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[Psychoanalysis and Cognitive Neuropsychology: Complementary Approaches to](#)

[Mental Structure: Commentary by Marcel Kinsbourne](#)

[Marcel Kinsbourne](#)

“The founder of psychoanalysis came close to discovering by himself most of the modern tenets of cognitive neuroscience.” This sweeping claim typifies Dr. Carlo Semenza's well-intentioned attempt to discern affinity and forge alliance between theory in cognitive neuropsychology and psychoanalysis. The shotgun marriage never does come to pass. Semenza's inability to make the argument stick “damns it with faint praise,” and only succeeds in highlighting the shared shortcomings of the two theoretical approaches.

Semenza offers five “basic notions about cognitivism” (after Gardner, 1985, pp. 6-7):

Mental Representation as a Separate Level of Analysis

This notion is far from original to the cognitive neuropsychology movement of the last two decades, though the more recent theoretical claims about specific representations have been increasingly finely grained (Caramazza, 1992). There are now numerous local models that specify component operations intermediate in processing series. Psychoanalysis makes no such finely differentiated claims.

Instead, it uses a limited number of general rules, a set of typical or illustrative scenarios, and interprets the endless smaller-scale individual variations. It does postulate specific, albeit unconscious, memories. A shared interest in memory (for entirely different purposes) is scant evidence of kinship between cognitive neuropsychology and psychoanalysis, and the pivotal concept of memory failure as due to repression has not kindled much interest among cognitive scientists.

More characteristic of cognitive neuropsychology (and cognitive science in general) is Semenza's combined use of the constructs of representation and processing, the latter computing over the former. This binary machinery seemed plausible in the past, when it was thought that stimulus information in each modality was received at a specific “first cortical relay” site, and that the bulk of cortex is “association cortex,” devoted to its processing. We now know that most of the cortical convexity is modality specific, for input or output. It is populated by numerous “maps” in what used to be called association cortex, for instance at least 32 topographic maps in visual areas. This makes one wonder where the processing areas are, if anywhere. According to an alternative model, multiple representations in the network (of input, intention, memory, and evaluation) both influence and transform each other in a cognitive “chain reaction.” There might not be any separate processing machinery (Kinsbourne, 2000a). Such a model seems more in tune with the

psychoanalytic emphasis on subjective value (see also Brown's commentary, this issue) than is the current cognitive neuropsychology (and cognitive science) scheme, which is preoccupied with performance. The issue is controversial but it does show that in formulating one's mental models one ignores the brain at one's peril.

The Computer Metaphor

This metaphor fits right into the dichotomy between representation and processing to which I referred above. Obviously Sigmund Freud was not in a position to evaluate this. His more contemporary followers have been, but have not taken advantage of the opportunity. This is fortunate, because there is no evidence that the brain functions anything like a digital computer, at any level of abstraction. Gardner (1985), whose list of attributes of cognitive science this is, is struck by the "deep difference between biological and mechanical systems" (p. 388). In Gardner's view, "adequate models of human thought and behavior will have to incorporate aspects of biological systems" (p. 388).

Deemphasis of Affect, Context, Culture, and History

Nothing could be more antithetical to Sigmund Freud's *modus operandi*. Semenza seeks to justify this glaring deficiency of cognitive science as compared to psychodynamic theory by pointing out that it is "easier to start with a simplified situation." Yes, but not if one simplifies away the point of the exercise.

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A Foundation in Western Philosophical Scientific Tradition

Its foundation in this tradition hardly picks out cognitive science, or psychoanalysis, from any of the many competing approaches to how the mind-brain works.

Interdisciplinary Moves

Cognitive neuropsychology and psychoanalysis typically reject the most important interdisciplinary move: intertheoretical reduction to the neurophysiological level. In the case of cognitive neuropsychology, this is justified to the extent that its stock-in-trade consists of local models. At that level of detail, the neural substrate can rarely be specified in functional terms at our present level of knowledge. By ignoring contemporary neuroscience, as Semenza advocates, the discipline does run the risk of adhering to once fruitful but now outdated general models of how the human forebrain works.

Sigmund Freud did abandon the general model of forebrain organization that he outlined in his "Project for a Scientific Psychology" (1895), not because he, a neurologist, thought the brain irrelevant, but because there was not sufficient available neurological knowledge a hundred years ago. Such an effort in "neuropsychanalysis" may now be more realistic. If it were to succeed, it would be in terms of models at a far more general level than that at which cognitive neuropsychology currently operates. Pursuing affinities between cognitive neuropsychology and psychoanalysis, Semenza perceives a sympathetic resonance between Freud's ideas and "new useful notions in cognitive theory." He cites the following characteristics as affinities:

Both Disciplines Deal with Pathological Cases

Pathological cases are studied at multiple levels of analysis in neuroscience, both in animals and man. To base models of the brain on such findings is uncontroversial. There is no special affinity between cognitive neuropsychology and psychoanalysis here.

The Founders of Neuropsychology “Use Theoretical Models and Diagrams (Like) Those Used by Modern Cognitive Psychologists”

If so, so much the worse for the cognitive neuropsychologists. Insofar as this is correct, it highlights another shared shortcoming with psychoanalysis: the use of archaic boxology (box and arrow diagramming), that treats the brain as capable only of transmitting information along private lines, between centers at which specific processing occurs. The founders did not recognize the powerful effect of inhibition in the brain, although this was well known even before Sherrington's (1906) classic treatment of excitation-inhibition balance, without which differentiated behavior would not be possible. Their models took no account of feedback or reciprocal traffic or balance between centers. A pervasive reciprocity of interconnection between linked loci has also become obvious and undisputed. In short, the “old connectionists” used a capriciously depleted armamentarium of concepts, one that Sigmund Freud himself sharply criticized, referring to Wernicke, a prime perpetrator.

