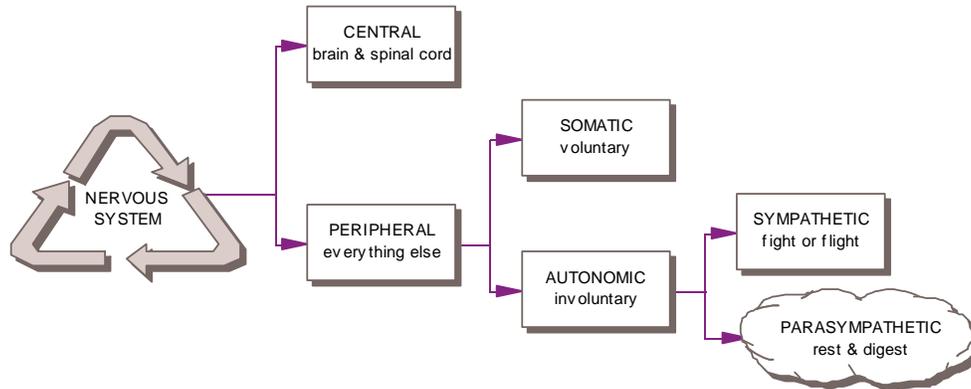


Figure 1: The nervous system

One of the most interesting questions is how the decision is made that determines whether the ANS will *rest and digest* in the *parasympathetic* state or whether it will sound the alarm for a full-fledged *fight-or-flight* response in the *sympathetic* state. Another good question considers how the ANS relates to the ‘readiness potential’¹³ that Walter Carrington and Benjamin Libet draw to our attention.

The sympathetic nervous system is a crisis manager which takes us back into the high performance of animal-reaction time: the sort of precision that animals have while either being hunted or doing the hunting. The conscious mind is reduced to the present moment, excluding all extraneous information. There is a third possibility as well, that of emotional paralysis, as experienced by a deer caught in the headlights, which occurs when the animal cannot decide between fight or flight. It is actually a psychophysical state of trauma which is best explained by Gregory Bateson’s ‘double bind theory’,¹⁴ which will be presented later in Section 2.

Two hormonal reactions occur in this process: a very small structure in the brain stem, the *locus coeruleus*, is made up of three thousand neurons which, quite uniquely, communicate with one-third to one-half of the tissues of the brain. It is responsible for the release of *nora-adrenaline* (nora epinephrine), which alerts organs to enter a high-performance state of readiness within moments and the adrenal glands to release *adrenaline* (epinephrine), which speeds up the heart. Muscles are tensed, profuse sweating or goosebumps can appear, blood vessels are constricted, and very often time distortion (of the sort experienced under amphetamines) permits a heightened awareness of survival choices.

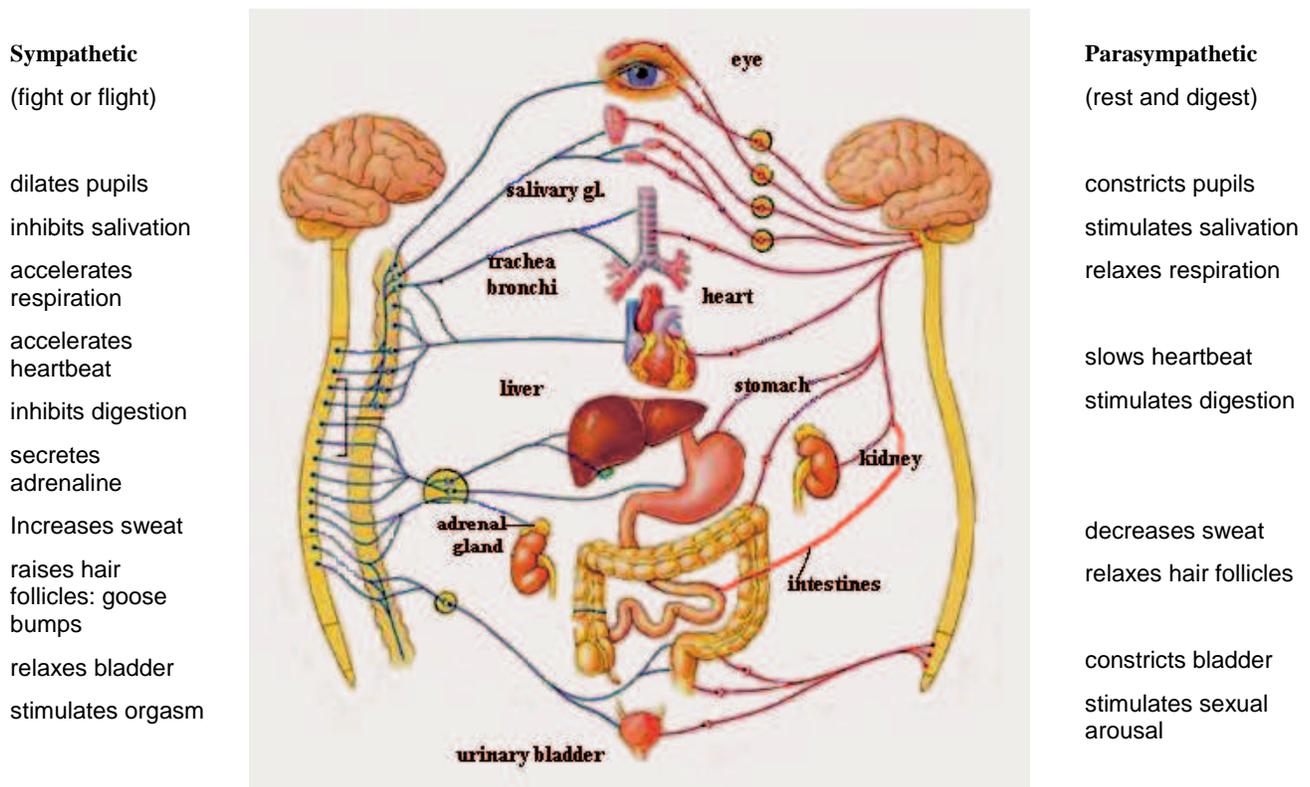


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Fortunately the wisdom of the body has provided an opposing and self-healing system within *the rest-and-digest* branch of the ANS, the *parasympathetic*. This branch is responsible for growth hormones, energy storage, restorative sleep, as well as subtle states of awareness necessary for fine psychophysical tuning, daydreaming, and other modes of creative and intuitive thought. After the need for crisis behaviour is past, the parasympathetic branch recalibrates the entire nervous system by slowing the heartbeat, decontracting blood vessels, and eliminating the residues of crisis: adrenaline and lactic acid.

Looking more closely at the ANS, we see that the survival fight-or-flight state is driven by a chain reaction of *sympathetic* nerves emanating from the thoracic region all the way to the lumbar region of the spinal cord. The rest-and-digest state, on the other hand, is induced by the *parasympathetic* nerve fibres which originate above the spinal cord in the midbrain, medulla, and pons (exiting through the vagus nerve), and also from the sacral region of the lower spinal column. The switch to a sympathetic dominance of the nervous system is triggered during emergencies or imagined emergencies.

Figure 2: The autonomic nervous system: sympathetic vs. parasympathetic



The dynamic balance of these two uses of the autonomic nervous system is a constant challenge for humans who live in a civilization that insists on quantitative production rather than qualitative performance process. The following is a perfect description of a psychophysical pathology that haunts every one of us if we approach intellectual endeavours with an end-gaining performance anxiety.

Perspective: ‘When people are ruled by their sympathetic nervous systems, life slowly becomes more and more uncomfortable. It is imperceptible at first because all they are aware of is the hardship and the oppressive situation or the thrill or the adrenaline rush. Over time as the sympathetic has the perpetual upper hand, it will slowly become more and more difficult to relax and give in to the parasympathetic. Once caught in this vicious circle, sleep and appetite become affected. Alcohol and other kinds of suppressants may be sought in a vain attempt to give the sufferer an imitation of what their own parasympathetic is waiting to give them. Later on backache, migraine, repetitive strain or ulcers...These are all signs that the switch to the sympathetic nervous system has become stuck.’ (R. Sands 2002)¹⁵



WELCOME BACK

Perspective: My goal here is to help you accomplish an intellectual learning without ever losing the underlying psychophysical congruence. At any time while you are reading, remember, you can close your eyes; you can choose your state of being congruent as more important than the best or worst idea in the world. You can actually *stop*. I invite you to stop. There is no information here that is more important than your breath ... more important than your quality of life ... absolutely nothing. This page will wait for *you*.

3.II. The Deep Trouble: the mind–body problem vs. body–mind dissociation

The phrase ‘The Deep Trouble’ is used in philosophy to identify a flawed fundamental belief which, once discovered, forces scientists and philosophers to rethink all their assumptions. It is the sort of thing that makes a paradigm shift. I have chosen one of the oldest unresolved classical troubles, which is called the *mind–body problem*, and contrasted it with the dilemma we often face as Alexander teachers when dealing with what is now recognized by psychology as *body–mind dissociation*.

