Identity Expansion and Transcendence*

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ABSTRACT

Emerging developments in communications and computing technology may transform the nature of human identity, in the process rendering obsolete the traditional philosophical and scientific frameworks for understanding the nature of individuals and groups. Progress toward an evaluation of this possibility and an appropriate conceptual basis for analyzing it may be derived from two very different but ultimately connected social movements that promote this radical change. One is the governmentally supported exploration of Converging Technologies, based in the unification of nanoscience, biology, information science and cognitive science (NBIC). The other is the Transhumanist movement, which has been criticized as excessively radical yet is primarily conducted as a dignified intellectual discussion within a new school of philosophy about human enhancement. Together, NBIC and Transhumanism suggest the immense transformative power of today's technologies, through which individuals may explore multiple identities by means of online avatars, semi-autonomous intelligent agents, and other identity expansions.

Introduction

For over three centuries, the forces unleashed by the Enlightenment and the Industrial Revolution have been eroding traditional notions of human nature, even as they have been expanding the powers of human creativity. In the present century, we may have reached the point at which it may be impossible to say what we *are*, even as we can decide what we *will be*. Two parallel

* The views expressed in this essay do not necessarily represent the views of the National Science Foundation or the United States.

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intellectual movements, Transhumanism and Converging Technologies have been developing rather deep conceptualizations of this dynamic situation, largely independent of each other, and one theme of this essay will be how these two historical strands can be knit together. Two specific issues will anchor the discussion, personality expansion and death transcendence, both to a significant extent achievable through the application of advanced information technology.

Since the first time a proto-human intentionally chipped a piece of stone to make a cutting tool, technology has extended the scope of human action, but now such developments as artificial intelligence permit extension of our very identities. Fear of one's own death, and grief over the death of loved ones, largely motivated the invention of religion, which is severely threatened by modernity. Advanced technology offers more than merely transcendence of death, but implies a reformulation of human nature and thus of societal institutions like churches. These issues can best be addressed after considering the origins and histories of the two intellectual movements.

1. Transhumanism

Primarily philosophical and cultural, Transhumanism has many roots and branches, so it is impossible to set an exact boundary on this movement. An obvious core is a small network of friends, primarily in the United States and Britain but also including people in many other nations, who communicate intensively with each other and have held various conferences and set up a dynamic series of formal organizations with names like The Extropy Institute, Terasem, The World Transhumanist Association, and Humanity+ (H+). In addition to the somewhat organized core of the movement, a significant number of very famous individuals have charted their own transhuman courses and intermittently interact with each other and with the organizations. Each member, in his or her own way, draws upon older intellectual traditions. One way to get an efficient overview is to scan the online self-descriptions of four of the related groups:

> Humanity+ (humanityplus.org and hplusmagazine.com):
> ...dedicated to elevating the human condition. We aim to deeply influence a new generation of thinkers who dare to envision humanity's next steps. Our programs combine unique insights into the developments of emerging and speculative technologies that focus on the well-being of our species and the changes that we are and will be facing. Our programs are designed to produce outcomes that can be helpful to individuals and institutions. Humanity+ is an

> international nonprofit membership organization which advocates the ethical use of technology to expand human capacities. In other words, we want people to be better than well.
>
> Institute for Ethics and Emerging Technologies (www.ieet.org):
> ...formed to study and debate vital questions such as: Which technologies, especially new ones, are likely to have the greatest impact on human beings and human societies in the 21st century? What ethical issues do those technologies and their applications raise for humans, our civilization, and our world? How much can we extrapolate from the past and how much accelerating change should we anticipate? What sort of policy positions can be recommended to promote the best possible outcomes for individuals and societies?
>
> Terasem Movement, Inc. (www.terasemcentral.org):
> ...a 501c3 not-for-profit charity endowed for the purpose of educating the public on the practicality and necessity of greatly extending human life, consistent with diversity and unity, via geoethical nanotechnology and personal cyberconsciousness, concentrating in particular on facilitating revivals from biostasis. The Movement focuses on preserving, evoking, reviving and downloading human consciousness.
>
> Singularity University (singularityu.org):
> ...a unique interdisciplinary, international and intercultural experience which challenges students to use transformative, exponential technologies to address grand challenges. SU educates and inspires students to discover and design sustainable organizations to positively impact humanity.

