

# ‘Where does the mind begin and end?’

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Wilson (2004), raises the question ‘Where does the mind begin and end?’, pointing to the disparity of conceptions of the individual across the social sciences. Each domain’s prototypic mind is a unit of study delimited by its ontology, methodology and dominant schools, a constructed individuated entity, carrying a weight of motivational assumptions, predictive utility and normative rationality.

Wilson (2004), defends the utility of atomised individualism – pipetting the brain, mind or social actor onto a metaphorical microscope slide for decontextualised investigation. In doing so, he rejects levels of analysis above and below the individual – from meta-individual processes of collective cognition to endophenotypic assessments of vulnerability to mental illness.

In this essay I will reject Wilson’s atomised mind, situating the individual within an environmentally extended working memory – a symbolically weighted, spatially and temporally extended system of shared representations. I will examine the individuated notion of the ‘disease process’ in psychological disorder, and the capacity of psychology’s implicit ontology and methodological framework to elucidate the mind. Finally, I will overview evolutionary, embodied, economic, and network models of cognition; alternative conceptions of the limits of the mind, as neither wholly intrinsic nor entirely external.

An oft-cited metaphor in systemic explanations of cognitive function is the image of a river, representing the emergent nature of social cognition and the situated mind. Viewed in isolation, a single H<sub>2</sub>O molecule possesses properties radically different to those of a body of water. Quantitative reactions and behaviours emerge - fluid dynamics, boiling and freezing, evaporation, weather phenomena – as a function of both the quantity of molecules present, and their situation in multilevel environmental systems; systems that are simply not present at the individual level of observation. Similarly, cultural artifacts such as Moscovici’s social representations (Moscovici, 1976) or Ross’s Psychocultural Narratives (Ross, 2007) - are irreducible to individual humans, and yet take a part in directing behaviour and framing our understanding of the world.

Cognitive processes have neurological tokens – tokens visible in selective neurocognitive damage, like the ‘moral reasoning’ skills lost by Phineas Gage and other patients with damage to the ventromedial prefrontal cortex (Wagar & Thagard,

2004); or in the functional disassociations visible in Asperger's Syndrome, where theory of mind is to a greater or lesser extent diminished (Baron-Cohen et al, 1997), and William's Syndrome (in which linguistic skill and sociability are preserved despite concurrent learning disability) (Mervis & Klein-Tasman, 2000). Cognition however, cannot be adequately described in terms of such tokens, without losing both the qualitative nature of experience and the functional and adaptive meaning of behaviour.

Wilson (2004), describes the environmental inputs to the brains 'language acquisition system' - a device proposed by Chomsky to account for universal commonalities in language construction and acquisition (Chomsky, 1968) - as of secondary importance, next to the rich internal structure of our innate grammatical and semantic capacities. Our capacity to acquire language is almost certainly innate, witness the selective loss of language production and comprehension in neurological insult (Kolb & Whishaw, 2001), or the creolisation of languages in developmentally isolated populations (DeGraff, 2001). However Wilson (2004), posits that both the physical environment prescribing the competitive advantages selected for in the evolution of language; and the social environment, without which language either fails to develop or develops in a grossly attenuated manner (Candland, 1995), are secondary to an internally rich structure. Language is a capacity requiring for its development the presence of a facilitating intrauterine environment; a capacity supported by the cognitive scaffolds necessary for structure to develop, and by exposure to the concept and content of social communication. To suggest that these factors are secondary to linguistic development is an exercise in reductionism.

Wilson's external minimalism thesis is an ahistoric rejection of the processes of development - cosmological development, ecological development, evolutionary development and socio-cultural development - which have shaped not only the subglottal physiology and communicative neuroanatomy of language production, but the mind itself. Wilson constructs straw tabula rasa arguments from which to defend his 'strong nativism'; mischaracterising contemporary anthropologists as naive constructivists (Shore, 1999), and miscasting evolutionary psychologists like Tooby & Cosmides as allies to an untenably individualist perspective (Wilson, 2004).

Evolutionary psychology situates adaptations in the context of constant environmental factors, temporally persistent features of the Environment of Evolutionary Adaptedness (EEA). To this view traits and adaptive behaviors are only expressible and valuable within a specific spectrum of natural ecology or social community. Wilson's misapprehension seems to lie in his construal of genes as information carriers, prescribing in rich detail the structure and functions of anatomy and mind. This is a false dichotomy, as genes are not units of knowledge, but rather of information, mindlessly duplicated and transcribed by intercellular processes unaware of their function. They represent interspecifically and intraspecifically adaptive solutions to environmental challenges; but only in the context of the Pleistocene environment to which they (blindly) adapted. Evolution is an environmental process acting on the substrates of species and organism, just as erosion is a process of entropy acting on a geographic / sedimentary substrate. A process that has left us constrained by a variety of bounds to our rationality – cognitive blind spots and limitations where adaptation has not caught up to the challenges of modern life – from the radical discounting of future costs to a tendency to overeat.