The *mind–body problem* is usually attributed to the writings of René Descartes in the seventeenth century, though strains of this problem can be traced back to the early Greek philosophers. In 1623 Descartes decided to embark upon an experiment as challenging as Alexander’s. They each came to the conclusion that they lacked proper methods to solve their problems and that this was because they were operating on flawed beliefs that they had simply accepted as *reality*. Descartes dared to put all that he knew in doubt and even went so far as to question his own existence.

His conclusion ‘I think therefore I am’ is probably familiar to most of you. His process for reaching this conclusion, which you can find in his very accessible *Discourse on Method* or his *Meditations*,¹⁶ is very likely to remind you of Alexander’s description of his early experimentation with self-observation. The difference was that Alexander used a mirror to reflect upon his *use* and Descartes used introspection to reflect upon his *existence*.

Their results were quite different: Descartes decided that *mind* was not physical, and Alexander believed that such mind–body separation was exactly the erroneous preconceived idea¹⁷ that destroyed psychophysical unity and retarded human potential. Descartes’ conclusions have influenced and defined the limits of intellectual practice in Western civilization during the last three centuries. Today, most scientists and philosophers recognize mind–body dualism as *Descartes’ Error*.¹⁸

However, what affects us as teachers is that mind–body dissociation, which is one of the negative results of Descartes’ experiment, remains embedded in both the pedagogy and the theory of every discipline. The reason why dualism and rational reduction (parts vs. holistic) were so successful is simply that his concepts proved to be amazingly useful thought experiments which made the advancement of technology possible.

Perspective 1: It is important to know that the terminology here becomes quite confusing because of an intellectual tradition that permits a scholar or scientist to borrow an idea or part of an idea from an earlier scholar and give it new meaning, even an opposite meaning.

Perspective 2: Descartes’ *dualism* states that the mind/soul is a completely separate *objective* thinking *entity* that interacts within a mechanically organized physical body within a mechanical universe. Descartes’ *rationalism* states that the mind and its knowledge are innate and that *certainty* will be gained through rational reductionism, which focuses on the detailed parts of a problem. (We often pride ourselves on expressing a rational (non-personal) point of view as having more validity.)

Perspective 3: This rational dualism is later contrasted with John Locke’s *empiricism*, which states that the mind is a blank slate at birth and that all thinking is based on sensory experience processed through the mechanism of the physical body.

Perspective 4: Various combinations of soul/mind and machine are in constant competition throughout the following centuries. For the rationalists it is enough to *think* through a problem (which can be seen as *deductive first-person testimony*) and disdain the empiricists/materialists, who say it is not real unless the result can be exactly reproduced through sensory experience or in laboratory experiments (which is considered to be *objective third-person valid data*). As we will see below in the section on consciousness, the terms keep being refined or even reshaped into their exact opposites. The tension between rationalist-objective-materialist and introspective-phenomenological programs of research continues to this day. This is the result of the mind–body problem.

Ironically, as these intellectual practices have become more sophisticated, they have also proved themselves, through their own rigorous application, to be based on mental attitudes which are the least appropriate for understanding lived experience. And the deepest trouble of all is that while most modern neuroscientists announce the error of Cartesian dualism or the narrowness of reductionist thinking, (or as physicists prove the impossibility of Cartesian certainty or objective observation in quantum physics), all are still caught in the mind–body dissociation because their mental training was based on Cartesian dualism.

It is because of this dilemma that the Alexander Technique is a technique of *re*-education and not education, which it could be. It is important for us to fully appreciate how it came to be that we need to be re-educated, that our minds must rediscover access to primary control, because it is our minds that lost it through body–mind dissociation.

It is equally important to remember that not all dissociation is damaging. It is *dualism* linked with *certainty* that is the real problem. As long as dissociations created by ‘as if’ propositions are seen as working ideas and not as certainty, we are able to imagine, to create abstract concepts like relativity theory, to paint marvelous pictures, or to perform ‘as if’ we were Romeo or Juliet.

It also allows us to manage crisis by issuing a calming *as if* 'it will be OK', which neutralizes the ANS fight-or-flight response. And it is our Alexander-inspired '*as if*' intentions of *forward-and-up* that provide us with the opportunity to dissociate new movements from our habitual over-doing.

However, the negative aspects of dissociation occur all too easily. Unless we have been fortunate enough to experience the creative pedagogy of experimental schools, most of us have been taught to use ourselves as Descartes instructed. The resulting pedagogical system which has trained and continues to train our thinking minds has forgotten to tell us that dualism, and with it dissociation, is simply a working idea. For centuries, children have been taught to set aside their organic knowledge and curiosity; to sit still (without ever being taught stillness), to prohibit spontaneous daydreaming (often the brain's method of non-doing integration), and to pay attention to a teacher who will provide them with facts about 'objective reality' on which they are to be judged as worthy human beings.

We received warnings about the this sort of pedagogy as early as 1904 from the eminent philosopher John Dewey, who applied pragmatism to progressive education, and insisted that traditional dualistic education could only retard an already alert human mind. It is the core problem that haunts cognitive science today. The dualist mode of teaching/learning is not congruent with the reality of brain function as we now know it. We find ourselves trained in a dualistic method that excludes correction except from its already 'debauched' cognitive perspective.

Perspective 1: 'The division in question is so deep-seated that it has affected even our language. We have no word by which to name mind–body in a unified wholeness of operation. For if we said "human life" few would recognize that it is precisely the unity of mind and body in action to which we were referring. Consequently, when we endeavour to establish this unity in human conduct, we still speak of body *and* mind and thus unconsciously perpetuate the very division we are striving to deny.'¹⁹ (John Dewey 1923)

Perspective 2: 'The very problem of mind and body suggests division; I do not know of anything so disastrously affected by the habit of division as this particular theme... Thus the question of integration of mind–body in action is the most practical of all questions we can ask of our civilization.'²⁰ (John Dewey 1927, 1928)

Perspective 3: 'beware of so-called concentration... This is true for the attitude of *attention* required for children in schools; it dissociates the brain instead of compacting it. Personally, I do not believe in any concentration that calls for effort. It is a wish, the conscious desire to do a thing or think a thing, which results in adequate performance.'²¹ (F. M. Alexander 1910)

Today we know that end-gaining pedagogy is the very basis of body–mind dissociation, since it presupposes that a teacher can take a child's mind and develop it, implying that it is quite separate from that troublesome character who is wriggling uncomfortably in a chair.

Eventually, that character may prove to be a well-balanced and successful intellectual, or a workaholic casualty of the sympathetic ANS, driven to achieve external validation, or a 'slow learner' (often a kinaesthetic learner), who may succeed in spite of humiliation or an embedded sense of low self-esteem, or even someone who completely fails to accommodate the mind–body problem and simply learns to detest all intellectual endeavours.



WELCOME BACK

As Alexander teachers, we are grateful to have discovered quite a different sort of pedagogy and know very well that learning useful information need not eliminate an interest in the quality of lived experience. In teaching, we might find it useful to recognize which form of dissociation our students are dealing with, because the conversion to psychophysical congruence is sometimes quite different, depending on which survival strategy a student has developed. It might be equally interesting for us to identify which strategy we developed before learning the Alexander Technique, since we may carry unconscious prejudice from that direction.

For those of you more interested in psychology, there are even more serious results of the *mind-body problem*. They are the manifestations of dissociative pathology found in addictive disorders and double-bind communication disorders, which compartmentalize parts of a personality and produce behaviour which at its extreme is diagnosed as multiple-personality disorder.

Perspective 1: *Double Bind*²² (DB) is a term created by Gregory Bateson (1972) while studying the communication pattern of families of schizophrenics. It is defined as a communication pattern which, in its negative form, offers two untenable choices, causing the mind to both fixate attention like the ‘deer in the headlights’ and split in an endless *either-or* search for a correct context. The ANS is triggered by the emotional frustration and if this sort of communication is the norm, the lesson of helplessness will ultimately embed a chronically depressive state, or a substance addiction as a substitute resolution, or even worse, a traumatic pattern of multiple-personality disorder. It seems more and more clear that the underlying mind-body dualism makes us vulnerable to this trauma. A trivial example of a DB is: ‘You didn’t eat your dinner. Don’t you love your mother?’ If this sort of communication were delivered in all its many forms, *as if* it were perfectly sensible and with a prohibition against saying it is crazy or inappropriate, the receiver would be very vulnerable to the above-stated pathologies.

Perspective 2: It was later discovered that schizophrenia was a pathology of the brain²³ and that what Bateson had been treating was actually *dissociative personality disorder*²⁴ (which had many of the schizophrenic symptoms), resulting from repeated and consistent emotional trauma via communication.

Perspective 3: Surprisingly, it is also possible to create a *positive* DB, of which Japanese Zen meditation koans (‘What is the sound of one hand clapping?’)²⁵ are a perfect example. It has even been suggested that Alexander directions, ‘forward-and-up’ could create a positive DB by distracting us from the temptation to end-gain by giving two positive, but seemingly contradictory, directions.