Transhumanists frequently cite Friedrich Nietzsche's concept of the Übermensch, presented well over a century ago in somewhat obscure form in the philosopher's quasi-biblical masterwork *Also Sprach Zarathustra* (Nietzsche, 1885; Sorgner, 2009; Bainbridge, 2010). The Übermensch is a superior form of being, toward which humans should aspire, although its exact nature and the route to its accomplishment may be beyond our present comprehension. A primary question for Nietzsche himself was how individualistic versus communal the Übermensch should be, a debate outlined in his earlier book *The Birth of Tragedy*, and this remains an issue (Nietzsche, 1872). In the first half of the twentieth century, many science fiction authors wrote often rather deep novels about superior humans, which were the product of natural evolution, mind-training systems, or advanced technologies.

Examples include *Odd John* by Olaf Stapledon (1935), *Slan* by A. E. Van Vogt (1946), and *More Than Human* by Theodore Sturgeon (1953).

Given the individualism and powerful achievement motivations of many current Transhumanist leaders, it is difficult to assemble an authoritative history of the early days of the movement, because each leader has a different recollection of it including the role they themselves played. Clearly, a key individual was Fereidoun M. Esfandiary, son of an Iranian diplomat who settled in the United States and changed his name to FM-2030 to symbolize both the rejection of constraining ethnicity and the embrace of future possibilities. His 1989 book, *Are You a Transhuman?*, not only set forth many principles of what became H+ but was organized around an extensive questionnaire that could be used to document the values and personality of the reader preparatory to various transformation methodologies (FM-2030, 1989).

Recently, two of FM-2030's associates, Max More and Natasha Vita-More (2013), published a massive edited volume nicely summing up this heritage, *The Transhumanist Reader*. Ten of the 42 chapters were reprinted from periodicals they had edited in the period 1992-2002 under the name *Extropy*, a term More defines as "the extent of a living or organizational system's intelligence, functional order, vitality, and capacity and drive for improvement" (More, 2013, p. 5). Transhumanists sometimes use the term *extropy* as an antonym for *entropy*. They generally do not use the alternative term from physics, *enthalpy*, nor *élan vital* which Henri Bergson (1911) considered to be the impetus responsible for evolution, but these are similar concepts. Another 19 chapters were newly written expressly for the *Reader*, and the remaining 13 were reprints from a variety of sources. Several of the contributors are quite prominent intellectuals, notably the artificial intelligence pioneer Marvin Minsky, who brought copies of his book *The Emotion Machine* (Minsky, 2006) to one Terasem meeting I attended, and Singularity University futurist Ray Kurzweil who discussed his book *The Age of Spiritual Machines* (Kurzweil, 1999) with me at another.

The nine sections of the *Reader* offer an ontology of the movement, beginning logically enough with an exposition of philosophical themes, including an eight-point Transhumanist Declaration that ends by proclaiming a new human right: "We favor morphological freedom - the right to modify and enhance one's body, cognition, and emotions. This freedom includes the right to use or not use techniques and technologies to extend life, preserve the self through cryonics, uploading, and other means, and to choose further

modifications and enhancements" (More, Vita-More, 2013, p. 55), *Cryonics* is the practice of freezing the entire body or just the head of a recently deceased person, in hopes that future biological technologies will be capable of restoring the individual to life and health. FM-2030 is currently under cryonic suspension, and Max More is the president of the Alcor Life Extension Foundation, the most prominent organization providing this service. *Uploading* refers to the transfer of human personalities into computerized information systems, hopefully allowing them to continue to function and interact with living people after their original biological substrates have ceased to function. That is the area within Transhumanism where I myself have been most active. My new book, *Personality Capture and Emulation*, describes the current state of the technology and sets out an agenda for further development (Bainbridge, 2014). My *Reader* essay and my other recent book, *eGods*, outline how people can cooperate to achieve cybernetic immortality, through avatars of a deceased person under the control of a living person (Bainbridge, 2013a, 2013b).

The second and third sections of the *Reader* cover human enhancement in the somatic and cognitive spheres, and the fifth section explicitly concerns death transcendence. Other sections describe the core technologies, consider ethical and political implications, and offer the optimistic view that technological development is accelerating toward a singularity at which almost anything will be possible. The final section responds to the assertion by conservative intellectual Francis Fukuyama (2002, 2004) that Transhumanism is the most dangerous idea in the world, worse even than Islamic radicalism, thus deserving to be suppressed.

A more moderate debate , roughly parallel to the cryonic-upload and somatic-cognitive distinctions, concerns whether the most promising technologies for human modification are biological or computational. Brian Wowk's (2013) contribution to the Reader's section on death transcendence takes the biological approach, and was reprinted from *The Scientific Conquest of Death: Essays on Infinite Lifespans*. I also had contributed to that earlier anthology, with an essay on computational personality capture (Bainbridge, 2004), that was published right between similar essays contributed by Ray Kurzweil (2004) and Marvin Minsky (2004). A later collection with the same perspective, *Unnatural Selection: The Challenges of Engineering Tomorrow's People*, included chapters by several *Reader* contributors, among them another of my personality capture studies (Bainbridge, 2009).

