

The science of subtlety

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Too many of us have become Stingy Materialists. A Stingy Materialist takes the view that subjective experiences may not be real if they have not yet been associated with particular brain areas, neurotransmitters, or genes. They suppose that if we have found the brain area for pain, then pain is a real emotion; but if we haven't yet found the brain area for sexual jealousy or existential dread, they are probably not real emotions. Likewise, if we have found neurotransmitter deficits in schizophrenia, then it is a real disorder; but if we have not found such deficits in irritability, then perhaps it is not a real disorder. Stingy Materialists lack confidence in their doctrine and in their consciousness, with the result that they fetishize neuroscience, and seek its approval for all things subjective. Since neuroscience is still in its infancy, this results in an infantile view of human nature, in which people are portrayed with crude outlines and primary colors, like stereotypes from a Jerry Bruckheimer action film.

Generous Materialists like Charles Darwin and William James took quite a different view. They accepted that all subjective experiences are based in brain activity, and were confident that all the subtleties of thought and feeling would prove to have a material basis. They were generous in attributing rich subjective experience to all individuals with complex brains. They were equally confident in scientific materialism and in human consciousness.

In the next 50 years, I think we will all become much more generous in our materialism. As neuroscience maps more of the subtleties of human consciousness, these subtleties will become better accepted and appreciated, to the benefit of our relationships and our society. Stingy Materialism tends to make people selfish and arrogant; Generous Materialism will make us more empathetic and humble. The key will be the development of new technologies for mapping neural activity and gene activation patterns in the brain. These will show us exactly what is going on in our heads, not only when we do simple cognitive tasks that we don't care about, but when we have complex social interactions that involve real emotion. As the intricacies of our thoughts, feelings, and social interactions are objectively validated by these new technologies, science will develop a more nuanced view of the psychological complexities within each person, and the differences between people.

A century ago, we had to rely on the novels of Henry James to portray human consciousness in high-resolution detail and rich-spectrum color. In the future, we

won't be able to rely on mass culture to do that – Viacom and Disney don't see the profit in it. But we may be able to turn to science to fill the void.

A little history can put Stingy Materialism in perspective. In the 19th century, psychology was done by and for Western intellectual bourgeois men. This had some well-known limitations: for example, there was little recognition of women, children, non-intellecutals, members of other cultures, or non-human animals as conscious beings. But it also had an under-appreciated advantage: the psychological similarities shared by Western intellectual bourgeois men allowed them to develop sophisticated ways to write to each other about the subtleties of having a rich inner life. There was a positive feedback loop between bourgeois psychology and bourgeois culture, exemplified by the correspondence between William James and his brother Henry. They traded introspections fervently, and got locked into a fraternal one-upmanship in trying to describe consciousness. More generally, the refinement of late 19th century European culture was reflected in the scope of psychological theorizing by Charles Darwin, Francis Galton, Sigmund Freud, Frans Brentano, James Mark Baldwin, William McDougall, and Wilhelm Wundt. They weren't afraid to write about emotions, aesthetics, love, family life, or altered states.

In the 20th century, everything changed with the democratization of mass culture and the rise of reductionism and positivism in science. Psychology expanded its subject pool, but narrowed its subject matter. Women, children, the working class, non-Western peoples, and primates achieved more political rights, and better representation as subjects in scientific research. At the same time, the culture industry expanded its clientele, with mass media such as film, radio, and television replacing the elite intimacy of the novel and the theater. Cultural depictions of human nature gradually became more stereotyped and less nuanced for this mass audience. In parallel, there was a gross simplification of psychology's content. The Behaviorism of Watson in the 1920s and Skinner in the 1950s emphasized learning and excluded almost everything else: thinking, feeling, speaking, socializing.

With the cognitive revolution of the 1960s, computation replaced learning as the dominant metaphor in psychology, but this did not broaden psychology's subject matter very much. It was still taboo to write about real social, sexual, or family relationships, or the diverse states of consciousness. Positivism, empiricism, and reductionism shifted the burden of proof against human consciousness: any state of mind that could not be validated in the laboratory was regarded as unreal. Since almost nothing about conscious inner life could be validated in this way given the experimental methods then available, most of subjective human life was excluded from the science of psychology.