It is my hope that, as you follow me through this labyrinth of ideas, you will develop empathy for your own mind-body condition. In particular, I hope that as teachers, you will develop a genuine compassion for those intellectuals who wrestle everyday with the mind-body problem. Most of them have no idea that they carry a deeper body-mind problem that continues to remain the primary obstacle to their complete success. Very few of them have ever heard of F. M. Alexander, or if they have, it has not touched their minds as it might have touched their bodies.

In the following section, we will see how ideas concerning consciousness and experience at the turn of the twentieth century are gaining new respect after having been held in disdain in the mid- twentieth century by the *empiricist*, the *materialist*, and the *behaviourist*.

3.III. A brief overview of ‘consciousness’ research in 1900 and 2000

Perspective 1: 1889 ‘Something happens when to a certain brain-state, a certain ‘consciousness’ corresponds. A genuine glimpse into what it is would be the scientific achievement before which all past achievement would pale.’²⁶ (William James 1899)

Perspective 2: 1995 Chalmers’ *hard problem*: ‘Consciousness poses the most baffling problems in the science of the mind. There is nothing that we know more intimately than conscious experience, but there is nothing that is harder to explain. All sorts of mental phenomena have yielded to scientific investigation in recent years, but consciousness has stubbornly resisted. Many have tried to explain it, but the explanations always seem to fall short of the target. Some have been led to suppose that the problem is intractable, and that no good explanation can be given.’ (Chalmers 1995)²⁷

Consciousness has so many meanings, in so many different contexts. The word ‘conscious’ has multiple meanings. It is used to mean ‘awake’, ‘responsible’, and ‘aware’, for example. The words ‘unconscious’, ‘sub-conscious’, and ‘non-conscious’ have been coined in different eras and have changed throughout the twentieth century in particular. Alexander himself defines ‘subconscious’ to mean instinct and/or habitual behaviour. Since the 1940s, the old usage of ‘subconscious’ is no longer acceptable because more precise terms were coined, such as Cannon’s concept of *homeostasis*,²⁸ Maturana and Varela’s concept of *autopoiesis*,²⁹ and Tinbergen’s differentiation of instinct³⁰ from habit.

It is for this reason that today’s field of cognitive science is struggling to clear up the confusion created by the vocabulary of its different disciplines. We ourselves live in a language use that carries layers of cultural myth, for example, the words ‘sunrise’ and ‘sunset’. We certainly know today that these events are more accurately represented (though surely less aesthetically pleasing) as the planet Earth turning. The words ‘conscious’, ‘unconscious’, ‘subconscious’ and ‘non-conscious’ more often fall into this sunset category that can change in meaning from moment to moment.

Though Alexander’s vocabulary emerged from the mind-over-matter dualism of the early twentieth century – ‘conscious control of the ... psycho-physical mechanism’³¹ – the Technique has always lacked the sort of definition which would be acceptable in a world that runs on mind–body dualism. The words ‘conscious’ and ‘use’ clearly point to a responsibility for one’s actions. But in the world of mind–body dualism, those words were reserved for an examination of moral conscience, not one’s psychophysical actions. These two attitudes, the moral and psychophysical, seem to merge in Alexander’s writing as he reacts to the devastation of world war:

‘If we face the facts, every honest man and woman on this earth today must admit that each and every one of us is more or less responsible for the crises of 1914 and 1939... how could Hitler or Mussolini or any such have reached the position they occupied during the war unless on the one side they had the necessary support, and, on the other, the ideas and principles they stood for had been acceptable to the people who supported them? ... surely those ‘wanting’ peace would have accepted the responsibility of the carrying-out of the only reasonable means to that end – the prevention of the importation of essential materials into Germany and Italy in quantities necessary for the creation of a gigantic war machine...’³² (F.M. Alexander 1941)

After each of the two wars, the entire Western world gave only lip-service to reviewing what was wrong that caused these wars to happen. Alexander was determined to address the question, and his apparent negativity in doing so must be understood by the modern reader in terms of the after-shock of war. He was, as always, focused on use and prevention and how they affect functioning and dysfunction.

At the turn of the twenty-first century this dysfunction is still unresolved and, as we shall see, researchers in the field of consciousness studies are facing some of the same problems of being heard. With all the present-day technology, much of the brain's functions have been revealed, but Chalmers' 'hard problem'³³ remains the ultimate challenge for the disciplines of philosophy of mind and neuroscience.

If science cannot adequately define *consciousness*, how can we form an adequate definition of *Constructive Conscious Control of the Individual?*³⁴ Without a full understanding of where the Technique fits and does not fit into our cultural traditions, we may forever stumble through our definitions and be relegated to the recent category of 'bodyworkers'.

It is very important for us as teachers to recognize that we are still a culture in recovery from the dominance of reductionist behaviourism, without even necessarily knowing what it was. During the last 100 years, there have been decades where the study or research of 'consciousness' was discarded in favour of more materialistic *behaviourism* (an experimental psychology which reduced all human behaviour to stimulus-response sequence).

Behaviourism forced psychophysical research into a regressive stance which rejected any professional interest in the field of consciousness studies, and with it all innovative experiential research models such as the Alexander Technique. When you try to specify and define the technique, you may often find that your words seem empty or that your listener has taken on a 'prove-it-to-me' attitude with a disdain for esoteric fluff. It is essential that we take into consideration this cultural prejudice rather than thinking the Technique cannot be rationally explained. A good example of such an explanation can be found in Frank Pierce Jones' article, 'F. M. Alexander and the Reeducation of Feeling'³⁵.



WELCOME BACK

It is not possible in this paper to provide you with a detailed picture of Western intellectual and psychological development. I can, however, recommend an amazing but rigorous overview by Randall Collins called *The Sociology of Philosophies*³⁶ as a resource for those who wish to delve more deeply into the networks that generated the architecture of most of our cultural assumptions about reality.

I think it will be useful to review the cultural era in which Alexander made his discoveries. At the turn of the twentieth century, what today is called *cultural and intellectual capital* was the accumulation of new ideas developed mostly during the previous 50 years. That atmosphere and lifestyle at the beginning of the twentieth century is so completely foreign to us in the twenty-first that it may help to review a few facts.

Perspective: In 1901, the world was governed by the old great empires and the newly developed colonies. England was the most powerful country economically and militarily. ‘Almost one-fourth of the earth’s land surface and population was ruled by Whitehall’ (Bloch 2004).³⁷ London was the centre of the world. There were 1,600 million human beings alive whose fate was in the hands of ‘white peoples’. Despite the nineteenth century’s advances in steam and iron, most Europeans still lived in the countryside, and agriculture was still the same horse-driven food provider of the world. The idea of manipulating nature had taken hold, yet there were no drugs for the treatment of infection, tuberculosis or pneumonia.

Against the background of a fundamental belief in the supremacy of Western man with his certainty, several extraordinary theories and scientific discoveries began, from the mid 1800s, to shake the very foundations of that certainty which had limited the creativity of the intellectual networks governing philosophy and the very nature of knowledge. I shall name only a few.

Cultural Capital (1800-1955)

Charles Darwin (1809-1882)		Franz Brentano (1838-1917)
Hermann von Helmholtz (1821-1894)		Wilhelm Wundt (1832-1920)
Gustave Fechner (1801-1887)		Edmund Husserl (1859-1938)
Paul Broca (1824-1880)		William James (1842-1910)
Ivan Pavlov (1849-1936)		Sigmund Freud (1856-1939)
Charles Sherrington (1857-1952)	F.M. Alexander (1869-1955)	John Dewey (1859-1952)
Rudolf Magnus (1873-1927)		Eastern philosophy (1800-)

I will now highlight some of the key areas of scientific discovery and philosophical development leading up to and through the first half of the twentieth century. In each of these areas, I will describe the ideas that were influential at that time and contrast them with their present-day counterparts.

Evolution

Before **Charles Darwin’s** *On the Origin of Species*³⁸ (1859) was published, science was not a topic of popular discussion. In the mid-nineteenth century, the possibility of human descent from primate ancestors was unthinkable. His theory of evolution not only challenged the fixed religious beliefs concerning the origin of Eve from the rib of Adam, but also the very superiority of *fixedness*, and in particular the distinct (non-animal) supremacy of human beings as having been created in a fully-formed state. Darwin’s evolutionary theory became the major turning point in nineteenth-century intellectual networks, as well as drawing-room conversations, by introducing into a strictly ‘cause-and-effect’ culture a new perspective which legitimized *transitions*.

Perspective 1: Today the entire sequence of the human genome is known and we now know that when it is compared to the sequence of a chimpanzee, there is less than two per cent difference between the two! (Goodman 2003)³⁹

Perspective 2: Today, in 2005, the question of human *transition* from quadruped to biped continues to elude evolutionary biologists. It is still a foreign idea for them to see a potential connection between this transition and the development of consciousness.