Whatever disciplines they earned their academic degrees in, most Transhumanist leaders function as philosophers, proposing and analyzing ideas and ideals, rather than conducting empirical research or constructing technologies. While imaginative, members of the Converging Technologies movement exhibit the opposite pattern, anchoring their work in practical accomplishments. Thus the two parallel movements have achieved an efficient division of labor between them, and those of us who belong to both believe they are partners creating the future for all humanity.

2. Converging Technologies

Primarily a technologically sophisticated community for research and engineering, Converging Technologies grew out of an intellectual movement initially focused on nanoscience and nanotechnology, which subsequently added biotechnology, information technology and new technologies based on cognitive science to go through a decade-long phase when it was called NBIC for Nano-Bio-Info-Cogno. The primary mode of organization and communication has been major conferences sponsored by US government science agencies, often with international components, that brought together experts across many fields from academia, industry, and government. Book-length reports always resulted from these conferences, often influential in shaping support for research around the globe (Roco & Bainbridge, 2003; Roco & Montemagno , 2004, Bainbridge & Roco, 2006a, 2006b). The latest such report was based on workshops held around the world, and organized from the US National Science Foundation (Roco et al., 2014). Participants were generally leaders in conventional institutions, and included only a few people directly associated with the Transhumanist social movement. Five of the contributors to *The Transhumanist Reader* also contributed to the Converging Technologies reports, in addition to myself: Wrye Sententia (2004, 2006), James Hughes (2006), Andy Miah (2006), and Anders Sandberg and Nick Bostrom (2006).

The historical origins of nanotechnology are open to debate, because two competing models can be argued. First, research and engineering at the nanoscale - structures less than 100 nanometers in size but larger than single atoms - was a natural extension of normal-science work in physics, chemistry, materials science, and microbiology. Second, it may have resulted from a revolutionary-science movement because its public face in the 1990s was

science fiction inspired by non-technical publications written by Eric Drexler, who is a technically sophisticated visionary, but not exactly a scientist or engineer. I prefer to look at it in a third way, more oriented toward the future than the past, but beginning with a conceptualization of prior human evolution (Bainbridge, 1997).

The universe was not created by a god, but selected by a human being, namely yourself. Of course, this is a metaphor, but worthy of consideration as a step toward a more formal model that might be developed in the future. There already exists a philosophical idea known as the Anthropic Cosmological Principle (Carr & Rees, 1979, Gale, 1981; Leslie, 1982; Barrow & Tipler, 1986), opposed to the more traditional Argument from Design.

Why is the world conducive for human life? Because God made it so. That is the Argument from Design: God must exist because there is no other explanation for the benevolence of nature toward humans, than that some superior being created the world with that purpose in mind (Bertocci, 1945). Corollaries of this theory are that the universe is meaningful, that its meaning centers on human beings, and that humans can trust that the future will be good. A century ago, when science had begun to discover how complex nature really was, biochemist and sociologist Lawrence Henderson (1913, 1917) pondered the ″fitness of the environment″ in a way that suggested science could be itself part of God's design, but admitting that our existence remained something of a puzzle. Today's scientists and engineers may not be religious, or contemplate the Argument from Design, but they seem committed to the view that endless progress is indeed possible, which would be the case if it were central to God's plan.

The Anthropic Cosmological Principle offers an alternate explanation, atheistic and less optimistic, in which the word *anthropic* places humans rather than gods at the center of the mystery. Here is one variant of it. The universe is vast and complex, containing a great variety of environments, possibly infinite in its diversity. At one location in space and time, the planet we call Earth formed at the proper distance from a G-type star to possess oceans, a non-toxic atmosphere, and other conditions required for the emergence of life. The process of emergence may have involved very low probability local events assembling the first self-reproducing molecules, but then natural selection from random variation led to evolution toward ever more complex systems including intelligence that approached what I have called the *Omicron Point*. This term is by analogy with the *Omega Point* postulated by Pierre Teihard de

Chardin (1964), defining the future goal that God has set for evolution. Both omicron and omega are letters of the Greek alphabet translated into ″O″ in the Latin alphabet, but omicron comes near the middle in alphabetical order, suggesting that the key point in history is not its conclusion, but an intermediate fulcrum around which history pivots.