“Reliance on Dissociation” by Both Fields

This is word play. Dissociation is a foundational methodological concept in neuropsychology, cognitive or otherwise. In psychoanalytic theory it is an explanatory construct.

“Encapsulated Modules”

Encapsulated modules are invoked by Semenza in another attempt to find something in common between the disciplines. In cognitive neuropsychology, these are hypothetical modules whose modes of operation are impervious to the state of the neural context in which they are embedded. In psychoanalysis, Semenza characterizes the frequently encountered inaccessible “deep conflicts” in the analysand as “encapsulated.” The two constructs are different and unrelated. The former refers to a processing mode, the latter to an affectively conflicted experience.

Psychoanalysts and Cognitive Neuropsychologists both Study Single Cases

The similarity is illusory, because cases are quite differently selected in the two disciplines, for different reasons. The difference highlights a gulf between the two disciplines. Psychoanalysts are practitioners who work with patients who present to them, with little prior selection. In contrast, cognitive neuropsychologists select only a very few patients from among the

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host of the brain damaged, specifically because they are unusual in the apparent selectivity of their cognitive deficit. In cognitive neuropsychology, the patient's symptom or deficit is typically construed as revealing impairment of a previously unknown mental operation. The novel construct that emerges has the status of a hypothesis. Semenza (1983) expressed this well: “The principle of modularity too extensively interpreted may lead to the inflation of ad hoc devices designed to account for each particular finding. No single case report can afford the basis for a

theory; rather ... it can serve a useful hypothesis-generating function" (p. 9). In single case studies one has to await one or more comparable cases, on which the hypothesis generated through study of the initial case can be tested by successful prediction.

The credibility of psychoanalysis as a science would benefit from studies which, based on how one patient's disorder is construed, successfully predict similar problems in another patient who appears to have undergone a sufficiently similar experience. Ex post facto explication and rationalization cannot be considered scientific. Plenty of excuses are available should such prediction fail. But it would cumulatively enhance the appreciation of psychoanalytic theory as scientific if successful prediction could at least sometimes be demonstrated.

Semenza makes two more points: In cognitive neuropsychology, the emphasis is on single, isolable components of processing, not even on the classical neuropsychological syndromes, which are "more or less ignored." Nothing that interests psychoanalysts can be described in such fragmented terms. Further, Semenza dismisses parallel distributed processing (PDP) or connectionistic models of neuropsychological phenomena as being "insufficiently constrained." To the contrary, it may be that modular modeling is unduly restrictive (Plaut, 1995).

Connectionistic modeling captures the active and dynamic nature of the brain-mind far better than the frozen flowcharts of inferred serial processing. PDP architecture seems suited to modeling the subtle psychic phenomena of interest to analysts.

Future models will strive to capture the fugitive play of patterned neural activation/ephemeral thoughts across the highly interactive neural network. For instance, the smooth flow of microgenesis, emerging into awareness, with its emphasis on the qualitative nature of errors (see Brown, this issue) is better suited to dynamic theories than the staccato transitions from stage to stage in serial processing models of cognitive psychology, with their emphasis on quantitative performance. The boxological route maps that Sigmund Freud so emphatically rejected are indeed not suited for an account of mental life.

In the end, Semenza captures few tenets of psychoanalysis and not the ones that are the most convincing or fundamental. His omissions are eloquent. The fundamental tenets don't fit with cognitive neuropsychology.

We are far from being able to recognize in the real-time functioning of the neural network, the way in which it instantiates meaning and other key attributes of mind. But we do know some of the ways in which the brain might not work. It certainly does not work like a digital computer, any more than it works like Wernicke's telegraph exchange. Gardner (1985) comments: "cognitive science will have to incorporate (and connect to) neurobiology" (p. 388). Here, finally, is the key shortcoming that cognitive neuropsychology (construed narrowly) and psychoanalysis have in common: a reliance on initially fruitful but now outdated models. If Sigmund Freud were reincarnated in the 21st century, I suggest he would choose to be a neuropsychologist. Rather than seek to legitimize psychoanalysis as scientific by an imagined affinity to cognitive science, a fertile, versatile, and omnivorous mind such as his would override the parochial limits of cognitive neuropsychology and psychoanalysis. Such a mind might even discern a common

neural basis of constructs in cognitive neuropsychology and psychoanalysis, and thereby uncover the affinity that currently eludes them. More immediately, a productive approach to cognitive neuropsychology and psychoanalysis would utilize their complementary differences. The rich diversity of human behavior and subjectivity is the product of the impact of events on contrasting personalities (Schapiro, 1965). Brain lesions can both exaggerate existing personality traits and engender new and different ones. They can also create bodily states that defy the patient's understanding. This is seen in dramatic fashion in anosognosia, confabulation, and other states of misfit between knowledge base and perceived reality (Kinsbourne, 2000b). How do patients react dynamically to brain damage that not only restricts and distorts their experience, but also transforms their cognitive style and the coping mechanisms at their disposal? This rich and as yet largely untapped field of study lends itself to complementary neuroscientific and psychodynamic approaches.

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