Neurophysiology

In 1850 the German physicist-physiologist **Hermann von Helmholtz** discovered that the speed of a nerve impulse was between 165 and 330 feet per second. Soon after, in 1860, the German psycho-physiologist **Gustav Fechner** developed *Fechner's law*:⁴⁰ a formula for measuring how the intensity of a sensation, loudness of a sound, brightness of a light, sweetness of a taste, could have a direct relationship to something measurable in the external world. Fechner coined the word 'psychophysical' and is credited as the father of experimental laboratory psychology.

Paul Broca, a French pathologist, neurosurgeon, and anthropologist, is considered the founder of modern brain surgery. In the 1860s he was responsible for identifying mental functions by correlating them with the activities of particular parts of the brain. He was the first to discover that the integrity of the left frontal convolution in the brain was responsible and necessary for articulate speech. (Since then, discoveries concerning the complexity of language have challenged the simplicity of Broca's theory.⁴¹)

By the early 1900s **Ivan Pavlov**, a Russian physiologist, introduced the concept of *conditioned learning* (which later fed into the behaviourist stimulus-response conditioning model), while **Charles Sherrington**, father of modern neurophysiology, moved in another direction by introducing the nervous system as an integrated holistic system. In 1905 Sherrington explained for the first time how it would be possible for the nerves, originating in the spinal cord, to communicate through neurons and synapses, and by so doing to organize the entire body in the maintenance of posture. He made the study of posture possible and influenced **Rudolf Magnus**, who worked at his laboratory in London in 1908, to initiate his research on the postural righting reflexes in animals, which he called 'central control'. (Alexander adapted this concept of 'central control' to 'primary control'.)

Perspective 1: Roger Sperry received a Nobel Prize in 1981 for his *split brain* research which found that the two sides of the brain can be independently conscious. 'The world of inner experience ... long rejected by twentieth-century scientific materialism, thus becomes recognized and included within the domain of science.' (Nobel acceptance speech)⁴²

Perspective 2: The development of technology such as MRI, PET, and MEG brain scanners has permitted laboratory science to measure brain-specific response, without surgical risk, during voluntary and involuntary behaviours.⁴³

Perspective 3: Benjamin Libet⁴⁴ (1983) made the amazing discovery that a mental event begins in the brain 350-400 milliseconds (about a third of second) before we are aware of *intending* the voluntary movement, but 200 milliseconds (about a fifth of a second) before the action has begun. This time window permits a possible *veto* or a selective control of the action. (For Alexander teachers, this is a beautiful example of inhibition).

Perspective 4: In 1994 Antonio Damasio⁴⁵ developed a neuroscientific theory concerning the significant connections between the amygdala, emotion and cognition.

Perspective 5: Brain *plasticity* was validated by MRI studies in 2000, which showed that the adult hippocampus, critical to many functions of memory, spatial-environmental relationships, and learning, becomes enlarged in periods of intensive study of geographic information. Later experiments showed that grey matter enlarged in visual and motor activity areas when experimental subjects learned and practiced juggling for three months, with growth diminishing when the practice was stopped. Another study shows that chronically depressed persons show an unrelenting activity in the right prefrontal cortex, while the test results from Tibetan monks show dramatic activity in the far-left prefrontal cortex. This implies brain *plasticity*: even the adult brain grows in response to the manner in which it is *used*.⁴⁶

Perspective 6: During the last ten years, Alexander teachers have begun to involve themselves in research projects in the tradition of Frank Pierce Jones. Chris Stevens connected with Benjamin Libet, who later visited the Constructive Teaching Centre, UK. Chloe Stallibrass published the results of her Alexander Technique experiments with patients who have idiopathic Parkinson's disease.⁴⁷

Perspective 7: Lucy Brown, a neuroscientist at Albert Einstein Medical Center in New York, conducts research on the relationship between empathetic touch and the basal ganglia (which influence the inhibition of movement). She was a keynote speaker at the Seventh International Congress of the F. M. Alexander Technique (2004) and is devoted to the advancement of scientific explanation of phenomena in learning and teaching the Alexander Technique.



WELCOME BACK

Philosophy and psychology

The concept of consciousness entered the intellectual networks via introspective psychology, which was the offspring of philosophy in the 1800s and in particular the anti-materialist lineage of the German priest-philosopher **Franz Brentano**, who in 1874 opposed reducing thought to a laboratory process. He insisted that ‘The true subject matter of psychology is the mental act – such of judging, sensing, imagining, or hearing, each of which reflects a sense of direction and purpose.’⁴⁸ Brentano’s philosophy was the precedent upon which later introspective experiential research was accepted into the intellectual networks. His most famous students, **Sigmund Freud** and **Edmund Husserl**, carried his message of preserving the focus on experience into the development of psychoanalysis and phenomenology at the beginning of the 1900s.

Freud startled his colleagues and the world with his theory of the repression of unconscious desires in *Interpretation of Dreams*,⁴⁹ while Husserl, in his phenomenology,⁵⁰ recognized the deep trouble in the mind-body debate and searched for definitions of the present-moment experience of intentionality. His *epochè* was rigorous self-observation in the moment when one is able to *stop* the flow of habitual thoughts.

Two other major contributors to the study of consciousness were the German physiologist and psychologist **Wilhelm Wundt**, and later the American medical scientist-psychologist-philosopher **William James**. Though they approached the subject differently, they are considered the founders of a form of psychology which accepts *experience* as significant to the full understanding of human consciousness. In 1879, Wundt challenged dualism by insisting that for every mental event there was a physical counterpart, and for every physical event there was a mental counterpart.

‘Thus Wundt embraced the method of introspection – a method whereby one attends carefully to one’s own sensations and reports them as objectively as possible. Such objectivity here means that one describes the sensations felt, rather than the stimulus giving rise to them; and that one reports thoughts (or images) without reference to their meaning or context of presentation.’⁵¹

In 1890 William James published *The Principles of Psychology*,⁵² which became a landmark reference book in the field of psychology. James identified subtleties of psychological phenomena such as stream of consciousness and observations about cognitive child development.

Today James is still considered a psychological genius and is equally respected as a philosopher for his introduction of pragmatism: ‘Our various ways of feeling and thinking have grown to be what they are because of their utility in shaping our reactions to the outer world...The pursuance of future ends and the choice of means for their attainment are thus the mark and criterion of the presence of mentality in a phenomenon.’⁵³ While both Husserl and James were developing phenomenology and pragmatism respectively, they also read each other’s work.

Pragmatism’s approach was to go straight to the question of what can be *done* with thoughts and ideas. It introduced a meta-position which recognized the difference between abstract constructs and ideas that could be put to practical use, thus demanding that philosophers be responsible for how they were *using* their propositions.

Pragmatism, psychology and education fit well together. All three were served by the American philosopher John Dewey, who was a major supporter of progressive education at the turn of the twentieth century. At that time, the history of Western pedagogy had a good chance of changing for the better; but reactionary post-war conservatism drove behaviourism to centre stage. Dewey had been greatly affected by James’ *The Principles of Psychology*. He was also a devoted pragmatist, fascinated by how we *use* ideas and what we can do with them. In 1894 he created the ‘Chicago School’ of interdisciplinary research in psychology, education, sociology, and philosophy. There was a great debate at that time over *student-centred* vs. *information-centred* education. Dewey believed that children needed to learn intellectual skills in a practical, social situation, rather than being isolated in classrooms away from real life. He was thoroughly against children being constantly observed and tested. He believed these practices would only distort a child’s learning experience.

Concerning consciousness, Dewey believed that infants, faced with an unpredictable and uncertain environment, must develop consciousness through their improvisational solutions.⁵⁴ At that time he offered the chance for education to evolve into a social, psychophysically congruent instrument. Dewey studied with Alexander and considered his Technique essential to the resolution of the mind–body problem: ‘It is another thing to discover the concrete procedure by which this greatest of all tasks can be executed. And this indispensable thing is exactly what Mr. Alexander has accomplished.’⁵⁵

Perspective 1: The intellectual lineages left by Husserl and James have been adapted to meet the needs of modern cognitive scientists, such as Francisco Varela, who claim that rigorous self-awareness deserves to be included in the definition of the human mind. There is also a rebirth of interest in the educational theories of Dewey.

Perspective 2: *The Empirical Stance*⁵⁶ by Bas van Fraassen, a philosopher of science at Princeton, reviews empiricism and traces the labyrinthian definitions which at one moment exclude rational or introspective theorizing in favour of laboratory experiments and at another moment validate the application of empirical method to research in the humanities. He presents the idea that empiricism should be viewed as a stance, a working methodology. If the concept of this stance were accepted, it would correct the dilemma that has refused to validate the empirical research methods used by F. M. Alexander to develop a method of psychophysical pattern disruption and re-education.

Perspective 3: At the turn of the twenty-first century the disciplines of psychiatry, psychology and psychotherapy have made dramatic changes in the diagnosis of psychosis. Today it is understood that multiple-personality disorder is more often a symptom of post-traumatic syndrome and not to be confused with schizophrenia. Psychopharmacology has developed drugs that can control the radical symptoms of patients who in 1900 would have been abandoned in prison-like insane asylums.