Omicron is the point in history when intelligence first seriously asked the question of why the universe is conducive to its existence, with the cognitive capability of understanding ideas like the Argument from Design or the Anthropic Cosmological Principle. Unfortunately, if this theory is in fact correct, progress after the Omicron Point is not merely uncertain but unlikely. This is true because the specific time and place when and where omicron occurs is the result of random factors, and one consequence is that the coherence of the environment will degrade over time, but perhaps slowly. Socio-cultural conditions conducive to progress may degrade more quickly. But perhaps most crucial is that fact that natural selection from random chaos does not assure that any additional scientific discoveries or technological inventions will be possible, in addition to those required to reach omicron.

An example seemingly remote from identity expansion, but illustrating key principles, is the currently stalled state of human spaceflight. We simply do not possess the launch technology required for colonization of the solar system, and the other planets are so different from Earth that they would not be economical locations for colonies, an especially obvious point when we remember that Antarctica has research bases but no ordinary towns. Already in 1961, the upper stages of the Saturn I launch vehicle used the most energetic practical rocket propellants, liquid oxygen and liquid hydrogen. Serious research on nuclear engines for launch to orbit was ended in 1972, the same year as the last expedition to the moon, and environmental concerns would prevent any resurrection of this higher-energy propulsion method. Cancellation of the Space Shuttle program indicates that innovative engineering designs really cannot find successful ways to work around these natural laws.

The severe natural limitations on human space travel can be understood in the light of the Anthropic Principle. Precisely because extreme diversity of environments is a requirement for one of them to support life, a solar system is exceedingly unlikely to possess more than one habitable planet. For there to be two temperate Earths, they would need to be in similar orbits, which over time would have lead to gravitation-induced orbital instabilities, either causing

the two to collide, or moving them into very different orbits, both of which could not be at the right distance from the Sun to support liquid water and thus life. If the Earth were smaller and thus had weaker gravity, it would be easier to launch spacecraft from it, but the planet would be unable to hold a rich atmosphere for the hundreds of millions of years required for the evolution of intelligent life. Travel to other stars that might have habitable planets would be easier if they were closer, but then the chances would have increased that Earth would have been destroyed when our solar system collided with another. While there is much room for debate about the potential future of astronautics, these points are easy to understand, and they stress the difficulties science and technology will have more generally, sustaining progress far after the Omicron Point.

This returns us to a consideration of Converging Technologies, which can be seen as a vigorous attempt to keep progress moving forward, even in the absence of divine aid. Whether or not Eric Drexler's ideas were really influential in the development of nanotechnology, he is a good example of the issue. Earlier in his career he was highly active in the L-5 society, a visionary but technically competent movement to advance human settlement of outer space. The name L-5 came from the idea of building an orbiting city at the Lagrange 5 point in the Moon's orbit. Founded only 3 years after the last human expedition to the Moon, at first L-5's goal may have seemed feasible to many reasonable people, but hope does not really "spring eternal." In the 1980s, L-5 merged with the National Space Institute to become the National Space Society, and while some local groups continued to uphold the L-5 vision, this moderating merger reflected the inability of humans to undertake colonization of the solar system. Drexler shifted his creative energies to writing books about the potential for progress at the opposite end of the distance scale from the vastness of outer space, to the infinitesimal inner space where nanotechnology operates.

The 1959 lecture "Plenty of Room at the Bottom" by physicist Richard Feynman influenced Drexler, who was not a participant in the Converging Technologies conferences, and it may have inspired many participants as well (Bainbridge, 2007, pp. 35-41). The implicit meaning of Feynman's title concerns where science may find scope for new discoveries, new intellectual or physical territories beyond the current frontier of knowledge. Feynman listed a number of radical technological innovations that might be achieved on very small scales, including but not limited to the nanoscale which is conventionally defined as between 1 and 100 nanometers on at least one of its dimensions.

Once the US National Nanotechnology Initiative was established in 2000, two processes expanded its scope to create a general progress-oriented movement.

First, actual nanotechnology developments tended to be in three areas that connected to other fields. Feynman and Drexler had emphasized the idea of building nanoscale machines following the principles of large-scale mechanical devices, but relatively little progress was achieved in this subfield, both because it proved very difficult to form and assemble their parts, and because natural phenomena at the lower end of the nanoscale, notably van der Waals forces, operate against the functioning of wheels and gears. Thus pure nanotechnology tended to become a subfield of materials science, for example through research on nanoscale particles similar to fine powders and on thin layers of one material on top of another, such as the coating of computer disk drives that utilized the nanoscale principle called the *giant magneto resistance effect* to store more data in small areas. A second nano-relevant field was microbiology, because proteins and DNA consist of molecules of nanoscale dimensions. The third was information technology, especially when transistors and other electronic elements on solid-state chips were successfully engineered with dimensions less than 100 nanometers. Thus, around the year 2000 it was quite natural for experts in the field to think about the synergies that could be achieved by bringing together nanotechnology, biotechnology, and information technology, nano-bio-info or NBI as it could be called.