If Wilson is wrong about the mind, if it requires a context to emerge, behave and acquire meaning, what then are its limits?

The cognitive revolution has demonstrated conclusively that preconscious, non-conscious and implicit processes make up the great majority of cognitive activity (Lakoff & Johnson, 1999, cited in Bem & DeJong, 2006) – just as the autonomic nervous system maintains homeostasis without recourse to conscious control or awareness. Similarly, while leaning can be a conscious process (or by contrast automaticised) the stores of long term semantic, experiential and procedural memory exist outside the immediate sphere of accessible thought – and may remain so despite our most directed efforts, until they spring again unbidden into conscious awareness. Despite this, work on both the construction of memory and its erasure, evidences a rejection of an immaterial store of thought and affect.

Elizabeth Loftus has established that mere elicitation of an existing memory can open it to modification (Loftus, 1974), while a new memory can be established through suggestion (Loftus, 2007). Similarly, the protein inhibitor anisomycin can be used to reduce the affective weight of recollected memories, and even to completely erase

them, although in this case the mechanism of action has been challenged (Rudy et al, 2006).

Some aspects of mind, in the sense of mental content, can therefore conclusively be said to be materialist – tied to structure, synaptic plasticity and patterns of neuronal activation. But this leaves us with a variety of puzzles. How can mere physiology give rise to the subjective experience of qualia, to reflexive self awareness – both distinct from, and capable of countermanding automatic reactions and preconscious processes. How can the brain establish causal agency? How can mere data, patterned homunculi, representations of our body and environment on the surface of the neocortex, create a person, still less facilitate the collective cognition of tribe, culture or society?

An implicit tension exists in psychology – where the unit of study, the individual, is of the same nature as the observer. Object and subject are linked, working together to create the individual through the discourse of the discipline and its influence on the wider culture. One example can be seen in Moscovici's investigation of the popularisation of psychoanalysis in France, where the developing discipline adopted much of the social and linguistic baggage of the confessional in traditional Catholicism (Moscovici, 1976).

Psychology's concept of the individual as a sum of observable stimulus responses (behaviourism), of cognitive processes and mental stores (cognitivism), or even as the subject of social influence and group processes (American social psychology), is not an inevitable empirically determined fact, but the output of the Western tradition of empiricism and logical positivism. Other cultures are more amenable to concepts like a 'bicameral mind' of collective consciousness and experience, interpreted as psychosis in the west (Jaynes, 1976), more frequently exhibiting social contagions or group psychological disorders.

Danziger (1997), argues that the categories and units of measurement that have developed in psychology, lack cross-cultural and even cross-temporal validity. Danziger described how terminology carries culturally specific meanings implicit in its origins and every-day meaning (Danziger, 1997).

This relativity is evident in the disorders of the American Psychiatric Association's 'Diagnostic and Statistical Manual of Mental Illnesses' (APA, 1994). In defining

Major Depression for example, the DSM suggests the possible substitution in non-Western clients of somatic symptoms for dysphoria. Health psychologists pointed out the ethnocentricity of such translations, pointing out that depression - as understood in modern capitalist post-industrial societies - is as much a culture bound syndrome as South-East Asia's Koro, or Malaysia's Latah; with its own social function – not amenable to translation into the symptomology of other cultures. MacLachlan (2004, 2006), emphasises the invisibility of the underlying disease process assumed to be common to the varied symptoms of Depression and its supposed cross-cultural variants (e.g.: somatic complaints, diagnosed as Neuroasthenia in China); a disease process whose existence is inferred from a set of localised somatic and psychological symptoms, and situated within the cultural and historic context of Western positivist medicine.

Robinson (2007), posits the need for a theoretical psychology to examine the validity of psychological theories and methodology; given the tendency for psychology to tackle the most tractable (rather than meaningful) of questions, and problems inherent in psychology's reliance upon probabilistic statistical estimations. The analysis of variance in the performance of a task or the appearance of a phenomena, does not in itself speak to the construct validity, the meaningfulness of the approach or results obtained, or the value of studying the phenomena observed (Robinson, 2007). In contrasting psychology with theoretical physics, Robinson demonstrates the arbitrary, decontextualised, domain specific nature of what constitutes 'psychological reality', and the speculative nature of the cognitive processes underlying contemporary experimental psychology – the essential lack within psychology of an underlying general theory (Robinson, 2007).