Perspective 4: Systems and information theories, the foundations of computer science, have been adapted to study organizational behaviour in families, corporations, and cultures.

Perspective 5: Philosophy and psychology have been integrated into cognitive science.

Perspective 6: Motivational research, which was developed after World War II, continues to recruit psychologists and sociologists for the purposes of advertising, marketing, and political propaganda. Unfortunately, this wealth of knowledge has contributed to the more recent pathologies of addiction.



WELCOME BACK

Eastern philosophy

Beyond the benefits the West accrued from commercial trade with the Middle and Far East, the philosophy of India entered the German intellectual network via Latin and French translations of the Hindu *Upanishads*, which circulated at the turn of the nineteenth century. The German philosopher Schopenhauer was one of the first to be influenced by these translations and was instrumental in making the rest of Europe aware of their significance through his writings. Small private societies were formed to study all things oriental. Edwin Arnold's poem *The Light of Asia* (1879), which romanticized the life of Buddha, was adapted to music and became the most popular song in Europe. In response to this movement the Christian churches became more and more defensive, calling Buddha the *Hindu Luther*.

The first Buddhist centre was established in Germany in 1924. During the early 1900s an interesting East–West network was established via the Kyoto School of philosophy in Japan created by Nishida Kitaro. The Kyoto School read phenomenology and sent students to study in Germany. Dialogues between Japanese and German scholars were the way in which Zen philosophy and practice were introduced into the network of phenomenology.

In contrast to the discrete histories of Western science and philosophy, the *Upanishads* presented a vision of a unified, non-dualistic world which made the concepts of relativity and quantum physics sensible. In 1925, Erwin Schrödinger was inspired to create his theory of *quantum wave mechanics* after reading this Hindu literature. Buddhism reached the United States in the 1800s through the Transcendentalist network and Henry Thoreau translated a French version of a Buddhist sutra into English.

On the esoteric front, romanticized representations of Asian culture made their way into the West in the latter part of the nineteenth century via a Russian aristocrat, Madame Blavatsky.⁵⁷ She travelled to Tibet, where she claimed to have been trained by 'the masters' from 1868–1870. She returned to England, where she created the Theosophical Society, whose purpose was to introduce the secret doctrine of esoteric Buddhist and Indian philosophies to humanity.

In 1890 Annie Besant, a celebrated feminist, became a supporter of Blavatsky's work. George Bernard Shaw, the Irish dramatist, social critic and close friend of F. M. Alexander, was involved in an intellectual Socialist network which included Besant. Though they disagreed on the merits of Theosophy, Shaw considered Hinduism the most tolerant religion in the world.

F. M. Alexander could not have avoided being aware of this fashionable focus on secret esoteric techniques. He was highly critical of religious or esoteric practices, which was a good reason to distance himself from anything remotely Eastern. No doubt there were students who made comparisons of the similarities between Alexander's inhibition / non-doing and Buddhist 'emptiness'. Alexander made it quite clear that the Alexander Technique had to remain grounded in Western rationalism or risk accusations of élitist, esoteric quackery. Nonetheless, he was interested in Chinese medical practice, in particular breathing techniques developed as treatment.⁵⁸

Perspective 1: The tradition of intellectual exchange between Japan and the phenomenologist lineage has continued, as evidenced by the visible population of Japanese students who regularly attended the lectures of the late Jacques Derrida in France. Francisco Varela adapted phenomenological methodology to explore the relationship between consciousness studies and Buddhist meditation practice. The intellectual networks of the early twenty-first century are following a similar pattern to that of the 1900s.

Perspective 2: Today, Buddhism is the fourth largest religion in the world, following Christianity, Islam and Hinduism. It is estimated that there are 3 million Buddhists in the United States, at least a quarter million in Europe, and more than 300 million in the world.

Perspective 3: Schools of meditation, yoga, tai chi and qui gong exist in every major city in the Western world, and courses taught by Westerners are offered (as stress management) to the average person at every local health spa and gym. Most bookstores have a section devoted to Eastern philosophy and methods of psychophysical practices.

Perspective 4: The Dalai Lama is one of the most popular religious figures in the world. His goal of restoring peaceful governance in Tibet has gained the attention of both the intellectual and popular networks. His willingness to participate in (published) dialogues with artists, scientists, philosophers, psychologists, and politicians has provided an effective venue for an interdisciplinary explanation of Tibetan Buddhist views on the responsibilities of human consciousness.

Perspective 5: Francisco Varela and others consider Tibetan monks, trained in meditation since childhood, as ideal subjects for laboratory experiments in consciousness studies.

Perspective 6: The advertising and marketing industry, which invests only in the public's attention space, has consistently developed media campaigns using Zen monks and Buddhist vocabulary (tranquillity, *samsara*, etc.) to sell everything from candy bars to cars.



WELCOME BACK

So, in review, at the beginning of the twentieth century there was an explosion of creative thinking in all fields. It seemed that Western man was going to understand all the laws of nature and be able to control his destiny. Many new disciplines were created and the questions about 'how we think we think' were possible to consider. Certainty and mysteries of conscious experience could be challenged. Innovation was possible.

It was into this atmosphere that the Alexander Technique was developed through empirical, first-person trial-and-error experimentation. We may always wonder how it was possible for the 26-year-old F. M. Alexander, born in Tasmania, a barely colonized part of the world, to find himself engaged in research concerning mind–body dissociation, which within a decade or two would be recognized by the leading-edge thinkers at the dawn of the twentieth century.

In line with Randall Collins' theory of small numbers⁵⁹ (of thinkers and ideas which can dominate the intellectual space at any given time), Alexander seems to have found several entry points into an international philosophical debate where conscious and unconscious experience was being taken seriously. New insights about both the nature of the human nervous system on the one hand, and the practical failure of medical science to successfully treat tuberculosis on the other, caused more determined patients and doctors to consider alternative solutions. In the background, Darwin's theory of evolution, which was either ridiculed or celebrated, required all intelligent men and women to reconsider the reassuring notion of human supremacy, and in particular their relationship with the body.

Perspective: In the beginning of Alexander's teaching career (and still now), it was both patients suffering from incurable discomforts and those professional and amateur artists interested in perfecting their performance that generated interest in Alexander's discoveries. Intelligent professionals had inklings about these discoveries, but Alexander had a great deal to work out before words could be written or spoken about them. He did not have the advantage of a vocabulary, that we have today from a hundred years of interdisciplinary research, to express the subtleties of inhibition or primary control. Since the technology in his lifetime did not include MRI or MEG brain scanners, there was probably not much point in submitting his work to scientific research. There was no way to appropriately measure it. Serious damage could have been done because primary control and direction would have failed the test, just as the sound language of dolphins could not have been considered to exist before high-frequency analytic computer technology could decipher it.

It is essential to place F. M. Alexander in the context of his lived experience, including two World Wars, from 1869 to 1955. The language with which he expressed his discoveries and philosophy is the vocabulary of a period that begins with Western civilization's sense of supremacy and paternal responsibility for the supposedly lesser developed of the human species and ends with post-wartime behaviourist psychology.

He states clearly: 'I am forced to use the words 'physical' and 'mental' ... because there are no other words at present which adequately express the manifestations of psycho-physical activity present at these various stages, not in any sense because the 'physical' and the 'mental' can be separated as such.'⁶⁰

The words 'primary control' are an adaptation of the term 'central control', which Rudolf Magnus coined for the righting reflexes of animals. Alexander also uses the term 'conditioning' (which Pavlov made famous) to refer to habit formation. His concept of the subconscious is that of instinct, which expresses a Victorian influence, and although Alexander would not have known much of Freud's work, there is a similar attitude towards a primitive self.

It is impossible to overestimate the demoralizing effect that the two World Wars had upon Western civilization. The shock of an entire continent as it watched morality deteriorate into violence twice in less than 50 years changed expectations of human potential. Darwin's theory of evolution was used to explain 'our brute animal natures'.

Control of this nature became a central issue, and may well explain why the behaviourist program of research was so popular from the 1920s to 1950. In the United States, social scientists responded to the brutal events of World War I by rapidly installing behaviourism as the dominant post-war vision of social research. The world wanted the comfort of certainty, even though deep down everyone knew that an unanswerable question about human nature had been posed that was far too painful to consider. And so, behaviourism silenced the research interest in conscious experience in America, while anti-German sentiment quashed the interest in introspection and phenomenology in Europe. Materialism won the dominant intellectual space. The mind and body could be dealt with as cause-and-effect machinery rather than as a conscious unity responsible for its actions.

By the end of the twentieth century, as shown earlier in the paper, new developments in technology had made it possible to define at least a small part of Alexander's discoveries in more precise ways. More importantly, it is essential to grasp the fact that his discoveries were well in advance of both common knowledge and the professional interventions of his day. Even at the beginning of the twenty-first century, this continues to be true. We will read more about this later in Section 3, 'Social interaction'.