Second, in part because of the connection to biotechnology and potential medical applications of nanotechnology itself, great attention was given to the social and ethical implications of nanotechnology (Roco & Bainbridge, 2001, 2006a, 2006b). The issues could be as straightforward as the danger of release of large quantities of nanoparticles from industry into the environment, or as complex as the second-order unintended consequences of new human-centered nanotechnologies. It is worth noting that computer and information science has given less emphasis to social and ethical issues than have medical technologies and nanotechnology, and increased attention to potential harmful effect of information technology would be a logical consequence of its convergence with nano and bio. The website of the National Nanotechnology Initiative asserts:

An important component of responsible development is the consideration of the ethical, legal, and societal implications of nanotechnology. How nanotechnology research and applications are introduced into society; how transparent decisions are; how sensitive and responsive policies are to the

needs and perceptions of the full range of stakeholders; and how ethical, legal, and social issues are addressed will determine public trust and the future of innovation driven by nanotechnology.[1]

The first major NBIC conference, held at the National Science Foundation, produced a book-length report whose title explicitly stressed revolutionary possibilities: *Converging Technologies for Improving Human Performance* (Roco & Bainbridge, 2003, p. 3):

> At this unique moment in the history of technical achievement, improvement of human performance becomes possible. Caught in the grip of social, political, and economic conflicts, the world hovers between optimism and pessimism. NBIC convergence can give us the means to deal successfully with these challenges by substantially enhancing human mental, physical, and social abilities. Better understanding of the human body and development of tools for direct human-machine interaction have opened completely new opportunities. Efforts must center on individual and collective human advancement, in terms of an enlightened conception of human benefit that embraces change while preserving fundamental values.

Such sentiments imply that in future the social sciences would need to be integrated with nano, bio, and info, but already in 2000 it was obvious that a related field needed to be added immediately, namely cognitive science. This relatively new field is itself multidisciplinary, including inputs from neuroscience and artificial intelligence, and thus already connected to bio and info. While the wider NBIC convergence integrated the quartet nano-bio-info-cogno, the triad BIC is also a proper focus of attention, are the dyads bio-cogno and info-cogno. Indeed, the dyads mirror the two specializations usually treated separately in Transhumanism, human enhancement via biotechnology versus via information technology. Given that my own work focuses on the triad info-cogno-social, that is the territory of Converging Technologies I shall emphasize here.

3. Identity Expansion During Life

All forms of life affect their environments, and for tens of thousands of years humans have been creating objects that expressed their thoughts, whether chipping flint to made axe heads of a distinctive style, painting the walls of caves or even their own bodies, and eventually by writing words that can be

[1] http://www.nano.gov/you/ethical-legal-issues, accessed September 19, 2013.

understood centuries later. One of the best ancient examples is Julius Caesar, whose written words are still worth reading today, whose face is recognizably preserved in sculptures that basically agree with each other, and through deeds that for better or worse shaped the history of the world. Since the Renaissance, technologies have democratized personality preservation, through the printing press, sound and video recordings, and now the multi-media communications of Internet. Most significantly, modern information technology allows an individual to offload aspects of the self in realtime, not merely preserving them for posterity, but providing much greater scope for action during life. Potentially, each person can become a team, led by the biological person, but uniting multiple semi-autonomous intelligent agents that act as secondary selves cooperating while performing different tasks in parallel.

An appropriate if modest example comes from research I did in 1986 in the wake of the accident that destroyed the Space Shuttle Challenger (Bainbridge, 1991, pp. 75-81). At the moment of the disaster, I happened to be visiting at Jet Propulsion Laboratory, exploring the possibilities for a new research project related to the space program, and watched the catastrophic launch on NASA's direct video feed from Cape Kennedy, along with scientists and journalists who had gathered at JPL for the encounter of the Voyager II Space probe with the planet Uranus. I had done a pilot project developing a questionnaire asking respondents to rate 49 different justifications for the space program, and the Challenger disaster inspired a larger effort that led to a questionnaire in which 894 Harvard students rated 125 potential goals of space exploration. I had used the standard factor analysis method of computerized statistical analysis in the pilot study, to see how the 49 rather specific ideas clustered into larger concepts, each representing a general value that space exploration might serve. However, in 1986 I did not have access to computer software that could do a factor analysis on 125 variables at once, so it was necessary to write my own software, and I decided to do so in a somewhat distinctive manner.