In short, both Western culture and psychology became Americanized in the 20th century. They became more inclusive but less sophisticated, more objective in method but less accurate in result, more progressive in orientation but less

successful in hindsight. They also became more egalitarian concerning political relations between strangers but less cognizant of social relationships within families and communities. Finally, they became more efficient about describing and exploiting solipsistic knee-jerk reactions, but less accepting of any conscious state that involves ambiguity, imagination, empathy, moral judgement, or aesthetic discrimination. Psychology assumed that it had to choose between behavior and consciousness, between empirical respectability and subjective accuracy.

I think this assumption will be proven false in the next 50 years. New technologies have the potential to validate a much greater range of human subjective experience. The result may be a much richer and more accurate model of human nature – but only if scientists have the guts to study real thoughts and feelings in meaningful social situations.

For example, brain imaging methods can show which areas of the brain are active when we are doing particular mental tasks in a laboratory. Until now, most such tasks have been taken from standard perceptual or cognitive psychology, and do not have any intrinsic meaning to the participants. I was a subject in such a brain imaging experiment as an undergraduate, and spent six hours at the Columbia Medical School, comparing simple geometric shapes to each other, while strapped to a bed with twenty Geiger counters pointed at my brain, breathing a mix of oxygen and radioactive xenon gas. It was not the most enjoyable day one can have in New York. Certainly, it is useful to know which parts of the brain are involved in shape discrimination. But I had many thoughts and feelings unrelated to shape discrimination: worries about the last argument with my girlfriend, attempts to reconstruct the plot of a Pasolini film, speculations about Reagan's senility. From the viewpoint of the researcher, these passing thoughts were 'noise', and perhaps if I had a sufficient diversity of experimentally irrelevant states of mind, they would all average out in the end.

However, there is something peculiar about experiments that pretend the thoughts and feelings of participants are much simpler than they really are. We should admit that current brain imaging technology is just not good enough for us to study fluid, complex thoughts and feelings about socially meaningful situations – and we should strive to develop systems that can. To some extent, better spatial and temporal resolution will help. If we can measure precisely which cubic millimeters of brain are active on a millisecond-by-millisecond basis, we will be able to study much more subtle psychological processes. Yet a change in research style may also be necessary. We could revive the 19th century tradition of introspection as used by Frans Brentano and William James, in which psychologists were their own best subjects. We could just put ourselves in the brain imagers, and systematically explore states of mind to see what lights up. Yet this would have the same behavioral limitation as introspection: we cannot observe ourselves while doing the sorts of real social interaction that are subjectively all-consuming, such as conversing, flirting, bargaining, fighting, or

breast-feeding. To do that, we'll need brain imaging systems that are light, robust, mobile, and inconspicuous. Only then will we be able to map the brain's true repertoire of capacities.

The other key technology in validating the complexities of human consciousness will be gene expression mapping. Each brain cell has a full set of genes, but only some of these genes are actively expressed at any given time. That is, only some are transcribed into RNA and thence into proteins. Moreover, different brain areas have different gene expression patterns, and these gene expression patterns change over time – not only across development from embryo to adult, but also across situations from day to day and month to month. There are feedback loops between social environment, neurophysiology, gene expression, and behavior. When we fall in love, no doubt the gene expression map of our brain changes. When a friend dies, likewise. Almost every state of mind that lasts more than a few hours may involve changes in gene expression, and scientists have barely begun to track these changes.

Once the technology improves, and we can do track gene expression in real time, in living people, a new world of psychological complexity will open up. We will be able to see the correspondence between modern social situations and the genetically evolved behavioral capacities that they elicit. We will also get beyond the muddled nonsense the nature and nurture are 'inextricable', and see more clearly how specific situations, thoughts, and feelings activate specific genes, and vice-versa. The charge that evolutionary psychology is a set of 'just-so stories' will vanish as we see the genetic footprints of evolution dancing across our brains.

If we have the courage to use them sympathetically, new developments in brain imaging and gene expression mapping will validate a much broader range of human experience. If we can find objective neural and genetic markers of conscious states that seem ephemeral or idiosyncratic, those states can be taken more seriously as part of human nature. We shouldn't really need this objective validation, but we do. There seems to be an innate tendency to act as if one's own mental life is much more complex, meaningful, and valid than that of anyone else. The 19th century Introspectionists focused on themselves, forgot about others, and described a rich inner world. The 20th century Behaviorists forgot about themselves, focused on others, and described a crude human nature based on learning and computation. The 21st century psychologists will break down this distinction between self and others, between subjective and objective, between Henry James and William James, by showing the neural and genetic signatures of even the most fleeting, whimsical, and ambivalent manifestations of human consciousness.