Beginning in 1900, and continuing through the two World Wars, cultural capital benefited from a steady stream of theories in physics and mathematics, such as Planck's introduction of *energy quanta*, Einstein's *special relativity theory*, Bohr's *spectrum theory*, Schrödinger's *wave theory*, and Heisenberg's *uncertainty principle*. In particular, World War II generated an interdisciplinary collaboration which combined research in mathematics with information and systems theories. The imagined Turing Machine (which would be able to process information) gave birth to cybernetics (communication theory) and computer science. For the first time in military history, enormous amounts of international data about troop movements, strategies of deployment, mistakes and successes could be analysed.

The same held true for medicine when, at the end of the war, medical laboratories in the United States, England, Germany and Russia started comparing their data on brain injuries. This data revealed unforeseen complexities in brain function, which ultimately contributed to the development of cognitive neuroscience.

During the same period of 1920–1950, a parallel development was resulting in new discoveries, and even newer disciplines of information theory, game theory and cybernetics had introduced radically different points of view that required a reformulation of old problems unanswered by behaviourism. Conferences were created to pose these problems to a multidisciplinary audience. In 1944 a conference sponsored by the J. P. Macy Foundation made it possible to formulate a new interdisciplinary science, which we now recognize as cognitive science.

This paradigm shift from isolated disciplines into a unifying field of cognitive science was witnessed by Norbert Wiener (a founder of computer science) at the Macy conference. He later recalled in 1948,

'... it had become clear to all that there was a substantial common basis of ideas between the workers in the different fields, that people in each group could already use notions which had been better developed by the others, and that some attempt should be made to achieve a common vocabulary.'⁶¹

But it is important to remember that during behaviourism's three decades of intellectual dominance from 1920 to 1950, the behaviourist credo refused to consider questions about the nature of human language, planning, problem solving, imagination and consciousness. It simplified all the issues with two principles: 1) the nervous system is in a state of inactivity most of the time, and 2) isolated reflexes become active only when appropriate stimuli occur.

Behaviourism was not successfully challenged until 1948 when Karl Lashley dared to prove that these two principles were fiction. He presented a paper at the Hixon Conference, which clarified the impossibility of the behaviourist position: ‘The nervous system consisted of always active hierarchically organized units, with control emanating from the centre rather than peripheral stimulation.’⁶² He insisted that the behaviourist belief in serial order could never explain the complex skills of high-performance athletes or musicians, because the action sequences take place at such speed that the behaviourist model of one-step-after-the-other responses dependent on the previous environmental stimulus could never keep up with the feedback necessary to control it.



WELCOME BACK

3.IV. Cognitive Science: its interdisciplinary development and potential

After the demise of behaviourism, a variety of disciplines published research in the areas that had been previously silenced. In 1956 Roman Jakobson⁶³ revealed a new perspective on language. He described the fundamental units or building blocks out of which the phonemes (or basic sounds) of language are constructed. In the same year, Gregory Bateson⁶⁴ published his research on feedback communication patterns in family systems. Humberto Maturana's⁶⁵ work on the retina of a frog challenged previous theories by proving that specific neurons in the retina responded to bug-like dark spots (without brain interpretation). Konrad Lorenz and Nikolas Tinbergen developed the field of ethology, which studied animals' social behaviour in their natural habitat rather than in a laboratory cage. Advances were made in anthropological methods of categorizing *reality* used by remote cultures. Mathematical innovations were adapted for use in the social sciences. The field of logic focused on ideas that recognize patterns, solve problems, and play games.

A turning point in the history of cognitive science was reached when in 1960 two psychologists, Jerome Bruner and George Miller, asked their dean of faculty, McGeorge Bundy, to support research on cognition. He agreed and the Harvard Center for Cognitive Studies was created. During the 1960s it became an interdisciplinary ‘think tank’ that kept the leading-edge questions in the forefront of discussion. Both the subject matter and the multidisciplinary resources began to adapt mathematical concepts of communication to fit biological models of lived experience.

This was unavoidable if artificial intelligence, a branch of computer science, was to meet its goal of designing hardware and software to think like a brain. In 1948 Norbert Wiener came to the conclusion that

The central nervous system no longer appears as a self-contained organ, receiving inputs from the senses and discharging into the muscles. On the contrary, some of its most characteristic activities are explicable only as circular processes, emerging from the nervous system into the muscles, and re-entering the nervous system through the sense organs, whether they be proprioceptors or organs of the special senses. This seemed to us to mark a new step in the study of that part of neurophysiology which concerns not solely the elementary processes of nerves and synapses but the performance of the nervous system as an integrated whole.⁶⁶

It was this sort of mixture of ideas that made cognitive science a new discipline, one that could dare to think ‘outside of the box’ of a single discipline. This is very much like the intellectual opening that existed, though not formally, in 1900. A new vocabulary has evolved continuously as each discipline (see Figure 3) entered a shared intellectual space with the leading-edge questions they each seek to answer.

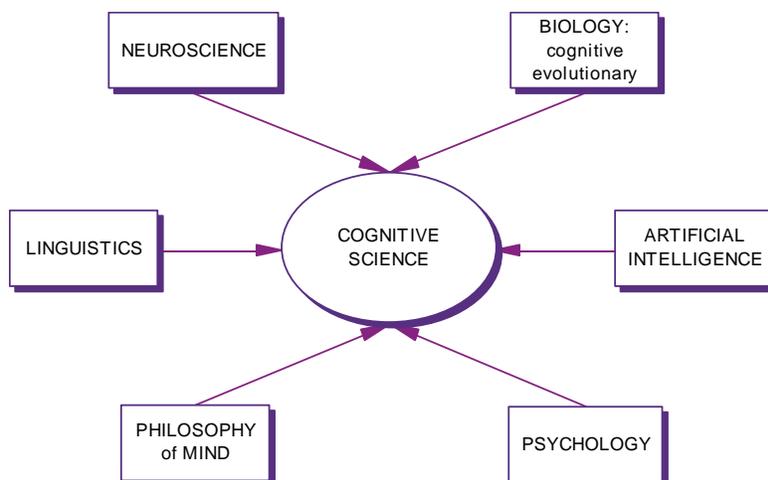


Figure 3: The interdisciplinary network of cognitive science

A large number of discoveries made in the last fifty years has answered, or is well on its way to answering, the so-called ‘easy problems’ of cognitive science, such as: How can a human subject discriminate between various sensory stimuli and react to them appropriately? How does the brain integrate information from many different sources and use this information to control behaviour? How is it that subjects can verbalise their internal states?

The hard problems are those challenging questions which still face the leading edge of each major discipline in cognitive science: Why does consciousness exist? What does it do? How could it develop from neuronal activities in the brain? What is the self? What is the mind? What is consciously lived experience?

As we will see, there are still positions within cognitive science that reflect the age-old tension between rationalist, objective materialism and introspective, phenomenological programs of research. Each discipline contributes both scientific and philosophical perspectives on which questions they are willing to accept. They all claim to have solved the mind–body problem.

There are three distinct approaches within cognitive science:

- The **computationalist** view grew out of early computer research such as the Turing machine, a theoretical machine that could process information by making ‘yes-or-no’ choices. Cognition is seen as a manipulation of ‘yes/no’s’, following structural limitations or rules.
- The **connectionist** view sees cognition as a system of dynamic networks that interconnect in recognizable patterns which can be categorized as following structural rules.
- The **embodied-enactive** view sees cognitive processes as emerging from a *situated* (real time/space), lived experience by a human being whose use of the moment creates the relations that make sense of the world.

It is the third approach, also called ‘emergence’, which was developed by Francisco Varela and his colleagues. This style of approach grew out of earlier research with his teacher, Humberto Maturana. Together they invented the word *autopoiesis*⁶⁷ in order to define the self-creating functions unique to all living organisms. This newly coined category made it possible for biologists to differentiate a holistic, living organism from nonorganic material by recognizing life’s primary function: the inherent ability to self-replicate, self-organize and self-correct spontaneously. These powerful concepts opened a new field, the biology of cognition, which was a direct challenge to the lingering attitudes of the behaviourists’ program. In 1986 Varela was invited to join CREA, École Polytechnique in Paris, where he continued to evolve his methodology. He was already trained in a form of non-doing observation which he learned from Tibetan Buddhism. He and his colleagues dared to approach the deep trouble by writing *The Embodied Mind*,⁶⁸ which suggested a new path to resolving what Chalmers’ later called ‘the hard problem of consciousness’.

By 1996 Varela had introduced *neuropsychology* and focused attention on an even deeper problem:

‘The nature of “hard” becomes reframed in two senses: (1) it is hard work to train and stabilize a new method to explore experience, (2) it is hard to change habits of science in order for it to accept that new tools are needed for the transformation of what it means to conduct research on mind and for training of the next generations.’⁶⁹

Varela insisted that if cognitive science continued to exclude conscious experience from laboratory research, all that could be hoped for would be a regression to the mind–body duality of the materialists and their belief that all cognition is a matter of wiring and mechanics. As mentioned earlier, this is the same debate that William James entered in 1899.