I wrote a set of programs that would allow me to enter the data into my already outdated Apple IIe personal computer, calculate the 15,500 Pearson's r correlation coefficients between all pairs of goals, then rearrange the correlation matrix to find blocks of goals that clustered together. The algorithm for the last of these steps was based on work a decade earlier by Harrison White, one of my Harvard professors, called *block modeling* (White et al., 1976). For each of several runs, I would select a threshold criterion,

such as 0.50. Correlations range from -1.00 to +1.00, and with this criterion every correlation in the matrix of 0.50 or greater would be turned into a 1, and all the others into zeros. The program would then go through the same set of steps tens of thousands of times: (1) select two goals at random, (2) calculate X the total distance of all the 1s in the table from the diagonal, (3) imagine switching the position of the two goals in both rows and columns of the table, (4) calculate Y the new total distance of all the 1s from the diagonal, (5) if Y < X, do switch the positions of the two goals, otherwise, do not. This block modeling would go on for as much as 36 hours for each criterion I tried, on an admittedly slow computer even for 1986.

Note that I could have used many different algorithms, for example not replacing the correlation coefficients with 1s and 0s but multiplying each coefficient by its distance from the diagonal. But I had written the program in the way I wanted to, so it was an extension of myself, and even of my personal experience at Jet Propulsion Laboratory and as a student of Harrison White, as well as being an objectively competent research tool. The program and the Apple IIe then served as my semi-autonomous agent, working away according to my instructions, even when I was asleep. They were an extension of me, expanding my ability to do work. Of course, this is not a new principle, as even ancient farmers could rely upon their cows to eat grass and produce milk, even while the farmer himself napped in the shade of a tree. Yet because it is a computer-based example, it illustrates how humans will be able progressively to offload more and more of their work – and of themselves – onto increasingly intelligent machines as the years pass.

A wide range of examples exist today. Trading agents assist investors, from simply issuing stop-loss orders if the value of a security drops some amount specified earlier by the user, to more complex systems for buying and selling. In some massively multiplayer online role-playing games, such as *EVE Online* and *Fallen Earth*, avatars can continue to do work after the player has logged out. People who have rated movies on a recommender system like Netflix are constantly providing automatic advice to other Netflix customers, because the system uses their preferences through complex computations to advise other people who have rated some of the same ones, thereby simulating all the people who rated the movies. Even Google acts as a surrogate for thousands of people, because a main component of its automatic search algorithm is based on links to a given website manually placed by people on their own websites, thus

incorporating the judgments of webmasters whose own sites have found favor with many other webmasters.

Given the diversity of even this very preliminary list of examples, many quite different conceptual approaches can plausibly outline the future possibilities. Here I shall summarize the approach I took in my recent book, *Personality Capture and Emulation* (Bainbridge, 2014). It begins with consideration of two very traditional methods that sought to capture aspects of human personalities for scientific purposes, the culture and personality research carried out by a huge team of scientists at Harvard University over half a century ago, and the emergence of questionnaire-based survey research of public opinions that was evolving at many institutions during the same period of time. Bringing the narrative up to the present time, the book then examines massive questionnaires that may included thousands of questions, which becomes quite practical if they are administered online and through mobile devices, so that it is comfortable for users to answer the questions at odd times throughout the day, over a period of months, for example while waiting for a bus or otherwise lacking anything inherently interesting to do other than to enter one's opinions and feelings into a database.

Three pilot study examples demonstrated feasibility. In one study, 2,000 situations that might trigger one of 20 standard emotions were solicited through an online questionnaire and culled from online publications such as novels. Then a program was written from scratch for a pocket computer to administer 2,000 one-sentence statements describing the situations, which the respondent was asked to rate along a scale for each of the 20 emotions, resulting in fully 40,000 questions, which a test subject had no difficulty finishing during free time over a period of weeks. A second pilot study used an Android app to administer a 200-item standard psychology test online, through a system that provided immediate feedback to the respondents and automatically collated the responses from the more than three thousand people who completed the questionnaire within its first week. The test traditionally was used to measure the Big Five personality dimensions, but given the large number of respondents, the statistical relationships were so solid it was possible to identify fully 15 dimensions of personality. In the third pilot study, commercial intelligence test software was administered through a pocket game machine, the Nintendo 3DS, demonstrating how modern popular technologies can be adapted to radical purposes such as personality capture.