In examining metalanguage (the shared set of supposedly 'theoretically neutral' terms) delimiting psychological categories and unifying the varied strands of Psychology, Danziger (1997), points to the historical interconnectedness of methodology and typology, which acts to disguise the social and interpersonal context of experimental psychology. Statistical variables, Danziger explains, became reified into psychological constructs in neo-behaviourism; allowing distinct categories of phenomena to be causally related and operationalised, without consideration of their relationship or mechanism of action - blurring the distinction between experimental

models and the phenomena they purport to investigate (Danziger, 1997). This approach persists today in the experimental emphasis on the contribution of 'independent variables' to between group differences - for example the extent to which maternal depression predicts child depressive disorder -, divorcing the individuals studied from their multidirectional inter-relationships and glossing over the mechanisms of causation of reported 'contributions to variance' (which are frequently tiny). A recent study posited as having validated the systems level assessment of the role of genetic variation in cognition and intelligence, demonstrates minimal contributions of endophenotype to variance in synaptic abundance (1.9%) and episodic verbal memory  $F=3.89$   $df=2, 591$ ,  $p = .02$  (Egan et al, 2003). Danziger's point is that psychologists have adopted statistical tools that contain implicit normative and atomising theoretical assumptions, and have in the process obscured the difficulties and social criticism innate to the study of human beings; and that it is this failure which has prevented psychology from gaining the predictive and hermeneutic utility it seeks.

Glaeser (2004), critiques social psychology's focus on the effect of social influences on individuals, rather than the psychology of groups. This is distinct from an emphasis on the transformative effects of group membership (see Greenwood, 2003, for one such critique), referring rather to the neglect of Interacting Cascade, Swarm Intelligence (Couzin, 2007), and Cognition in the Wild (Hutchins, 1996) models of collective computation and emergent cognition (Crutchfield, 1994). Glaeser's solution is to propose the use of economic theories to account for the supply of cognitive distortions, positing a top down supply-side account of the spread of irrational beliefs (specifically an 'Economics of Hate'), as governed by the demand and supply of utility maximising ideas (subject to cognitive distortions, such as loss avoidance) (Glaeser, 2004).

Danziger demonstrates how embedded psychology and its conception of the mind are in the language of the discipline (Danziger, 1997). While this is an uncontroversial position within philosophy, contemporary psychology has fetishised functional imaging paradigms as uncovering the most profound level of psychological explanation. Cognitive psychology has provided an expository frame for the experimental design and the interpretation of neuroimaging results, and has gained in

return a boost in credibility from its association with hard sciences like physics and neurochemistry.

If what we think of as the mind cannot be completely described in terms of stimulus response relationships, linear variables or individual brain chemistry, then what does it encompass? How can such notions be addressed without a decent into qualitative subjectivity?

The neuroscientist Antonio Damasio elucidates one aspect of the situated, embodied mind. His Somatic Marker Hypothesis situates a storehouse of affective knowledge in a variety of somatic states, polled by the ventromedial prefrontal cortex to provide pre-conscious subcortical influences on decision making (Damasio, 2005).

Bem & DeJong (2006) elaborate the notion of an extended mind, embodied both literally, and figuratively, in the individual's social and physical environment.

Evolutionary psychological approaches posit evolved mental mechanisms tailored to specific environmental problems (Buss, 1999) (everything from spatial reasoning to the correct position to take in an unbounded game of reciprocal trades). To this conception instinct and environment cohere to describe the patterns of comprehension and cognition delimiting the mind. The individual can be separated from the environment to which he is adapted, but both the environment as a developmental facilitator and the individual as a key in the latch of his ecological niche, reflect and prescribe one another. Humans mould and develop their own environments – sometimes maladaptively – to hyperstimulate mechanisms designed to facilitate survival and successful reproduction in the EEA. This is true whether or not the 'spurious generalisations' (Bem & De Jong, 2006) of Cosmides & Tooby, accurately portray the theories of evolutionary biology. Our ability to utilise such knowledge, to infer and experimentally evaluate hypothesised features of the organism – ecology dyad, may however depend upon the validity of such theories.

Similarly 'situated' perspectives on cognition come from efforts to develop artificial intelligence (Bem & DeJong, 2006). With the failure of lexical and connectionist models to construct a decontextualised artificial general intelligence (AGI); roboticists began to construct intelligences whose model of the world was situated in an environment, providing context and responses to their dynamic functions (Bem &

DeJong, 2006). The utility of such approaches to the exposition of the embodied mind is evidenced by their radical successes in enabling robots to navigate and perambulate through their environment, as witnessed in the recent traversal by an autonomous vehicle of 132 miles of novel desert terrain in under 7 hours (Thrun, 2006); utilising a 'perception action cycle' (Bem & de Jong, 2006) of assessment, performance and adjustment.

Developing models of cognition as situated in the social and physical environment are calling into question psychology's conception of the individual. In studying the extended mind, not as an element of subjective culture or an invisible social function, but as a holist emergent process; inextricably linked to the natural and social world; we may move closer to psychologies traditional goal of predicting behaviour, to understanding the dichotomy of qualia and brain function, and to comprehending the social, phenomenological nature of 'psychological disorder'. Adaptivist network models may offer an escape from the trap of metalanguage, and the methodological reductionism that has typified experimental psychology, whilst retaining the inferential utility of quantitative experimentalism.

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