‘Something happens when to a certain brain-state, a certain ‘consciousness’ corresponds. A genuine glimpse into what it is would be the scientific achievement before which all past achievement would pale.’⁷⁰

A hundred years later, the greatest problems – the hardest problems – remain. How do we introduce the experience of consciousness to the rigor of the laboratory? How can we determine the reliability of personal testimony which is the product of consciousness? How do we develop a methodology that would allow research scientists to make appropriate measurements?



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3.V. The remaining hard problem: the reduction of conscious experience to a suitable model for laboratory research.

Varela decided to design laboratory experiments that could include first- second- and third-person experience. He insisted that the experimental subjects be changed from college sophomores (minimum requirements) to subjects who had been highly trained in conscious mental states (maximum requirements) whose (first-person) testimony expressed categories of refined differentiation. Next, he required that the research scientists themselves (participatory third-person observers) be trained in the chosen methodology; and lastly, that a trainer or an adept (second-person) in the method act as an intermediary to help both design the experiment and translate the results into objective (third-person) data.

The Alexander Technique experience

Perspective 1: A first-person testimony as an Alexander student. In 1966 I arrived in New York, having been told by my acting teacher in Washington D.C., that I *must* study with Judy Leibowitz if I ever hoped to cure a childhood physical disability which precipitated short muscular seizures once or twice a month. I arrived at Judy's apartment on West 71st Street and soon found myself lying on a table being touched in a most extraordinary way. Judy's hands simply rested on my neck and *listened*. There was no demand for me to perform; there was simply a waiting for something. My mind had been busy wondering about who this highly recommended lady with a funny accent might be. As the waiting continued, there was something irresistible about it. My mind was curious about this process of waiting and I slowly became aware of the weightless quality of her listening. It occurred to me that she must be listening to something. Wishing to eavesdrop on Judy's process, my mind found its way into her hands. Her listening hands were focused on the passage of specific stimuli through my nervous system. She seemed to be eavesdropping on patterns of anxiety messages circulating throughout my body. As my mind followed her lead, I began to notice a recurrent event that kept passing through our net of listening. The moment my mind recognized this event, without *doing* anything, it spontaneously neutralized the source stimulus. I became almost tranquilly aware of a 'me' that at once felt like returning home to some sort of state of grace. This was the beginning of my experience of travelling through Judy's listening hands into the possibility of thinking congruent messages within my own nervous system. Within two weeks, I had learned to trust the directions and had discovered a way to disrupt the pattern of seizures which had been with me for almost twenty years.

Perspective 2: A second-person testimony as an Alexander teacher. When I first entered the training program, I had never had an Alexander lesson from anyone other than Judy Leibowitz. Having established a strong kinaesthetic bonding with her well-minded hands, I found the hands of other teachers to be completely foreign and almost empty. They were clearly not teaching the 'Alexander Technique' as I knew it! Gradually I became accustomed to the differences and learned in other ways. I lived and breathed the Technique. Yet, after three years of training, I was only beginning to see the implications of the work. It took five years of steady teaching before the day came when I could say 'Ah, I get it. I understand how it all fits. Now it is for me to see how deeply I can enter into this *listening* to the living of myself *listening* to the living of the other. How much I can trust that *transmission of intention* is all that is required. The process of transmission is the most interesting aspect of the pedagogy. When I joined the faculty, I was fascinated with the different ways trainees learned. It was my pleasure to validate the experience of trainees during those very delicate transitions into sensitivity beyond the norm. I remember there were students who seemed so stuck that the faculty doubted they would make their way, only to discover them completely transformed five years after graduation. I came to understand how truly personal the experience of learning and living the Technique is. In particular, it was clear to me that each personality integrates the Technique in its own unique fashion and time.

Perspective 3: A third-person testimony as an observer analyst. I will attempt a modern-day summary of Alexander's technique: Alexander's genius was to recognize the deep trouble of mind-body dissociation and to develop a method of repairing it. Using a mirror and empirical method, he developed a meta-consciousness, a genuine *participating observer*, who could access and improve psychophysical patterns, particularly those engaged in balance. This ingenious method begins by *stopping*, becoming aware of what we are doing in the moment, *stopping again* to inhibit correction, and *stopping again* as the nervous system shifts into a parasympathetic state of non-doing, which neutralizes the left-over erroneous stimuli that are still active in the proprioceptive system. After a state of non-doing is continually accessed, the method evolves into a positive cognitive process by projecting a thought (as an actor might *think* of his voice resonating in the back of the theatre without speaking) until it seems that the thought is suspended in mid-air. This induces primary control to spontaneously calibrate its relationship to gravity, whereupon we initiate an act of trust and give consent to the whole organism to respond congruently.

Varela states the basic scientific requirements for the design of an actual experiment:

- ‘(1) Providing a clear *procedure* for accessing some phenomenal domain.
- (2) Providing a clear means for an *expression* and *validation* within a community of observers who have familiarity with procedures as in (1).’⁷¹

Varela chose to use the intellectual strategy I mentioned earlier in the paper, of selecting a previous philosopher’s model, in this case that of Husserl, who had developed around 1910 a Western theoretical model of accessing conscious awareness, which he called *epochè*. Philosophically it was considered a ‘phenomenological reduction’, which means simply that it makes the steps involved precise. We will find the methodology of *epochè* extraordinarily familiar. It is a three-stage process, as shown in Figure 4.

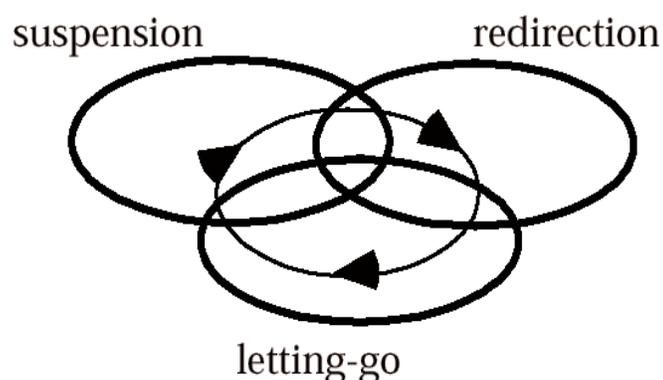


Figure 4: Epochè (Depraz, Varela, Vermersch⁷²)

Varela’s personal agenda was to use laboratory research to validate the experiential domain of his chosen ‘expert’, the Tibetan Buddhist meditator. His motivation for working with Buddhists is that ‘the Buddhist traditions have accumulated a vast amount of expertise in training the mind and cultivating its ability for reflection and introspection. It has done so over centuries’,⁷³ and has expressed its accumulated observations in terms that are acceptable to Western philosophy and psychology.

Varela consistently expresses his awareness of the importance of psychophysically congruent states when he writes:

‘subjective experience refers to the level of the user of one’s own cognitions, of intentions and doings, in everyday practices. I know that my movements are the products of coordinated series of muscle contractions. However, the activity of moving my hand operates on the emergent scale of motor plans that appear to me as motor intentions as an active agent-user, not the muscle tones that can only be seen from a third-person position.’⁷⁴

Figure 5: The Methods of Francisco Varela and F. M. Alexander

‘The blind spot in the cognition sciences of the twentieth century is that we do not have a method of properly accessing experience...’ F. Varela, 2000



Francisco Varela

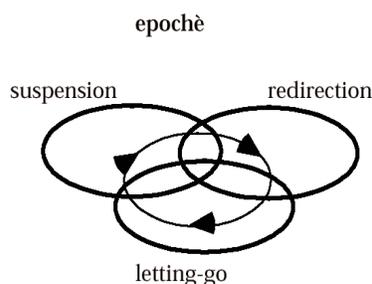
The Gesture of Becoming Aware: *epochè*

A. A phase of *suspension* of habitual thought and judgement. This is a basic precondition for any possibility of change in the attention which the subject gives to his own experience and which represents a break with a ‘natural’ or non-examined attitude.

B. A phase of *conversion (redirection)* of attention from ‘the exterior’ to ‘the interior’.

C. A phase of *letting-go* or of receptivity towards the experience.

Note in passing that in this recursive movement, the suspending movement which begins the process, has a quality which is different each time around, at each step of the structuring of the reflective act. (Depraz, Varela, Vermersch 2000)



The Alexander Technique

A. Awareness: a conscious attention engaged in an ongoing relationship between self and the environment.

B. Inhibition: the withholding of conscious consent to respond to any stimulus to act or *to do* a movement. It neutralizes habitual reactions and opens the field of awareness to conscious choice.

C. Direction: a consciously practiced shift of attention to include an external spatial concept of *forward and up* (while continuing *inhibition*) which stimulates spontaneous kinesthetic reorganization through *primary control* (organic *righting response* to gravitational force).

D. Giving consent: a permission to allow movement to occur while maintaining the integrity between *inhibition* and *direction*.