Other chapters explored the utility of recommender systems like the Netflix one, personalized expert systems, recording and reproducing personal autobiographic memories, natural language processing analysis of written text, and the use of online virtual worlds for both capture and emulation of personalities. All these studies were supported by references to the scientific literature, indicating how researchers working at the cutting edge in their fields are implicitly developing identity expansion technology, whether or not that is their goal. The book publisher is the same one that produced the most recent Converging Technologies report, and both can be obtained either electronically or on paper. An important indicator of the changing basis of human culture is the fact that 10 personality capture computer programs, used for several of the pilot studies in *Personality Capture and Emulation*, can be downloaded from the publisher's website for use by readers who wish to capture their own personalities. Progress in this field will require the creative energies of many scientists, engineers, and interested people in the general public, but they will experience payoffs every step of the way, as these new technological methods expand the scope of human action, awareness, and intellectual adventure.

4. Identity Transcendence

By any plausible demographic reckoning, most people who have ever lived are dead. Yet all their atoms still exist. Western religions tend to say that their souls migrated to an afterlife, while some eastern religions imagine they are periodically reincarnated, sans memories, in this world. But both assume that each person has a transcendent essence, call it the *immortal soul*, that can inhabit a physical body but is not limited to that form of existence. This is not merely a theological claim, that humans are like minor gods, but a way of conceptualizing the fact that our minds do not feel as if they were identical to our bodies. I suggest that this is a valid perception, but framed in primitive terms that may be considered obsolete in this post-modern age.

In a very real sense, a person is a dynamic pattern of information. Objectively, we are a particular configuration of atoms, not the atoms themselves. Subjectively, we are the data transmitted through our brain and wider nervous system, not the neurons themselves. Whatever value completely different conceptualizations may have, this one is in tune with our present era, in which every prosperous person owns a computer containing vast amount of

personally-relevant information, and often voyages out across Internet in one informatic form or another. If this conceptualization is factually correct, then the doctrine of immortal souls is not so much incorrect as it is primitive. An afterlife may exist, but in Cyberspace, not Heaven.

A different view emerged in the nineteenth century and is still developing today, based on evolution by natural selection from random biological variation. Existence consists of physical atoms distributed unevenly across space, and the atoms are sufficiently complex that some of them assembled through pure chance to form the basis of life. Most of the cosmos is dead, but on a very few rare planets like the Earth, primitive organisms evolved in the sea and eventually were complex enough to move onto the land. Within animal lineages, nervous systems evolved not with any intentional purpose, but as a result of the fact that they enhanced the survival and reproduction chances for the individuals who possessed them. Evolution is slow, and large populations have an evolutionary advantage because of their genetic diversity, so no one individual matters. The proper unit of analysis is the gene pool, a point made by Richard Dawkins in his popular book, *The Selfish Gene* (Dawkins, 1976; Strong & Bainbridge, 2003). Once very complex nervous systems had evolved, animals such as humans become aware of their own mortality, but the appropriate solution to the problem of death is reproduction, so that genes can live on in successive generations.

Yet another view has probably existed throughout history but was clearly articulated over the past couple of centuries. Humans are social beings. Without language we cannot think about issues of life and death, but languages were collectively constructed over hundreds of thousands of years in a social process. Thus, humans do not really exist as individuals but as societies. The best way for an individual to deal with death is to contribute so much to family, society and culture, that the deceased person will live on through the surviving people who benefitted from that person's actions. This may be what sociologist Émile Durkheim (1915) meant when he said that God is really a metaphor for society. It is certainly consistent with secularism and can supplement almost any religious doctrine.

We could call the evolutionary idea the *reproduction* solution to the problem of death, and the social one the *incorporation* solution, as a person surviving through good deeds becomes incorporated into the living community. Conceptualizing humans as dynamic patterns of information defines the *information* solution. None of these three requires supernatural

beliefs, and it would be philosophically consistent for a person who lacks faith to invest equally in the reproduction, incorporation and information solutions. That is to say, *convergence* of the three partial solutions is most practically effective and psychologically satisfying. At the present time, however, the information solution seems to offer the greatest potential for progress, so it is emphasized here.