A, B, C, and D create a *loop*, feeding one into the other, permitting conscious awareness of new choices at any moment. (Interpretation: R. Zahn.)



John Dewey and F. M. Alexander (STAT)

‘...before man can make changes necessary in the outside world, he must learn to know the kind of doing he should prevent in himself, and the HOW of preventing it.’ F. M. Alexander, 1945

The significance that Varela's agenda holds for Alexander teachers, whether we appreciate Tibetan Buddhism or not, is that he has created a research program using a vocabulary that is virtually identical to Alexander's hundred-year-old description of his technique. Efforts to introduce Alexander's work or discoveries into the domain of science have always required that we adapt our language to that of dualistic or behaviourist reductionism. Though we had a brief permissive atmosphere during the 1970s, there has never been this kind of *neuropsychological* scientific interest in our domain.

The Alexander Technique meets Varela's requirements at three levels:

- **the first-person expert:** Alexander teachers are highly trained in awareness of conscious experience as well as specific kinaesthetic phenomena in the proprioceptive system.
- **the second-person intermediary:** Alexander teachers are especially trained to consider their own use of primary control as a prerequisite before and during any interaction with a student. Most psychophysical experts are trained to focus only on their student/patient's condition during a session. However, Alexander teachers and Tibetan Buddhist masters *are* in the same state that they wish to *transmit* to their students.

The quality of Alexander touch, the direct result of the above pedagogy, can be studied via the basal ganglia work of Lucy Brown (published elsewhere in this volume), which she introduced at the Seventh International Congress of the Alexander Technique in Oxford. She has shown a specific basal ganglia response in direct relationship to the stimulus of empathetic touch. An MRI study applied to the first- and second-person interaction of a student and Alexander teacher could well show, for the first time, how the kinaesthetic information of 'correct use' is transmitted and received neurologically. Since this is one of the major areas of difference between the Alexander Technique and other physical interventions (and, I might add, one which is rarely spoken of because of its seemingly mysterious, nonrational implications), Lucy Brown's work could validate this core process in a non-esoteric, scientifically acceptable experiment.

Alexander teachers are equally capable of training laboratory scientists in their use, as well as assisting in the design of the experiment and interpreting the results. This means that an expert, after many years of experience, has a better chance of selecting the moment where high performance begins and has a better 'eye' for pinpointing the changes to be measured by the third-person scientist.

- **the third-person 'observer':** the Alexander Technique offers a wonderful combination of data for experimentation: the primary control of bipedal balance in earth's gravity and the phenomena of inhibition (epochè), direction (epochè), and giving consent (epochè). MRI scans provide the scientist with an opportunity to observe the brain in Alexander-specific conditions of nondirection and direction with primary control in a very precise way. This sort of experimentation is a perfect opportunity to test B. Libet's preconscious initiation of voluntary movement, as well as the veto-window of a fifth of a second where permission, inhibition, or style can be admitted.

Since Varela's death in 2001, he has become something of an icon of impeccable research in consciousness studies, and researchers from all of the interdisciplinary fields of cognitive science (Figure 3) have increasingly begun to quote him, as he quoted Husserl, in order to validate a new research strategy. One of the areas that will be profoundly affected by this new research is learning theory, which is the principal way of modifying widespread educational practice. The education of the future, whether private or public, will be forced to change its methodology as cognitive science proves that the brain functions very differently from what a dualistic system proposes.

Alexander's consistent views on the negative effect of traditional education and his focus on prevention seem to indicate that he hoped his technique would pass from having a re-educative role to a purely educative one, thereby averting the disembodiment of mind at its origin. In that light, I think that the Alexander Technique has a better chance of being recognized through the avenue of cognitive science. Varela's colleagues continue to create a vocabulary of phenomenological description which happens to be suitable to understanding the functions of the Alexander Technique, whereas the traditional strongholds of physiotherapy, medicine and psychology are still constrained by conservative reductionist practice.

These innovative scientists have arrived at the model of *epochè* as their best reduction of conscious experience. They have invited a Feldenkrais teacher to contribute knowledge from a body movement perspective. It would be a pity if they never knew that Alexander's process was so close to their own. If they are to know this, it will require that we meet them halfway by learning more of their language. There are already many Alexander teachers who are also musicians, dancers, psychotherapists, doctors and the like, and who, possessing the vocabulary of those professions, are able to make the Alexander Technique more accessible to students from those professions. I would not expect all Alexander teachers to agree to learn the language of cognitive science, just as not all would want to learn the vocabulary of dance, but I would like to find those who are interested in this direction.

4. Social interaction

An abbreviated form of this paper was presented twice during the 2004 Oxford conference. In each case, participants expressed appreciation for the topics, and, in particular, an appreciation for the attention paid to the psychophysical discomfort that they often experience during lectures of dense intellectual content, and the preventive measures we explored. They also reacted positively to the idea of integrating intellectual skill into their practice of the Alexander Technique as they might do in learning a new sport.

In addition, we discussed the possibilities of Alexander teaching being accepted into social health systems and the difficulties that could entail. One of the greatest difficulties is that Alexander's discoveries exceeded the vocabulary and the technology of his day and forever remained outside the mainstream of current acceptance.

Today, though there are thousands of Alexander teachers in the world and a hundred years' worth of validating testimonials from highly respected scientists and philosophers, Alexander's ideas are still far ahead of the formal validation criterion of social institutions. If we look closely at the requirements for membership into the professional arena, we will find the language of either dualistic reductionism (lowest common denominators) or the sanctions of an already discredited behaviourist model (which rejects consciousness). This creates an impossible dilemma for the Alexander Technique, which either has to say it is less than it is, thus belying its uniqueness, and arrive at the misnomer of 'bodywork', or dare to define its actual teaching practice in terms of 'non-doing', 'leaving one's self alone', 'thinking in activity', 'kinaesthetic transmission', and other phenomena essential to the Alexander experience. It is the exact formula for a double bind: in order to be validated as a member of an existing profession, you must misrepresent what you do (creating the grounds for a potential polemic within the Alexander community) and if you honestly present your professional skills, you will surely be rejected for claiming to be that which has no valid existence. Therefore, it might serve us well to approach this sometimes sensitive task of defining the Alexander Technique, the skills of an Alexander teacher, and the lived experience of a student of the Technique, with a conscious awareness of the difficulty inherent in expressing first-person experience for a third-person validation.

I mentioned that I had been approached by a trainee in Paris who had received permission to write a master's thesis on Alexander and John Dewey. (This is a rare opportunity, since Dewey has only recently been translated into French.) I suggested that those of us interested in research should consider pooling our resources to help such students.

To my surprise, within our conference discussion, it became evident that there were teachers who seemed shy, if not actually embarrassed, to share their written or published material about the Alexander Technique because of what they felt to be an anti-intellectual environment within the profession. Most everyone seemed enthusiastic about creating a method of accumulating such work and for collecting useful research articles that we came across in journals. We agreed that there should be a way to assist teachers interested in research so that they need not reinvent the wheel. Sharyn West suggested that we create a website. There were also requests for seminars on cognitive science and an understanding that working with scientists could become an exciting prospect for the future.

I would be delighted to have your comments, suggestions, and continued participation in this ongoing discussion. Please contact me via my email or postal address listed at the beginning of the article.



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Acknowledgements

I wish to express my appreciation to the colleagues who have offered guidance through the subtle issues of explaining the Alexander Technique. I wish to thank the following colleagues for so generously providing feedback and encouragement for this lengthy project: Walter Carrington, James Leifer, Michel Bitbol, Chloe Stallibrass, Charlotte Coe Lemann, Lucy Brown, Sharyn West, Melissa Rieley, Theresa de Belder, and Anne Oppenheimer.

Figures 1-5

1. The nervous system p.6. Rachel Zahn (2005)

2. The autonomic nervous system p.8: Psychology Image Bank. McGraw Hill:
<http://www.mhhe.com/socscience/intro/ibank/ibank/0111.jpg>

3. The interdisciplinary network of Cognitive Science. p.26. Rachel Zahn (2005)

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- Photograph of F. M. Alexander, (Copyright 2002, The Society of Teachers of the Alexander Technique. London)
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Biography

Rachel Zahn graduated from ACAT in 1969, assisted Judith Leibowitz at the Juilliard School, and joined the ACAT faculty from 1972–1981. During the 1970s she collaborated and trained with psychologists, developing a unique interdisciplinary approach to the psychophysical process of ‘high performance’ in artists, athletes and original thinkers.

Now living in Paris, Rachel is conducting research in cognitive science (under the direction of Michel Bitbol) at the University of Paris 1 and CREA, École Polytechnique, on ‘Psychophysical practice and the mind–body problem in the twentieth century’. She has been encouraged and inspired by an ongoing research dialogue with Walter Carrington.

Rachel is currently introducing the Alexander Technique to cognitive scientists and developing an introductory course in cognitive science for Alexander teachers. She conducts workshops internationally and maintains a private practice in Paris.

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