Among the most controversial ideas is the intentional engineering of a new religious tradition promising immortality by means of interstellar delivery of digitized human personalities, perhaps using robots to colonize distant planets where traditional human bodies could be synthesized from DNA, or conceivably transmitting the data to extraterrestrial civilizations so that they can invite humans to dwell in the computers on their worlds (Bainbridge, 2011). Setting aside the myriad of technical challenges, the reason this idea is controversial is that religion is held sacred by believers, and thus universities do not teach religious engineering, when they logically could, applying the results of research in the psychology and sociology of religion. However, August Comte (1883), the founder of sociology, considered sociology itself to be a modern form of religion. Robert Geraci (2014) has studied the way Transhumanists have used the virtual world Second Life to achieve electronic transcendence, becoming a form of religion. At least one innovative religious ″cult″ that used electronic devices in its ministry has explicitly called its work ″religious engineering″ (Bainbridge 1978, p. 48). Giulio Prisco, a physicist and computer scientist, contributed a chapter on transcendent engineering to *The Transhumanist Reader*. He writes:

> I am persuaded that the ultimate realization of the dream of achieving an indefinite lifespan, with vastly enhanced cognitive abilities, lies in leaving biology behind and moving to a new, postbiological, cybernetic phase of our evolution. Mind uploading, the transfer of a human mind, memories, personality and ″self″ (whatever ″self″ is) to new high-performance substrates is the ultimate technology for immortality. Therefore I have always been interested in mind uploading and I consider it as the ″Holy Grail″ of transhumanism: let our minds break free of our biological brains and bodies, and we will be free to roam the universe and grow beyond limits as ″software angels.″ (Prisco, 2013, p. 235)

The radical transformation of human beings suggested by Prisco is not merely a wild attempt to transcend the current human condition, but a plausible method of overcoming the practical barriers to interstellar

spaceflight. We have no difficulty sending space probes throughout the solar system, even beyond, and many of them have survived for years in environments where biological humans would die in an instant. Evolution has produced our intelligence within the confines of the terrestrial biosphere, and now that natural intelligence can create very different forms of artificial intelligence, suitable for a range of alien environments. If interstellar travel goes at the speed of Voyager II, it will take 50,000 years to reach another solar system, which would require unusually long-duration technologies, but would not require impossibilities.

The unification of the reproduction, incorporation, and information responses to death naturally follows the principles detailed in all the Converging Technologies reports, most specifically the convergence of biology, social science, and information science, assisted by cognitive science and nanoscience. The latest report however transcended even convergence itself, through a theory of the *convergence-divergence cycle*. As the executive summary of the new report explains (Roco et al., 2014),

Convergence is actually part of a dynamic and cyclical convergence–divergence process that originates organically from brain functions and other domains of the global human activity system. This process can provide a structure and specific improvement methods for the creative-innovation-production chain. The convergence phase consists of analysis, making creative connections among disparate ideas, and integration. The divergence phase consists of taking these new convergences and applying them to conceptual formation of new systems; application of innovation to new areas; new discoveries based on these processes; and multidimensional new outcomes in competencies, technologies, and products.

In biological evolution, the convergence-divergence cycle is manifested in speciation. In a large and diverse gene pool, many genes come together in a general configuration that is inherently new or well-adapted to new environmental conditions, converging to produce a new species, manifestly different from the old species and soon becoming reproductively separate from it. Then, if the new species is especially successful, it will undergo adaptive radiation, a divergence into many offspring species. In modern information systems, a diversity of people input data, and the data converge into a collective database. As people use the system, the data are personalized during the output phase, representing a form of divergence. With these two examples in mind, one can wonder how the convergence-divergence cycle might function

on a grand scale, if humanity is able to spread its diverse yet interacting cultures out across immensity to the stars.

Conclusion

On balance, Transhumanists have expressed more radical views than most participants in the Converging Technologies movement. However, both movements are optimistic that we are not fast approaching the limits of scientific discovery and technological invention (cf. Horgan, 1996; Barrow, 1998). Especially at the Converging Technologies conferences, one heard the view that innovation will stall quickly unless we energize widespread enthusiasm for research and development, even if that progress faces steeply increasing investment costs. Only time will tell whether critics of the two parallel movements were right, that progress is coming inexorably to an end. Yet one of the best arguments for optimism is that pessimism is a self-fulfilling prophecy.

The most optimistic scenario would assume that both the Argument from Design and the Anthropic Principle are true, but for different periods of human history. The Anthropic Principle explains the past prior to the Omicron Point, by natural selection from random events. The Argument from Design explains the future after the Omicron Point, but in a novel way. God did not design the universe in the past, because he never existed. But having imagined the concept of god, we can play that role, creating a universe that has purpose. To accomplish that goal, we would first need to transform ourselves into gods.

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